

**MONROE TOWNSHIP MUNICIPAL UTILITIES AUTHORITY**  
**RULES AND REGULATIONS FOR**  
**PROPOSED WATER SYSTEMS**

**W:1 CONDITIONS REQUIRING AUTHORITY APPROVAL.**

Any developer shall be required to obtain approval for his development from the Authority. All property owners shall be subject to provisions of Chapter 126, Water Supply Systems, Public, of the Code of the Township of Monroe, New Jersey.

**W:2 DEFINITIONS.**

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

*Applicant:* Means a developer submitting an application for development (MLUL).

*Authority:* Means the Monroe Township Municipal Utilities Authority.

*Block:* Means an area delineated as such on the Tax Map of the Township of Monroe.

*Developer:* Means the legal or beneficial owner or owners of a lot or of any land proposed to be included in a proposed development, including the holder of an option or contract to purchase, or other person having an enforceable proprietary interest in such land. (MLUL).

*Developer, Original:* Means any developer or owner of a vacant lot who installs a sewer improvement pursuant to these Rules and Regulations to be owned by the Authority which improvement is installed larger and/or deeper in order to be capable of being utilized by other developers.

*Development:* Means 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 of any mining excavation or landfill; and any use or change in the use of any building or other structure, or land, or extension of use of land, for which permission may be required per the Municipal Land Use Law. (MLUL).

*Easement:* Means the right to use the land of another for a specific purpose.

*Equivalent Dwelling Unit:* Shall be defined as follows:

- a. Residential:
  1. Each single family dwelling or portion of a structure normally occupied by a single family.
  2. Each single family apartment dwelling in a multiple family structure or structures.
- b. Nonresidential:
  1. Other than residential: each commercial, industrial, professional, institutional, public, or other user not heretofore mentioned, one unit shall equal the average residential consumption per household as defined in N.J.S.A. 40:14B-21 and shown on the current rate schedule.

*House Service Connection:* Means the pipe and appurtenances between the Authority's street main and the individual curb stop, including the curb stop; it also includes the meter pit.

*Lot:* Means a designated parcel, tract, or area of land established by a plat, or otherwise as permitted by law, and to be used, developed, or built upon as a unit. (MLUL).

*Major Application – Water:* Means any commercial/industrial application or residential application which involves an extension of Monroe Township MUA water facilities and will connect more than 3 houses to the water system, or any application other than a minor application.

*Minor Application – Water:* Means a minor application is any residential application which does not involve an extension of Monroe Township Municipal Utilities Authority water facilities and which will not connect more than 3 houses to the water system.

*Original Developer:* See "Developer, Original."

*Plat:* Means a map of a development.

*Right-of-Way:* Means a strip of land occupied or intended to be occupied by a street, crosswalk, railroad, road, electric transmission line, gas pipeline, watermain, sanitary or storm sewer main, shade tree, or for another special use.

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

*Street:* Means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, or which is shown upon a plat heretofore approved pursuant to law, or which is approved by official action as

provided by the MLUL, or which is shown on a plat duly filed and recorded in the office of the county recording officer prior to the appointment of a planning board and the grant to such board of the power to review plats; and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines. (MLUL).

*Township:* Means the Township of Monroe, in the County of Middlesex, New Jersey.

### **W:3 SUMMARY OF REQUIREMENTS FOR SUBMISSION OF APPLICATIONS.**

#### **W:3-1 Preliminary Approval of Plans for Water Systems.**

- a. An applicant for preliminary approval shall be required to submit:
  1. Preliminary Application Forms
  2. General Plan (Paper and digital copies)
  3. Fees
  4. Preliminary Engineer's Report
    - (a) Design compliance with current N.J.D.E.P. Water Supply Element Safe Drinking Water Act Rules N.J.A.C. 7:10
    - (b) Design compliance with the Authority policy indicating potable water shall not be used for irrigation purposes.
  5. Wetlands Delineation by D.E.P.
  6. Attend Meetings (Major Applications Only)
  7. Taxpayer I.D. form W-9 (for deposits and escrow fees)

#### **W:3-2 Tentative Approval of Plans for Water Systems.**

- a. An application for Tentative approval is required when extending Authority facilities. An application for Tentative approval shall be required to submit:
  1. Tentative Application Forms
  2. Engineer's Cost Estimate
  3. Engineer's Report

- (a) Design compliance with current N.J.D.E.P. Water Supply Element Safe Drinking Water Act N.J.A.C. 7:10
  - (b) Design compliance with the Authority policy indicating potable water shall not be used for irrigation purposes.
- 4. General Map (overall water plan which shows hydrant(s) # and valves) Similarly, overall irrigation plan at a scale to maximize one 24" x 36" plan sheet.
- 5. Plan and Profiles
- 6. Specifications
- 7. Details of Construction (MTMUA has supplied standard details which have been already reviewed and approved; however, applicant may submit other details for review and approval).
- 8. N.J.D.E.P. BSDW Permit (if necessary)
- 9. N.J.D.E.P. Wetlands L.O.I. or Presence/Absence Letter
- 10. Fees
- 11. Attend meetings

**W:3-3 Application for Final Approval of Plans for Water Systems.**

- a. An applicant for final approval must submit:
  - 1. Final Application Forms
  - 2. Engineer's Estimate
  - 3. Engineer's Report
  - 4. General Map
  - 5. Plans and Profiles
  - 6. Specifications
  - 7. Details of Construction
  - 8. Deed of easements with separate map and metes and bound descriptions
  - 9. Copy of all required N.J.D.E.P. Permit(s)

10. D&R CC
11. Performance Guarantee
12. Fees
13. Attend meetings

**W:3-4 Approval of Plans by State, County and Other Agencies.**

- a. Prior to construction, an applicant must submit the following approvals where necessary:
  1. SCS
  2. County and/or Local Road Opening Permits

**W:3-5 Application for Individual Water Connections.**

- a. Where a service line and curb stop exist to the lot, an applicant for water connection must submit:
  1. Duplicate Application Form for Individual Connection
  2. Connection fee as per current rate schedule
- b. Where a service line and curb stop to the lot do not exist, an applicant must make a preliminary application and submit bonds, permits and applicable fees.

**W:3-6 Revised Applications.**

- a. An applicant for a revised approval shall be required to submit:
  1. Revised Application Forms
  2. Engineer's Cost Estimate
  3. Engineer's Report
  4. General Map

5. Plan and Profiles
6. Specifications
7. Details of Constructions
8. Fees
9. Revised Permits (if necessary)
10. Attend meetings

### **W:3-7 Irrigation Systems.**

It is the policy of the Authority that potable water shall not be used for irrigation purposes on any commercial or industrial property nor shall it be used in any residential development that requires a major subdivision. The developer of any major subdivision or commercial or industrial property shall be required by the Authority to at least install dry lines for a separate non-potable water system to provide for irrigation. Further, all developments shall be reviewed at the time of preliminary approval to determine whether or not it is feasible based upon the size of the development and the proximity to non-potable supply(s) to require the developer to install offsite improvements in order to provide a source of non-potable water for irrigation purposes within the development. (Revised 5-16-02)

PRC developments with homeowner associations shall own, operate and maintain irrigation system.

Developer shall make every effort to conserve water by utilizing storm water, drought tolerant grass and drip fed irrigation for trees and shrubs. Irrigation demand shall be supplied as part of the engineer's report. Demand shall be calculated assuming a requirement of 1" of irrigation water required per week. Developments shall be segmented into three boxes; irrigating 1/2" per day, twice a week.

### **W:4 APPLICATIONS TO THE AUTHORITY.**

- a. Preamble.
  1. Time for Submission.

All applications must be complete and submitted at least fourteen (14) calendar days before a regularly scheduled agenda meeting of the Authority. All items must be collated and packaged together

for each application. Application number, once assigned, shall appear on all subsequent documents submitted.

2. Incomplete Applications.

Should it be found upon review of any application that the application is deficient in any items as required above, the application shall be deemed to be incomplete and shall not be heard at the Authority meeting until all deficiencies are corrected. If, upon review of the plan submission, it should be determined that the plans or technical submissions are deficient in the requirements set forth herein, the application shall also be deemed incomplete. Resubmission of any plan which has been deemed incomplete must be accompanied with the required application number. Piecemeal submissions are discouraged. The Authority reserves the right to return incomplete applications.

3. Separate Application for Sewer System Required.

Each application for preliminary approval must also be accompanied by a separate application for Preliminary approval for a sewer system. All applications are to be signed by the applicant or an officer of the applicant. If the applicant is not the owner, the owner must also sign. The applicant or his representative should be present at the agenda meeting to discuss the application.

4. Concurrent Applications.

Concurrent submission of applications for two or more different stages (e.g. Preliminary and Tentative) of Authority approval on any project is discouraged, but may be requested prior to submission and may be approved, subject to the discretion of the Authority.

5. Expiration of Approvals.

Approved Preliminary applications will be null and void after a one-year period from the date of Resolution, approved Tentative applications will be null and void after a one-year period from the date of Resolution, and approved Final applications will be null and void after a one-year period if no construction takes place or after a two-year period if all work has not been completed. Date of approval is the date of the meeting at which the Authority grants its total or conditional approval of an application. Extension of approvals may be approved in accordance with Section 4-6 of these rules.

6. Unused Deposits.

Unused portions of deposits on approved applications that become null and void are refundable within two months after request in accordance with N.J.S.A. 40:14B-20.1.

7. Conditions of Approval.

Approvals are not deemed valid until all conditions of approval have been satisfied.

8. Payment of Expenses.

Applicants requesting special meetings of the Authority to consider their applications will be responsible for payment of all expenses which are incurred by the Authority (such as advertising costs, secretarial costs, attendance of staff members, attendance of professionals, etc.) in conducting such a meeting. The expenses for secretarial cost and staff members shall be at one and on-half times their hourly rate.

9. Reserved Capacities.

No capacity shall be reserved in the Authority's water system for any development until that development has received approval of its application for final approval as required by Section W:3-3 and all fees have been paid.

10. Drawing and Designs.

All drawings, design reports, specifications and estimates submitted by the applicant must bear the signatures and raised seal of the applicant's engineer.

**W:4-1 Application for Preliminary Approval of Plans for Water Systems.**

a. Preliminary Application Forms:

1. An application for preliminary review of the proposed water system for the proposed development shall be submitted to the Authority for a ruling on whether a comprehensive water system is required.
2. Information as to ownership. If applicant is a corporation or partnership, a list of the names and address of all stockholders or individual partners owning at least 10% of the interest in the



partnership as the case may be, as required by N.J.S.A. 40:55D-48.1 and 40:55DF-48.2.

3. The applicant is advised that no application will be made to the Authority for capacities exceeding 32,500 gpd or 100 units. The developer must enter into a written agreement with the Authority which defines the phasing of the project. (Revised 2-21-02; 1-16-03)
  4. This application shall be filed, in duplicate, on a form which may be obtained from the Authority.
- b. Preliminary Plans:
1. The applicant shall furnish two (2) copies of a general plan showing the location of the development in the Township with the location of the nearest Authority existing facilities in the area and a description of the proposed method of connection.
  2. Plans shall be of uniform size, 24" x 36".
  3. The plan shall be based on an acceptable survey and drawn at a scale of not more than two hundred (200) feet to the inch and be based on 1988 vertical datum, and shall contain at least the following information:
    - (a) Proposed development name, identifying title, or Block and Lot No.(s).
    - (b) Name and address of the owner of the tract.
    - (c) Name and address of the developer (if other than the owner).
    - (d) Name, address, and professional seal of person preparing plan.
    - (e) Information regarding proposed development (e.g. zoning information).
    - (f) Key map showing the location of the tract in the municipality.
    - (g) The location of that portion of the tract which is to be developed relative to the entire tract.
    - (h) The location of all existing sewers and watermains on the tract. Also indicated to the same scale as the rest of the plan shall be the proposed location and means of connection to the existing water or sanitary system and any required easements.

- (i) The general layout and number of all proposed lots.
  - (j) Proposed easements.
  - (k) Digital copies of the overall plan shall be submitted on compact disc and shall be consistent with New Jersey State Plan Coordinate System. Digital data shall meet or exceed NJDEP mapping and digital data standards.
  - (l) All lettering and numbers must be a minimum of 0.1".
- 4. An overall plan of the proposed application at a scale which maximizes a 24" x 36" sheet (include h, i, j). (a, b, c, d, e, f & g should be on a title sheet).
- c. Fees:

Fees as per fee schedule attached shall accompany the application.
- d. Preliminary Engineer's Report:

Provide calculations for expected water demand using N.J.D.E.P./RSIS standards. Provide fire flow requirements in accordance with NFPA code. For commercial applications, provide a letter from the insurance underwriter which defines the fire flow demand. See Section W:5-1, 3 (b) for additional requirements. As part of the review the M.T.M.U.A. will perform a computer Hardy-Cross analysis. If Hardy Cross model is not available, it is the applicant's engineer's responsibility to perform hydrant flow tests and certify that the existing and proposed system can meet the fire flow requirements. For non-residential applications give hours of operation. Provide sufficient information to enable the Authority's Engineer to determine if site can be served by water. If more than a year elapses between Preliminary and Tentative application, the hardy cross analysis must be re-done. (Revised 5-15-97)

Provide calculations of irrigation requirements based on 1" per week of irrigated areas.
- e. Attend Meetings:

In addition, the applicant should appear before the Authority at a regularly scheduled agenda meeting to discuss the application with the Authority. The purpose of the discussion shall be to establish the general guide lines to be followed by the applicant in developing the water plan for the project and to further define the project.

#### **W:4-2 Application for Tentative Approval of Plans for Water Systems.**

- a. These Rules and Regulations are consistent with N.J.A.C. 5:21, "Residential Site Improvement Standards". Any questions as to this consistency should be raised prior to approval of plans and specifications in order not to create delays or unsafe conditions in the field.
- b. Tentative Application Forms:
  1. If a water/irrigation system is required, the applicant must submit an application, in duplicate, for tentative approval on a form to be furnished by the Authority.
  2. The then current Water System Master Plan, with these Rules and Regulations, will govern the approximate sizes and location of mains, and places of connection.
  3. If the size of any watermain, as shown by the applicant's engineer, and checked by the Authority's Engineer, is inadequate for the future requirements of the area, or if the Authority requires facilities of greater capacity or head than that required by the applicant, the applicant shall install the larger facility or facilities if required to do so by the Authority.
  4. In condominium or co-operative developments, water shall be supplied by gang meter(s) servicing multiple units. In all other developments, individual connections shall be provided for each individual unit proposed. Each connection shall be provided with a curb stop 2' behind the curb line or edge of pavement or at the easement line.
  5. Where the Authority issues a conditional tentative approval, the applicant must make a resubmission including cover letter indicating how the conditions enumerated were satisfied.
  6. Where a proposed watermain passes conforming vacant lots or existing homes other than the applicant's proposed lots, it will be the applicant's responsibility to install the complete water services with meter pit to same vacant lots and/or homes.
- c. Engineer's Estimate of Construction Cost: (2 Copies)

Construction cost shall include, as a minimum, the following items where required: pipe, valves, fittings, fire hydrants, house connections, wet taps, thrustblocks, booster pumping stations, water storage tanks, treatment plants, disinfection, appurtenances, restoration of disturbed areas including existing roadways and easements, and preparation of as-

built drawings. Construction cost estimate shall reflect costs of the Authority's installation of the facilities.

d. Engineer's Report: (2 Copies)

1. A complete engineer's report, setting forth the basis of design, shall be submitted to the Authority for each project.
2. All watermains shall be designed to carry the peak hour flows, and, where fire protection is provided, the required fire demand plus the required domestic demand. Average daily consumption shall be calculated in accordance with current N.J.D.E.P. regulations.
3. For a Tentative application to be considered complete, the applicant must submit New Jersey Department of Environmental Protection (N.J.D.E.P.) wetlands delineation, mapping revision and BSDW forms where required.
4. Submit size of fire connection at watermain tie in and sprinkler head count.
5. The Authority will establish flow standards for any construction not included in the above.
6. Minimum size of watermains shall be 8" diameter.
7. Material used in construction of water DR 18 shall be ductile iron pipe, class 52 minimum or PVC, C-900. House connections shall be type K copper, 3/4 inch diameter minimum or PE, C-901, C-905, C-909. Each house connection shall include a curb stop, valve box assembly, meter pit and meter.
8. Larger size connections will be allowed as approved by the MTMUA Engineer.
9. In all cases during watermain installation a continuous 8 gauge tracer wire shall be installed under the pipe. The wire shall be taped to each pipe length. Wires shall be cad welded together and terminated in a separate "curb box" style box.

e. Overall Map of Entire Development.

Two copies of an overall map of the entire application shall be furnished, showing the water distribution system, valves, hydrants, booster pumping stations, pressure zones, required easements, number of units and water supply, treatment and storage facilities and irrigation system for the entire development and necessary off-site facilities and the location of that portion of the tract to be developed relative to the entire tract. Maps shall

also be supplied in digital format and be consistent with New Jersey State Plan Coordinate System.

f. Plans and Profiles of all Proposed Water Pipelines and Structures:

1. Two sets of paper drawings shall be submitted. Upon acceptance of the Tentative drawings, the applicant shall be required to submit a copy of the plans in accordance with the NJDEP mapping and digital standards.

2. The plans shall contain the following:

(a) General Information:

- (1) Proposed development name, identifying title, or block and lot no.(s).
- (2) Name and address of the owner of the tract.
- (3) Name and address of the developer, if other than owner.
- (4) Name, address and professional seal of person preparing plans.
- (5) Drawings uniform in size 24" x 36".
- (6) Drawings at a scale of not more than fifty (50) feet to the inch.
- (7) The smallest lettering size shall be .10 inch. (No Exceptions!)
- (8) Phases or section applying for and number of units.

(b) Site Information:

- (1) A key map showing the location of the tract in the municipality.
- (2) The location of any wetlands transition areas and flood hazard areas on the tract or within 50 feet of the tract.
- (3) Tract boundaries as determined from a legal description or engineering survey.
- (4) Existing contours of one (1) foot intervals on the tract. Datum, symbols and conventions shall refer to established USCGS elevations and standards based on 1988 vertical datum. Horizontal datum shall be consistent with New Jersey State plan Coordinate System. (NAD 83)

- (5) Locations of all existing buildings, streets, waterways, and other significant features.
- (6) Locations of all existing sewers, laterals, watermains, water services, culverts, fire hydrants, storm drains, catch basins, manholes, and other manmade features on and within three hundred (300) feet of the tract.
- (7) Locations of all existing and proposed easements and rights-of-way on the tract.
- (8) Results of boring logs and tests to indicate subsurface conditions on the tract including potential for acid soils and dewatering. Borings must be taken during the period January 1st thru April 30th unless approved by the MTMUA Engineer. Design Engineer's report to specify seasonal high water table. Soil boring shall be taken on centerline of pipe at 100 to 200 foot intervals except in rock 10 to 50 foot. Depth of borings below anticipated or preliminary pipe invert should be 5' or more to allow for latitude in final design affecting the invert elevations and to aid in the design of dewatering system(s) where needed. When soil borings indicate poor or unstable soils, boring depth will be to a necessary depth requisite for determining the kind of foundation such as bearing piles or replacing poor soil with other consolidating materials and in accordance with the Manual of Engineering Practice 8, ASCE.

(c) Planning Information:

- (1) Proposed location and dimensions of all roads, curbs, and sidewalks within and adjacent to the tract, with a notation as to the proposed widths of their rights-of-way.
- (2) Proposed location of all lot lines and front set-back lines. All lots shall be numbered and all lot lines dimensioned.
- (3) Proposed locations and widths of all easements (minimum 20') and rights-of-way to be established on the tract and the purpose for which they are to be established. Easements are to be avoided whenever possible.

- (4) Designations as to the proposed use of each lot and an indication of the types, location, and number of buildings and units proposed.
- (d) Engineering Information:
- (1) Proposed locations for all proposed watermains, valves, water services, curb stops, precast meter pits, fire hydrants, booster pumping stations, treatment lines, storage tanks, irrigation systems and lines, electric, telephone, gas, cable TV, storm and sanitary sewers, laterals, clean outs, and their accompanying manholes, inlets, culverts and appurtenances.
  - (2) Watermains to be constructed five feet from the curb, with four foot of cover including where mains cross gutters, with clearance of any utility crossing or obstruction by 18" minimum (sewer, gas, electric, storm sewer, etc.). Where 18" clearance is not physically possible, the space between the pipe crossing shall be chocked with 3/8" clean stone. In addition, where watermain crosses under sanitary sewer it shall be in the middle of one full length of sanitary sewer pipe. Where proposed watermains cross existing transite pipelines, the transite pipe shall be removed from joint to joint to virgin ground 1-1/2 feet minimum beyond the proposed watermain trench's angle of repose and replaced with class 52 DIP using Mueller solid repair sleeves or approved equal, or as directed by the Authority's Engineer. Note that existing watermain shut downs must be coordinated 48 hours in advance with Authority's water department personnel.
  - (2a) If the watermain crosses below a storm or sanitary sewer, if the clearance is between 2-6", an arch cradle storm to protect water is required. If clearance is less than 2", utilize compressible fill or foam to cushion watermain.
  - (3) Where the proposed watermains are located parallel to proposed or existing sanitary sewers, they shall have a parallel clearance of 10' minimum. All watermains shall be located 5' off the curb face or edge of pavement unless otherwise directed by the Authority's Engineer.

Where tight clearances between property line sidewalk and curb or edge of pavement exist, the applicant will be required to use special fittings in hydrant locking tees, etc. to position hydrant between proposed curb and sidewalk.

- (4) Pipe sizes, types and strength classifications.
- (5) Benchmarks, referring to established USC&GS monuments, shall be permanently established for the area and shall be set at all supply, treatment and storage facilities. Each application must be verified to a USC&GS monument, not to an elevation established by a previous application.
- (6) Spot elevations to the nearest 0.1 foot.
- (7) Finished first floor elevations at each unit.
- (8) Proposed contours of one (1) foot intervals for the whole tract.
- (9) Storage shall consist of an elevated tank and shall be constructed of steel to AWWA D-100-84 standard or latest revision thereof.
- (10) Gradients, lengths, sizes, materials, and strength classifications of all pipes. Top of pipe elevation at all high points, low points, changes in grade, and at all fittings.
- (11) Clearances between any pipe crossings with top of pipe and bottom of pipe elevations labeled.
- (12) Standard drawing scales (ex. 1" = 50' Horizontal, 1" = 5' Vertical) on each sheet.
- (13) Sheets numbered consecutively.
- (14) An index location plan of the streets shall also be shown on the upper right hand corner of each sheet with shading indicating location of current section.



- (15) Plans for water supply, treatment, storage facilities or the like shall include a general site plan with property boundaries and site contours, proposed structures, wells, pumping stations, treatment plants and/or storage facilities with capacities, proposed mechanical and piping plans, electrical plans, and underground piping and underground and overhead wiring and other details necessary for review of the proposal. Automatic on-site standby power facilities shall be provided. A flow diagram shall be included for treatment plants. The details of all storage facilities shall include tank dimensions, minimum water level and overflow level, capacity, foundation, piping, valve pit dimensions, etc. The detail plans for wells shall show the depth, size and construction of each well. The ground strata through which the well is to be driven shall be shown in cross-section.
- (16) The method and equipment proposed for applying chlorine shall be clearly indicated. If treatment beyond chlorination is required the plans shall show details of each unit of the works, the method of applying chemicals, master meter, piping and valves, etc.
- (17) Individual connections provided for each family dwelling shall be supplied with a curb stop and meter pit. Meter pits shall be located between the sidewalk and the property. When the proposed watermain is in the following locations:
- (i) Under or adjacent to sidewalks.
    - [a] Curb stop on same side of watermain shall be located between sidewalk and property line.
    - [b] Curb stop on opposite side from watermain (across street) shall be located 2 feet behind curb line or edge of pavement.
  - (ii) Between R.O.W. line and pavement edge or curb only with no sidewalk present:
    - [a] Curb stop and meter pit on same side of watermain shall be located

between watermain and property line.

[b] Curb stop and meter pit on opposite side from watermain (across street) shall be located 2 feet behind edge of pavement or curb line.

(iii) When watermain is located within easement R.O.W.:

[a] Curb stop and meter pit shall be located at the easement line both sides.

(iv) In all conditions mentioned above, services with curb stops shall be designed and constructed leaving the mainline at 90°.

(18) The plans and specifications must indicate provisions for landscaping, paved roads, fences, driveway(s) and walkways. All landscaped berms must be shown on the drawings.

(19) Where there appears to be a conflict of grade between watermain and storm sewer, storm sewer/watermain junction chambers will not be allowed. The applicant may raise the grade of the site to allow for proper clearances.

(e) Facilities Outside the Township.

In the event that a proposal involves use of a water supply system lying entirely or partially outside of the Township limits, submission shall include comprehensive plans of all mains, treatment works, pumping stations, and all connecting appurtenances of the interconnection.

(f) Easements.

(1) Easements are to be avoided wherever possible.

(2) All required easements to be deeded to the Authority shall be clearly indicated on the drawings. Easements shall be unencumbered and restricted to water and sewer utilities only and shall be a minimum of twenty (20) feet.

- (3) Description of easement shall be metes and bounds. The description shall be in the form of a map and metes and bounds description. The POB (point of beginning) shall be tied to an existing surveyed point, bearings and distances should be described in words and numeric characters. All turning points shall be labeled with their corresponding N.J. State Plane Coordinate (northing, easting) consistent with NAD '83 horizontal datum. Where watermains are not installed in accordance with the approved plans, the MUA may require additional easement width or require the applicant to re-lay the watermain in the correct location as per the approved plans.
- (4) Where water lines are to be installed in streets which will not be dedicated to the Township of Monroe, the County of Middlesex or State of New Jersey, the easements width shall be the entire width between the curb lines including 10 additional feet on both sides or as required by the MUA. A deed in recordable form satisfactory to the Authority shall be submitted with application for final approval (see Section W:13j, Deed of Easement). For above ground installations, a fee simple title is required.

g. Specifications for the Construction of Water Facilities.

Two copies of complete specifications for the construction of the proposed water system and appurtenances, including lines, wells, booster stations, tanks and treatment plants, shall accompany the plans. They may be omitted for watermain extensions, provided that approved specifications for the water system are already filed and reference is made to them in the application and on the drawings.

h. Details of Construction.

Two copies of details of fittings, blowoffs, wet taps, insertion valves, hydrants, thrust blocks, etc. shall accompany the plans. Details shall be drawn to standard scales to show clearly the nature of design.

i. Fees.

The proper review fee for review of the application shall be based on the latest review fee schedule.

j. Attend Meetings.

The applicant should appear at a regularly scheduled Authority agenda meeting for discussion of the project.

#### **W:4-3 Application for Final Approval of Plans for Water Systems.**

a. Application to Authority.

1. Final Application Forms:

Upon notification by the Authority that tentative approval has been given to the proposed water system with its appurtenances and that all conditions of Tentative approval have been satisfied, including applicable approved NJDEP permits, the applicant may file an application for Final approval of plans and specifications.

This application will be filed, in duplicate, on a form furnished by the Authority.

2. Engineer's Estimate of Construction Cost:

Four (4) copies of the approved Tentative Engineer's estimate.

3. Engineer's Report:

Four (4) copies of the approved Tentative Engineer's report.

4. General Map:

Four (4) copies of the approved Tentative overall map, marked "Final".

5. Plans and Profiles:

Four (4) copies of the approved Tentative plans and profiles, marked "Final" clearly labeling pipe sizes and shading areas which require easements.

6. Specifications:

Four (4) copies of approved Tentative specifications, marked "Final".

7. Details of Construction:

Four (4) copies of the approved Tentative details of construction, marked "Final".

8. N.J.D.E.P. Construction Permit:

- (a) Where required, under the current N.J.D.E.P. Water Supply Element Safe Drinking Water Act Rules, N.J.A.C. 7:10, two certified copies of the N.J.D.E.P. permit to construct the facilities shall be filed with the application for final approval. Permit shall be obtained by applicant.
- (b) Other permits (Conrail Crossings, Utility Licenses, Rights of Entry, D&RCC permits, etc.) as necessary shall be required as part of a complete Final application.

9. Performance Guarantee:

Performance Guarantees shall be in a form acceptable to the Authority's attorney and shall be in the amount of one hundred twenty (120%) percent of the total construction cost as defined under "Engineer's Estimate of Construction Cost". It shall be furnished guaranteeing complete construction within the time period to be specified by the Authority and further guaranteeing that said construction will be in accordance with the Rules and Regulations of the Authority, and the Plans and Specifications, Engineer's Report and Cost Estimates as approved by the Authority. The guarantee may be either:

- (a) 10% cash and 90% acceptable bond or Letter of Credit or
- (b) 100% Letter of Credit or cash

10. Fees:

- (a) Application fees shall be based on the latest fee schedule.
- (b) Review fees shall be based on the latest fee schedule.
- (c) Inspection fees shall be based on the latest fee schedule.

For those developments for which the reasonably anticipated inspection fees are less than \$10,000, fees may, at the option of the developer, be paid in two installments. The initial amount deposited by a developer shall be 50% of the reasonably anticipated fees. When the balance on deposit drops to 10% of the reasonably anticipated fees because the amount deposited by the developer has been reduced by the amount paid to the Staff Engineer for inspection, the developer shall deposit the remaining 50% of the anticipated inspection fees. For those developments for which the reasonably anticipated fees are \$10,000 or greater, fees may, at the option of the developer, be paid in four installments. The initial amount

deposited by a developer shall be 25% of the reasonably anticipated fees. When the balance on deposit drops to 10% of the reasonably anticipated fees because the amount deposited by the developer has been reduced by the amount paid to the Staff Engineer for inspection, the developer shall make additional deposits of 25% of the reasonably anticipated fees. The Staff Engineer shall not perform any inspection if sufficient funds to pay for those inspections are not on deposit.

- (d) Connection fees (as set forth in the Authority's current Rate Schedule) shall be applied as follows:
- (1) In the case of real estate developers the connection fees for the development shall be payable at the time of final approval.
  - (2) In any development of more than ten (10) but less than forty (40) units, connection fees for twenty-five percent (25%) of the units shall be payable at the time of final approval with the balance of connection fees payable in advance of actual connection.
  - (3) In any development of more than forty (40) units, connection fees for the first ten (10) units shall be payable at the time of final approval with the balance of connection fees payable in groups of ten (10) units at a time in advance of the actual connection.
  - (4) For uses other than residential, connection fees (as set forth in the Authority's current rate schedules) shall be calculated by using the Engineer's estimate based on N.J.D.E.P. Standards of water average daily flow, and dividing it by the Equivalent Dwelling Unit (E.D.U.) and multiplying the E.D.U. by the connection fee amount set forth in the schedule.
  - (5) If a non-residential applicant wishes to estimate usage based on other than DEP standards, the Authority may permit it, provided the applicant enters into a written agreement allowing the Authority to monitor the actual flow and assess additional connection fees at the then current rate for increases in flow above the original estimate.

- (6) Residential flow will be calculated in accordance with the Residential Site Improvement Standards ( 5:21-5).

11. Easements:

For all lands other than public right of ways, Deeds of Easement fully executed in accordance with Section W:13j, Deed of Easement, shall be submitted. They shall be accompanied by metes and bounds descriptions with drawings signed and sealed by a licensed land surveyor. All easements will be recorded by the MTMUA, not the applicant.

12. Attend Meetings:

The applicant should appear at a regularly scheduled Authority agenda meeting.

**W:4-4 Application for Individual Water Connections.**

- a. Property owners desirous of making connection to existing watermains, shall file an application for water connection with the Authority on a form furnished by the Authority. This application shall be accompanied by the appropriate connection fees as set forth in the Authority's current rate schedule. The applicant shall also be responsible for the cost of the meter, meter pit and wet tap which will be paid in full prior to the completion of the connection. Connections 2" and under shall be made to an existing street main only by the Authority at the expense of the applicant. Excavation and backfill shall be provided by the applicant. Connection to the watermain shall be made in accordance with the Authority's Construction details, Appendix A, as amended.
- b. A house service connection shall be defined as the pipe and appurtenances between the Authority's street main and the individual curb shutoff, including the curb stop and box, meter pit and meter as required.
- c. Connections beyond the curb shutoff assembly are under the jurisdiction of the Township Construction Office through its Plumbing Inspector whose approval will be required before the Authority will allow the service to be turned on.

#### **W:4-5 Revised Application.**

Whenever there is substantive change in the configuration of the system and/or revision of the road pattern, and/or any offsite change related to the project or section proposed, then a revised application of approval is required.

#### **W:4-6 Application for Extension of Approval.**

If an approval has become null and void as per Section W:4., the applicant may apply for an extension of approval. He shall attend the M.T.M.U.A. meeting to explain the reasons necessitating an extension.

### **W:5 DETAILED INFORMATION ON DESIGN AND CONSTRUCTION OF WATER SYSTEMS.**

#### **W:5-1 General Criteria.**

- a. The following requirements are to be considered requirements for the design and construction of water systems. All references to standard specifications A.W.W.A., A.S.T.M., A.S.A., N.J.D.E.P. Water Supply Element Safe Drinking Water Act Rules, N.J.A.C. 7:10, and the like, shall be to the latest revision thereof. Regardless of size of development, the distribution system shall be capable of supplying the necessary domestic flow and fire protection or peak hour flow, whichever is greater.
  1. Distribution System and Appurtenances.
    - (a) The design and construction of the water distribution system shall be based on the current N.J.D.E.P. Water Supply Element Safe Drinking Water Act Rules N.J.A.C. 7:10.
    - (b) In the design of the water distribution system, a C=100 frictional index based on the Hazan and Williams formula shall be used.
    - (c) Where practical, hydrants shall be located wherever possible at each street intersection and shall be so distributed that in no instance shall hydrant spacing be such that a house is more than 400 feet from a hydrant measured along paved roads. Air release valves shall be provided at all high points and sediment blowoffs at all low points in the system when hydrants are not located at these points.



- (d) The design of the distribution system shall be based upon the required domestic flow as per 5:21-5.2 plus the fire demand or peak hour flow, whichever is greater. Peak hour flow shall include irrigation demands, which must be submitted as part of the application. The Hardy Cross method or an equivalent method shall be used in balancing loops. As part of the review, the Authority will analyze the distribution system for improvements necessary to keep all points in the system above 20 psi.
- (e) The minimum size of watermains shall be eight (8) inches. Minimum depth of cover shall be four (4) feet from the top of the pipe to the proposed finished grade.
- (f) Distribution mains shall be inter-connected into closed loops so that the supply may be brought to the consumer from more than one direction for safe, adequate and reliable service which will require 3 valves at every tee, and 4 valves at every cross. Wherever a wet tap is installed an insertion valve will be required on the existing main on the side of the wet tap opposite from the supply side of the system or both sides as required by the MTMUA Staff Engineer. Where dead ends are unavoidable they shall not be permitted with more than 20 homes served permanently, or no more than 50 dwelling units temporarily. All dead end lines shall be provided with a means of flushing. Hydrants shall be located at the ends of lines providing fire protection. Valves of full line size shall be provided at ends of all dead end lines, since those lines may be extended in the future.
- (g) Valves shall be located on distribution mains such that not more than one quarter mile of pipe shall be out of service. Line valves shall be provided such that not more than one hydrant is taken out of service by a main break. At street intersections, valves shall be located in line with property lines for ease in finding in the event of a break. Horizontal valves with bypass valves shall be furnished on 16" mains or larger and so indicated on the plans. All valves on PVC pressure pipe (including those in hydrant run-outs) require anchorage against thrust created when valve is closed consisting of two ½" anchor rods embedded in 3000 psi concrete poured to the limits of each valve bell and 12" deep into pocketed out earth key.
- (h) An approved air release valve in a pit shall be located at all high points in a distribution system, with proper means of

drainage provided. Similarly approved sediment blowoffs will be located at all low points. Tangent tees on watermains 10" and larger will be required as blowoffs or air releases where hydrants are used.

- (i) Pressure reducing valves in suitable precast concrete vaults shall be installed where required by the Authority. Bypasses shall be included.
- (j) Easements to the Authority for watermains shall be unencumbered and restricted to water utilities only and a minimum of 20 feet wide. The pipe shall be centered with the easement to allow sufficient room for maintenance or installation of future pipe.

## 2. Storage Tanks.

- (a) Storage in elevated tanks shall have a total effective capacity which, when combined with pumping capacity, shall be at least equal to the fire demand flow plus the maximum day consumption, or meet the peak hour demand requirements, whichever is greater. The overflow levels in all elevated storage tanks shall be 300 feet above MSL.
- (b) A double acting altitude valve in a precast concrete vault with a bypass lines shall be used for water level control in elevated storage tanks.
- (c) Hydro-pneumatic systems will not be accepted.
- (d) Booster pump stations shall include appropriately sized pumps, motors, controls, superstructure, and bypass piping.

## 3. Water Supply.

- (a) The average daily, maximum daily and peak hourly water demand rates for residential, commercial, industrial and institutional areas shall be considered separately in the computation of the total system demand and the quantities to be added shall be determined by the applicant and approved by the Authority.
- (b) Fire protection shall be furnished for any development. In any event, the applicant shall provide the required fire flows in all areas in addition to the maximum daily requirements. Residential fire flow requirements are based

on spacing between residential units as per AWWA M31 "Manual of Water Practices - Distribution System Requirements for Fire Protection, ISO Method on pages 3-9 and are as follows:

Distance Between Buildings ft.	Needed Fire Flow gpm
Over 100	500
31-100	750
11-30	1000
Less than 11	1500

In the event that the design peak hour demand flow rate exceeds the maximum day consumption plus the fire flow rate, the system shall be designed for the greater rate.

For commercial/industrial applications, the applicant shall obtain fire demand from the Insurance Underwriter via a letter indicating fire demand requirements or from the fire official based on minimum fire flow requirements for representative structures and locations in the municipality or fire district or a qualified, licensed professional engineer. The fire flow requirements are based on estimates of the number of hose streams required at a given location for unprotected structures and facilities and the sprinkler demand plus hose stream allowance for sprinkler protected properties unless a reduced pressure backflow preventer is provided.

- (c) All residential, commercial or industrial buildings shall have a meter pit located at or near the curb, preferably in a non-H<sub>2</sub>O loaded area. Meter pit shall be designed by applicant's engineer and submitted prior to approval. Pits shall be provided with remove-ready devices. Wire will be provided by the Developer's contractor and shall be 6 conductor 20 AWG cable, 300V/105EC. PVC insulated, tinned copper stranded conductors, sunlight resistant PVC jacket with nominal O.D. 0.15 to 0.26 inches. For runs longer than 50 feet and up to 100 feet, or for industrial pit applications, use foil or braided shielded cable. Belden cable number 201001806 or approved equal shall be used. Location of this point (if required) shall be coordinated with the MTMUA Staff Engineer during design phase of application.

- (d) Where the danger from backflow presents a health hazard at cross connections to potable water systems or where fire suppression systems exist, a reduced pressure zone backflow preventer with detector check assembly is required.
- (e) All others shall be double check valve backflow preventers with detector assembly. Where any physical connection and cross connection with a potable water system occurs, it shall be designed in accordance with N.J.D.E.P. Water Supply Element Safe Drinking Water Act Rules, N.J.A.C. 7:10.

#### **W:5-2 Construction of Wells.**

Wells shall be sited and constructed in accordance with N.J.D.E.P.-BWA and BSDW regulations in effect at that time.

#### **W:5-3 Construction of Treatment Plants.**

- a. No general rules can be formulated for the design of treatment plants and each case will be considered individually based upon the raw water quality. The type and method of treatment must be approved by the New Jersey State Department of Environmental Protection.
- b. Treatment plant plans and specifications must include provisions for lawns, shrubbery, paved roads and sidewalks. Plants shall be architecturally compatible with the surrounding environment.
- c. The entire property must be surrounded by a seven foot chain link fence with full pipe supports.
- d. Separate gates must be provided for pedestrian and truck use.
- e. Detailed estimates of operating and maintenance costs of the proposed treatment plant must be submitted with the engineer's estimate.
- f. Automatic emergency standby electrical power must be provided.
- g. All water shall be disinfected using a sodium hypochlorite injection system before it enters the distribution system and shall have a chlorine residual of 0.2 ppm throughout the system.

- h. All standards of U.S. Public Health Service applicable to protection of the water sources, wells, watermains, equipment and treatment works shall be met in the design of treatment plants.
- i. The finished water shall meet, in addition to the standards set forth here in Subsection W:5-1a,3, Water Supply, above, all other potable water standards adopted by the State of New Jersey, Department of Environmental Protection and U.S. Environmental Protection Agency.
- j. Adequate light, ventilation, heat, incoming electrical service transient voltage surge suppression, telemetering system (see Section W:5-4) and potable water supply shall be provided at the plant. Complete repair and operating tools and accessories shall be provided with the treatment facilities and wells.
- k. Treatment facilities shall be so designed to produce water after treatment that is uniform and of a quality, which meets or exceeds all Federal, State, County or local requirements.

#### **W:5-4 Construction of Booster Pumping Stations.**

- a. General Information.
  - 1. At least one pump, plus a back-up pump shall be provided, each capable of handling the total ultimate peak flow. The pump motor shall be 3 phase 460 volt with reduced voltage starters.
  - 2. An auxiliary generator (natural gas where available, diesel otherwise) shall be provided for electrically driven pumps. The generator shall be sized to start the second pump with the first pump running and with accessory equipment on line.
  - 3. Automatic start and transfer provisions shall be included.
  - 4. Minimum pipe size in pump stations shall be 6 inch diameter.
  - 5. All pump stations shall be housed in a superstructure conforming to the neighborhood architecture and shall be vandal proof.
  - 6. All facilities shall be designed for ease of maintenance. Sump pump, dehumidifier and hoist provision shall be included.
  - 7. Automatic sound alarms shall be installed independently of station power and shall give warning of high and low pressure and power failure both locally and remotely by telemetering the alarm to the Authority offices.

8. The applicant shall provide and install at his expense a telemetering system matching existing systems used by the MTMUA at other sites, consisting of the following components:
  - (a) Solid state electronic flow transmitter as manufactured by RACO, Model Verbatum #VSS-8C with 4 Channel Analog
  - (b) Direct acting 12" circular flow recorder using linear weekly charts.
  - (c) Remote terminal unit (RTU), Model VSS-8C by RACO.  
Adequate light, ventilation, heat and fresh water supply shall be provided.
  - (d) Voltage Surge Protection and incoming electrical service transient voltage surge suppression.
9. Complete repair tools, manufacturers' recommended spare parts and accessories shall be provided with the pumps.
10. Pumping station plans and specifications must include provisions for crushed stone ground cover, shrubbery, paved roads, and the entire facility must be surrounded by a seven foot chain link fence with full pipe supports. A truck gate must be provided. All pumping stations shall be located in areas that are not subject to flooding and that are accessible by motor vehicle.

b. Facilities.

Adequate light, ventilation, dehumidification, actual fresh water supply with hose outlets downstream of a reduced pressure backflow preventer shall be provided at all stations.

1. Detailed Estimates.

Detailed estimates of operational costs of the pumping station must be submitted with the Engineer's estimate. Alternate pumping stations where appropriate due to low flows will be considered by the Authority.

2. Incoming Electrical Service (Transient voltage surge suppression).

System voltage surge protection shall be by Liebert Interceptor series or approved equal whose size (model #) shall be determined by a professional electrical engineer based on number of life cycle surges per mode and phase with the following characteristics:

- (a) Noise Attenuation: the filter shall provide insertion loss with a maximum of 60 dB from 100 khz to 100 mhz per 50 phm insertion loss methodology from MIL 220A.
- (b) Dual Form C Contacts: the specified system shall have two sets of electrically isolated form C dry contacts, one normally open, and one normally closed for remote monitoring.
- (c) Overcurrent Protection: all components are individually fused and rated to allow maximum specified surge current capacity. For every 100 ka of surge current capacity, 120 amps RMS of internal fusing shall be provided.
- (d) Life Cycle Testing: the system shall be duty life cycle tested to survive 10 ka, 20 kv, 1EEE C 62.41 category C3 surge current with less than 5% degradation of clamping voltage. The minimum number of surges the unit shall be able to protect against. (See table below:)

# of Life Cycle Surges per Mode		# of Life Cycle Surges per Phase	
L-N	L-G	N-G	(L-N+L-G)
3,000	3,000	3,000	6,000
6,000	6,000	6,000	12,000
9,000	9,000	9,000	18,000
12,000	12,000	12,000	24,000

- (e) Enclosure: The TVSS shall be provided in a heavy duty NEMA 12 dust – tight, drip – tight enclosure with no ventilation openings. The cover of the enclosure shall be hinged on the left side with a drawing pocket provided inside the door for storage of drawings and manuals. All monitoring indication will be visible without opening the door. The enclosure dimensions vary according to specific model number (maximum dimensions shall be 30 X 24 X 9).
- (f) Modes Of Protection: All modes shall be provided, Line to Neutral, or Line to Line, Line to Ground, and Neutral to Ground (where applicable).

- (g) UL 1449 Ratings: The maximum UL 1449 listed surge ratings for each protection mode shall not exceed the following in any mode of protection:

System Voltage	Without Disconnect	With Disconnect
120/208 or 120/240	400 V	500 V
208, 240, 277, 230/400, or 277/480	800 V	1000 V *(800 V)
346, or 346/600	1200 V	1500 V
480	1500 V	1500 V
600	2000 V	2000 V

- (h) Agency Listing: All TVSS devices shall be UL 1449 listed and labeled, UL 1283 listed and labeled, and CSA listed. Control Concepts/Liebert is also company certified ISO 9001 for manufacturing, design, and service.
- (i) Warranty: A full five year, on site, parts and labor warranty.
- (j) Integral Fused Disconnect: The specified system shall include a 300 KAIC integral fused disconnect switch located in line with the system enclosure with an external manual operator. The switch rating is as follows:

Amp Rating
40 Amps
40 Amps
80 Amps
100 Amps

- (k) Audible Alarm: The specified system shall be equipped with an audible alarm that shall be activated when summary alarm contacts are activated. An On/Off switch shall be provided to silence the alarm and an alarm push-to-test switch shall be provided to test the alarm function.



A visible LED will confirm whether alarm is on or disabled. Both switches and audible alarm will be located on the unit's front cover.

- (l) Single Transient Counter: The specified system shall be equipped with a single, adjustable transient counter. The single counter shall total transients that occur in the common mode. The counter will be located on the unit's front cover and features a seven digit LCD, a lithium battery (with 10 year life), and a reset switch.
- (m) Dual Transient Counters: The specified system shall be equipped with two, adjustable transient counters which total transient surges in both normal and common modes. The counter will be located on the unit's front cover and features a seven digit LCD, lithium batteries (with 10 year life), and remotely located reset switches.
- (n) Remote Monitor Panel: The specified system shall include a self contained, UL Listed, monitoring panel. Input power to the monitoring panel shall be equipped with a 6 foot power cord with a 3 NEMA 5-15 plug. The monitor shall have an audible alarm, red and green LED's, silence switch, and a test switch.
- (o) Reduced Voltage Starters: Shall be furnished including all labor, equipment, material and incidentals necessary to install completely and make ready for operation, two (2) reduced voltage solid state starters as required for the operation of (2) sewage pumps and motors. This shall include all logic, wiring and interfacing with other control components and systems.
- (p) Ground And Lightning Protection: Furnish and install grounding systems complete in accordance with the minimum requirements established by the NEC, NFPA, and as shown on the drawings. In addition to the NEC requirements the following shall be permanently and effectively grounded.
- (q) Building electrical equipment:
  - (1) Equipment grounding shall be made between ground pads and system ground grid.
  - (2) The lightning protection system shall be installed on the highest portions of the structure and as shown on the drawings.

- (3) The system shall consist of air terminals, roof conductors, down conductors and shall be in accordance with the National Fire Protection Association lightning code, ANSI C5.1 and shall bear the master label of UL.

#### **W:5-5 Construction of Meter Pits for Gang Meters.**

Meter pits shall be constructed of precast or poured in place reinforced concrete containing all valves, piping, doors, excavation, backfill, bedding, miscellaneous metals, wall sleeves, installation of remote sensor in Bilco door, and "remote" sensor wiring to the dimensions shown in the attached detailed drawings, and constructed in accordance with current N.J.D.E.P. Water Supply Element Safe Drinking Water Act Rules, N.J.A.C.7:10. All sub-grade structures must be capable of withstanding an H-20 loading if in an anticipated traffic area.

#### **W:5-6 Irrigation Systems.**

No general rules can be formulated for the design of irrigation systems, therefore each case will be considered individually based upon supply availability and site conditions. Meter Pit Mueller/Hunt shown on detailed drawing, Appendix B. (Revised 8-21-03) Pressure PVC pipe shall conform to C-900, C-905, DR-18. Pipe shall be purple in color and shall be clearly labeled, "Not for potable use – do not drink".

#### **W:5-7 Specifications.**

- a. General.
  1. The applicant's contractor shall provide all labor, pipe, fittings, gaskets, copper trace wires, accessories, and other materials, equipment, special services, and all else necessary to furnish, install, and provide complete, in place, all watermains and appurtenances as required by the plans and specifications or as required in order to fulfill the intent of same. All work and materials shall conform to the requirements of the Utilities Authority Rules and Regulations.
  2. This specification includes the construction of watermains and appurtenances at the locations shown on the plans and shall include performing all operations in connection with the installation of all pipe, fittings, adapters, gate valves, valve boxes, hydrants,

connections to existing and new piping, thrust blocks, plastic and concrete encasement, bedding, trenching, backfilling, accessories, appurtenances, miscellaneous work, and the testing and disinfection of the entire new system.

3. The quality of all materials, manufacturing procedures, and the finished pipe shall be subject to inspection and approval of the Engineer. Such inspection may be made at the place of manufacture and/or at the work site after delivery, and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture.

b. Condition of Site.

1. Pre-construction photos – A complete video of the areas adjacent to the proposed work will be made by the applicant's contractor. Any post construction damages not clearly shown in the pre-construction video will be assumed to have been caused by the contractor, so the contractor is advised to carefully document all pre-construction conditions adjacent to the work (e.g., curbs, sidewalks, foundations, etc.)
2. The applicant's contractor shall protect and take care of all work until final completion and acceptance thereof. During construction, the applicant's contractor shall keep the site free and clean from all rubbish and debris and in a sanitary condition, and shall promptly clean up the site after being notified by the owner.
3. All work shall be confined to the applicant's site and/or Right-of-Ways and/or existing easements. If property owned by other than the owner is disturbed it shall be restored to at least as good a condition as prior to disturbance as soon as the work is completed. The M.T.M.U.A. may order a halt of construction until such restoration is effected.
4. After completion of the work and before application for acceptance of the work, the applicant's contractor shall clean the site of the work and all ground and property that has been occupied or used by him in connection with the work, removing all rubbish, surplus materials, false work, temporary structures, and equipment, and all parts of the work shall be left in a neat, presentable and operable condition. All work shall be confined to the applicant's site and/or R.O.W.'s and/or existing easements. If property owned by other than the Owner is disturbed it shall be returned to at least as good a condition as prior to disturbance as soon as the work is

completed. The M.T.M.U.A. may order a halt of construction until such restoration is effected.

c. Protection of Traffic.

All streets and roads used shall be kept free from dust. Unless permission to close certain streets or roads is obtained from the Township's Council, at least one-half of the width of each street or road shall be kept open to traffic at all times.

d. Storm and Waste Water.

The applicant's contractor shall take care of storm water and waste water reaching the right-of-way from any source and shall prevent damage to property on or off the right-of-way due to interruption or diversion of such storm or waste water on account of his operations.

e. Standard Practices.

1. All distribution mains shall be provided with a minimum of 4 foot cover to prevent freezing.
2. Watermains and sewers shall be installed in separate trenches and separated by a horizontal distance of 10 feet. Where they cross they shall be separated by a vertical clearance of 18 inches, sanitary line being lower, unless sewer pipe is ductile iron with mechanical, or slip-on joints, or sewer main encasement shall be provided with sewer being adequately supported.
3. At crossings, if vertical clearance is less than 18", the space between pipes shall be chocked with 3/8" clean stone. If clearance is less than 6", a reinforced concrete arch support shall be designed.
4. In place of ductile iron pipe sewers the Utility may accept 6 inch thick concrete encasement as shown on Standard Details extending ten (10) feet each side of the crossing as shown on the plans and required by the Utility.
5. If watermains, fittings and appurtenances are to be installed in an area that has been previously excavated for sanitary sewers or storm drains, the backfill beneath the water facilities shall be backfilled to 95% Modified Proctor Density and so certified by a soils lab acceptable to the Utility.
6. If clean stone instead of choked stone blend is used in the trench for control of groundwater, the clean stone shall be encapsulated in suitable approved geotechnical filter fabric.

f. Construction of Distribution System.

1. Pipe.

- (a) The pipe shall be Tyton Joint Ductile Iron Pipe, centrifugally cast, cement lined and seal coated inside and coated outside per Federal Specification WW-P-421-b, (A.S.A.A.21.51-1965) minimum thickness Class 52 or PVC C-900, SDR-18.
- (b) For bridge crossings, or other special aerial installations, pipe and casing material shall be steel, with annular space insulated with perlite or styrofoam.
- (c) Ductile iron pipe shall be centrifugally cast in metal or sand molds in accordance with A.S.A. specification A21.51, minimum thickness Class 52, unless otherwise required. The joint shall conform with the requirements of A.S.A. A21.11 and shall be of a type that employs a single elongated groove gasket to effect a joint seal such as United States Cast Iron Pipe Company's "Tyton" joint, or approved equal.
- (d) The outside of the pipe shall be coated with a uniform thickness of a hot applied coal tar and the inside of the pipe shall be lined with cement and bituminous seal in accordance with the American Standard Specifications for cement mortar lining for cast iron pipe and fittings, A.S.A., A21.4.
- (e) Pressure PVC pipe, appurtenances, fittings, design, manufacturing, tapping, and installation shall conform to ANSI/AWWA/ASTM Standards C-900, C-901, C-905, C-909, C-605, M-23, M-17, M-31, D-1784, D-2321, D-2241, D-1598, D-1599, D-2239, D-2487, D-2737, D-2774, D-2837, D-3035, D-3139, D-3350, F-412, F-1483, and UNI-B-9. A detection wire shall be supplied and taped to the underside of the pipe.
- (f) Steel casing pipe shall conform to AWW C-200. Steel pipe under 12" in diameter shall be Schedule 80, 12" and over shall have a wall thickness of 0.500 inches. Steel pipe shall be cement mortar lined and coated in Accordance with AWW C104. Buried steel casing pipe shall be wrapped in accordance with AWWA C203, Section A1.4, Fiberglass and asbestos felt wrap.

- (g) Exposed steel pipe shall be primed (2 mil. dry) and painted, 3 coat vinyl (2 mil. dry), (4 mil. total, min.).
- 2. An 8 gauge (coated) detection wire shall be utilized. Wire shall be installed directly under pipe (PVC & DIP). Where wires intersect, they shall be cad welded together. Wires to be terminated at approved wire boxes.
- 3. Specials and Fittings.
  - (a) Cast iron mechanical joint or Tyton fittings shall be furnished per A.S.A. Specifications A21.10-1964, Class 150; cement lined and coated inside and coated outside per Federal Specifications WW-P-421-6 or A.S.A. A21.4-1964 shall be supplied with S. S. hardware.
  - (b) Ductile iron elbows, tees, crosses and sleeves shall be either United States Cast Iron Pipe Company, or approved equal, fittings. Flanges and fittings shall conform to ASA Standard B-16 drilled for 125 lb. service.
- 4. Insertion Valve.

The tapping valve shall be by U.S. Pipe or approved equal.
- 5. Tangent Tee.

These fittings will be required on watermains 12" and larger when hydrants are used for blow off or air release assemblies. Due to the long lead time for ordering these tangent tees, the developer will be responsible to order these based on the time required for manufacture.
- 6. Valves and Fittings - Mechanical Joint.
  - (a) The fittings shall be inspected for defects and, when suspended above grade, shall be rung with a light hammer to detect cracks. The last 8 inches outside of the spigot and inside of the bell shall be thoroughly cleaned to remove oil, tar, grit, and other foreign matter from the joint, and then painted with a soap solution made by dissolving 1/2 cup of granulated soap in one gallon of water.
  - (b) The cast-iron retainer where PVC pipe is used shall be by Romac Industries model "Grip Ring" and should be used in place of retainer gland or approved equal gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket or bell end. The

rubber gasket shall be painted with the soap solution and placed on the spigot and with the thick edge toward the gland. The entire section of the pipe shall be pushed forward to seat the spigot end in the bell. The gasket shall then be pressed into place within the bell, being careful to have the gasket evenly located around the entire joint. The cast iron gland shall be moved along the pipe into position for bolting, all the S. S. bolts inserted, and the S. S. nuts screwed up tightly with the fingers. All units shall be tightened with a suitable torque-limiting wrench. The torque for various sizes of bolts shall be as follows:

5/8 inch - 40-60 ft.-lb

3/4 inch - 60-90 ft.-lb.

1 inch - 70-100 ft.-lb.

1-1/2 inch - 90-120 ft.-lb.

- (c) Nuts spaced 180 degrees apart shall be tightened alternately in order to produce an equal pressure on all parts of the gland.
- (d) Wherever it is necessary to deflect pipe in order to form a long radius curve, the amount of deflection shall not exceed the maximum limits set in specification A.W.W.A. C-600.54T of the American Water Works Association. All bolts, nuts, washers, ears, rods, or exposed metal shall be stainless steel.
- (e) Mechanical joint valves 12" and under shall be Mueller Company Figure A-2360, or approved equal, epoxy lined resilient wedge gate, non-rising stem valves manufactured to AWWA Specifications with square operating nuts. Mechanical joint valves 14" and over, for horizontal installations shall be Mueller Company Figure A-2380-20-06 epoxy lined, or approved equal. Stainless steel hardware shall be used with anti rotation bolts on slots on top of valve.
- (f) Flanged gate valves shall be Mueller Company Figure A-2360 epoxy lined resilient wedge gate for valves 12" and under, or approved equal. For valves 14" and over they shall be A-2380-6-06 epoxy lined double disc, non-rising stem valves, or approved equal valves manufactured by AWWA Standards with square operating nuts. Flanged ends shall be ASA Standard 125 lb. drilling.
- (g) All valves shall open left or counter-clockwise. A valve box shall be provided for every valve. The valve box shall be as specified in the standard detail, and shall be centered

and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed.

- (h) Gate valves and valve boxes shall be set plumb with a 6" minimum base of crushed stone or gravel. Valve boxes shall be centered on the gate valves and the box cover shall finish flush with the surface of the pavement or ground. When unavoidable, valve boxes located in pedestrian walkways or sidewalk shall be flush to grade of sidewalk (no exceptions will be made).
- (i) Valve boxes shall be Mueller Figure H-10364 with cover, or approved equal. Cover shall be lettered "water". It shall be the responsibility of the Contractor to furnish valve boxes of suitable length for each location such that the rim of the box shall be flush with the ground or paving surfaces.

7. Hydrants.

- (a) The hydrants shall be Mueller A-423, 5 1/4" valve opening, 6" mechanical joint inlet connection, 5'-0" bury, National Standard 1-1/2" pentagon operating nut, open left, with two 2 1/2" hose nozzles and one 4 1/2" pumper nozzle National Standard Thread, or approved equal. All fire hydrants shall be painted in a color or colors to be directed by the Authority.

Hydrant Paint Specification

	<u>Color</u>	<u>Sherwin Williams #</u>
6" Main	Red	SW 4081
8-20" Main	Orange	SW 4082
12-14" Main	Green	SW 4071
16" – Up Main	Light Blue	SW 4086

ALL TOPS TO BE PAINTED WHITE

A.R.A. Candy Canes to be painted green



- (b) All hydrants shall be connected to the main line with pipe not less than six (6) inches in diameter. A gate valve and box shall be located between the hydrant and the main.
- (c) Hydrants shall be set plumb and to the established grade with hose nozzles at least 19 inches above the ground as directed. A concrete thrust block shall be provided at each hydrant and 7 1/2 cubic feet of crushed stone or gravel as indicated on the Detail Sheet.
- (d) At all areas where ductile iron pipe is exposed to corrosive soil conditions, runs parallel to cathodically protected gas lines on the same side of the road or crosses gas lines, the watermain shall be protected by encasing the pipe with plastic. Polyethylene film shall be applied loosely but continuously to the pipe with joints in plastic made by polyethylene adhesive tape. Care shall be taken in the installation and backfilling operation to prevent tearing the plastic and exposing the bare metal pipe.
- (e) All hydrants are to be numbered and tagged with brass tags. Numbering scheme will be provided by the MTMUA.

8. Gaskets.

All gaskets to be vulcanized natural or vulcanized synthetic rubber meeting the requirements of "American Standard for Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings" (A.S.A. A21.00-1964).

9. Wet Taps.

Tapping sleeve shall be mechanical joint type Mueller #H-615 for DIP or use JCM-432 series all stainless steel for A.C.P. Tapping valves shall be mechanical joint type Mueller #T-2360 or approved equal. All tapping sleeves shall be bolted onto main and set level and plumb and tested @ 150 psi with no leak prior to wet tapping of main.

10. Service Taps On All PVC Mains.

- (a) On 8" through 12" PVC pipe a stainless steel service sleeve shall be used as manufactured Smith Blair model number 371 or approved equal.
- (b) On 14" through 36" PVC pipe a stainless steel service sleeve shall be used as manufactured by Power Seal model number 3416 AS.

11. House Service Connections.

- (a) Each new house service connection shall include a corporation stop, a minimum of 3/4" diameter Type K copper or polyethylene service pipe and compression fittings, curb stop and box, and service pipe extension beyond the curb stop for connection by others. 3/4" Diameter type "K" copper shall conform to ASTM Spec. B-88 and B-251.
- (b) Polyethylene shall conform to ASTM C-901.
- (c) Corporation stops shall be Mueller Company Figure H-15008 for 3/4" and 1" sizes and H-15013 for 1-1/2" and 2" sizes or approved equal.
- (d) Curb stops shall be Mueller Company Figure H-15209 for 3/4" and 1" through 2" sizes with stainless steel rod and standard cover or approved equal.
- (e) Cover shall be lettered "water". It shall be the responsibility of the Contractor to furnish curb boxes of suitable length for each location such that the rim of the box shall be flush with the finished grade. Where curb boxes are located in all paved areas, the curb box shall be installed flush to stabilized base course and riser rings made of cast iron used to adjust curb box covers to finish pavement grade.
- (f) Curb boxes shall be Mueller Figure H-10314 for 3/4" to 1" sizes and H-10336 for 1-1/2" to 2" sizes with stainless steel rod and standard cover or approved equal. Cover shall be lettered "water". It shall be the responsibility of the Contractor to furnish curb boxes of suitable length for each location such that the rim of the box shall be flush with the proposed finished grade.
- (g) Curb stop protection boxes shall be Tyler pipe 6-3/8" I.D. or approved equal, 18" high with lid marked "Water" to be constructed as shown on the water details sheet.
- (h) No house service connections shall be made to a street main, whether tested or not, unless under the supervision and inspection of the engineer for the Authority.
- (i) When a section of watermain has been satisfactorily tested, then all individual house connections must also be satisfactorily tested.

- (j) Any and all structures will require a meter pit located at or near the curb/edge of pavement. Residential meter pits shall be 18" diameter Model #203CS1848FSBS by Mueller/Hunt or approved equal.
- (k) Meters shall read in "gallons".
- (l) Meters shall be furnished by the applicant or may be purchased from the Authority.
- (m) Meters shall be:
 

5/8" x 3/4"	Hersey400 11 S Series
3/4" Straight	Hersey400 11 S Series
1"	Hersey400 11 S Series
1.5" through 6"	HerseyMCT II - Compound

12. Installation of Pipe.

- (a) All pipe shall be placed by use of a laser grade instrument, where practical.
- (b) It shall be the contractor's responsibility to contact the utility companies involved and to locate existing structures. Underground drains, electrical lines, sprinklers or other underground improvements in the public rights-of-way shall be maintained in service by the contractor during construction, and restored, after construction is complete, to at least the condition prior to construction.
- (c) As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and the excavation shall be done manually, as directed.

13. Pipe Tracing Wire.

Prior to backfilling the watermain trench, a PVC coated single solid 8 gauge copper trace wire shall be installed directly under the watermain. The copper trace wire shall be installed for the entire length of the watermain with extension leads coming up through the hydrant valve boxes. A continuity test prior to activating and again prior to release of performance bond shall be performed by the contractor to insure that the copper wire or its connections have not pulled apart. All connections shall be

performed with CAD weld system approved by the M.T.M.U.A. Engineer.

14. Pipe Bedding and Trenching.

- (a) Trench dimensions, maximum depths, and bedding requirements (including cradles and encasement) for watermains, etc. shall be in accordance with the manufacturer's recommendations and as a minimum shall conform to the details shown on the Water Systems Detail Drawings, Appendix A, included as part of these Rules and Regulations.
- (b) The applicant's application for Tentative review by the Authority shall include trenching dimensions and bedding details including reinforcing bar schedules for concrete cradles where applicable.
- (c) The trench shall be excavated to the specified invert grade. Before the pipe is laid the subgrade shall be prepared by backfilling and thoroughly tamped as directed by the Engineer of the Authority to assure a firm foundation for the pipe. The finished subgrade shall be prepared accurately by means of hand tools and level lines. A laying square or other suitable means shall be used to insure proper and uniform grade. The use of blocks for the purpose of supporting pipe and fittings will not be permitted unless otherwise specified in the plans. Bell holes of ample dimensions shall be dug at each joint to permit the joint to be made properly.
- (d) The Engineer of the Authority shall have the right to limit (to 100' maximum) the amount of trench which shall be opened in advance of the completed pipe laying work and to limit (to 200' maximum) the amount of trench left unfilled, backfilled and unpaved.
- (e) The material excavated shall be laid compactly on the side of the trench and kept trimmed up so that it will be of as little inconvenience as possible to the traveling public and to adjoining tenants. Where the streets are paved, the paving material shall be kept separate from the other materials excavated. All streets shall be kept open for travel unless otherwise approved by the Township Engineer and the Traffic Safety Officer.
- (f) All pipe, fittings, adapters, valves and appurtenances shall be kept clean during the laying operations by plugging or

other approved means. Cutting of pipe shall be done in a neat and workmanlike manner with an approved type of mechanical cutter without damage to the pipe or lining so as to leave a smooth end at right angle to the axis of the pipe. All joints or piping, couplings, fittings, valves, specials, and fire hydrants, whether push-on type or mechanical type, shall be made up in accordance with the manufacturer's printed recommendations.

- (g) Concrete thrust blocks shall be provided at all tees, bends, hydrants, and dead ends.
- (h) Thrust block placement and size shall be as indicated on the "Table of Thrust Blocks" on the Construction Details for Water Distribution Systems, Appendix A.
- (i) The installation of tapping sleeves and valves for making wet taps under full main pressure shall be done only by the workmen thoroughly experienced in this type of work.
- (j) The existing main shall be thoroughly cleaned of all rust, dirt, scale or other materials down to the clean metal just prior to the installation of the tapping sleeve. Tapping connections shall be installed exactly horizontal and at right angles to the center line of the pipe to be tapped.
- (k) All excess clean excavated material shall become the property of the applicant and shall be disposed of in accordance with all applicable New Jersey laws.
- (l) All debris and unsuitable material shall be removed and deposited at a location provided by the applicant's contractor in accordance with all applicable New Jersey laws. All costs for removing and depositing excess material shall be included in the price of the pipe. The Engineer alone shall determine if excess material is clean or not. If in the opinion of the Engineer of the Authority, the material at or below the grade to which excavation would normally be carried is unsuitable for foundation, or if the material from any other part of the trench is unsuitable for backfill, it shall be replaced with suitable surplus material excavated from other parts of the project as specified below.
- (m) If suitable surplus material is not available for other parts of the project then the applicant's Contractor shall furnish suitable material if and where required by the Engineer of the Authority.

- (n) The applicant may, as an alternate, provide a written recommendation by a licensed professional engineer as to suitability of on-site backfill material, its emplacement and compaction or suitable off-site backfill and its method of installation.
- (o) The Authority may require the applicant to provide an opinion of a professional engineer relative to the suitability of the on-site material to be used as backfill. Where the on-site material is deemed suitable, the opinion shall specify the appropriate installation methods for the material. Where the on-site material is deemed not suitable, the opinion shall specify modification or replacement of the material and the appropriate installation for the specified material.

15. Laying.

- (a) All pipe, fittings, valves, and appurtenances shall be cleaned of foreign matter prior to being carefully lowered into the trench piece by piece by means of a crane, ropes, or other suitable tools or equipment in such manner as to prevent damage to watermain materials and/or protective coatings and linings.
- (b) The bell socket and the plain end of the entering pipe must be absolutely clean and free of foreign matter prior to the seating of the gasket. The gasket should be wiped clean, flexed, and then placed in the socket with the large round end entering first, so that the gasket is seated evenly around the inside of the socket with the groove fitted over the head. As the gasket fits snugly in the gasket seat, it may be necessary to smooth out the gasket around the entire circumference to remove any bulges which might interfere with the proper entry of the spigot end. A thin film of lubricant should be applied to inside surface of gasket which will come in contact entering plain end of pipe. In some cases, it is desirable to apply a thin film of lubricant to the outside of the plain end for about one inch from the end; lubricant other than furnished with the pipe should not be used. The plain end of the pipe should be aligned and carefully entered into the socket until it just makes contact with the gasket. Joint assembly should then be completed by forcing the plain end of the entering pipe past the gasket until it makes contact with the bottom of the socket. The first painted stripe should be inside the socket and the front edge of the second stripe should be approximately

flush with the bell face. If assembly is not accomplished with the application of reasonable force, the plain end of the pipe should be removed to check for the proper positioning of the gasket. A jack-type tool must be used to make up the joints. Assembly operations shall be conducted in accordance with A.W.W.A. Specifications.

(1) Sheeting.

The applicant's contractor shall furnish, install in place and maintain such sheeting and bracing, etc., as may be required to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation below that necessary for proper construction, or otherwise injure or delay the work or endanger adjacent structures. If the Engineer of the Authority is of the opinion that at any point, sufficient or proper supports have not been provided, he may order additional supports put in by the applicant's contractor. All trench shields and sheeting shall be designed by a N.J. professional engineer in accordance with O.S.H.A. standards.

(2) Dewatering of Trench.

(i) All pipes shall be laid on a solid, dry foundation. The applicant's contractor shall furnish all equipment, material and labor necessary to keep all trenches free from water to one foot below invert of pipe. Any pipe laid in water or wet trenches must be removed and reinstalled by the applicant's contractor.

(ii) The applicant's contractor shall provide, maintain and operate such drains, percolation stone, trenches, sumps, pumps, hoses, piping, deep-wells, well-pointing systems, and other approved methods and equipment as may be necessary to keep the excavations free from water during all stages of the construction operations and course of work. Where dewatering required after working hours, overnight, or weekends all pumps shall be electrically operated from commercial power lines. No diesel or

gasoline operated generators or pumps will be allowed in these situations. The applicant's contractor shall provide such dikes, ditches, sumps and pumping that may also be required to prevent the flow of surface waters into excavated areas and into any and all areas where construction or installations are in progress. All water pumped from the excavation shall be discharged in such manner as shall not cause injury to work completed, damage to property, health hazards or impediment to traffic. All well/well points holes shall be properly sealed by an approved licensed well/well point driller in accordance with N.J.D.E.P. standards with an approved well/well point abandonment form being filled out by the sealer with copy given to the M.T.M.U.A.

- (iii) Surface runoff, water from the trench, or water diverted from any sewer, drain or water course shall be conveyed in conformance with N.J. State Soil Conservation Committees' "Standards for Soil Erosion and Sediment Control in New Jersey" dewatering permits required by N.J.D.E.P. shall be obtained by the developer. Water shall be completely removed from all excavations to one foot below invert of pipe promptly and continuously throughout the progress of the work and the applicant's contractor shall keep excavations absolutely dry at all times until the watermains have been properly joined and bedded and work completed. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes.

(3) Backfilling.

- (i) Unless otherwise approved by the Engineer of the Authority, the applicant's Contractor shall backfill all trenches at the end of each working day with suitable material from the trench excavation or temporary stockpile.



Backfill shall be brought to elevations which allow construction of temporary paving specified elsewhere in these specifications. If, in the opinion of the Engineer, the above material is unsuitable, select off-site material shall be provided as described in the Construction Details for Water Distribution Systems, Appendix A. Backfill material shall be deposited and mechanically compacted to a minimum 90 percent Modified Proctor Density in layers not exceeding 6 inches in depth (loose measure) to a point 12 inches above the top of the pipe. From this point, all backfill shall be mechanically compacted in maximum 12 inch lifts, unless otherwise approved by the Engineer, to obtain a minimum 90 percent Modified Proctor Density to a point 3 feet below the road surface. From this point, a minimum 95 percent Modified Proctor Density is required. Smaller lifts shall be required if this density is not obtained.

- (ii) The backfill material shall be wet or dried as required to obtain the required density.
- (iii) The only methods of compacting the backfill material permitted shall be mechanical compaction in lifts as specified. Consolidation will not be acceptable as a method to achieve the soil densities specified.
- (iv) The Engineer of the Authority, at his discretion, may perform, or have performed soil density checks at randomly chosen lifts. Density testing will be performed at the completion of the compaction effort. Compaction requirements will be strictly enforced.
- (v) When the trench is not in or across a dedicated street, right-of-way, or any other place where pavement is to be constructed, backfill shall be compacted to obtain a minimum 90 percent Modified Proctor Density.

(vi) The densities referred to above shall be based upon the latest Standard Test Methods for Moisture-Density Relations of Soil and Soil Aggregate Mixtures Using 10 lb. Hammer and 18" Drop, ASTM Designation D-1557. Density control in the field shall be based on the latest Test for Density of Soil in Place by the Sand/Cone Method, ASTM Designation D-1556. The applicant may retain and, except as otherwise specified, pay for the services of an independent testing laboratory to do such sampling and to make such tests as the applicant or Engineer of the Authority may deem necessary to certify that work conforms to the requirements of the specifications.

(4) Temporary Pavement Repairs.

(i) During the interval between the completion of backfill and the time of placement of permanent paving, all pavement and drives shall be maintained in a safe and satisfactory condition. The applicant's contractor shall install all temporary pavement repair in accordance with these specifications.

(ii) Temporary pavement repair shall be constructed within 24 hours of completion of backfill, unless otherwise approved by the Engineer of the Authority.

(iii) Temporary pavement repair shall be in accordance with either Township or County requirements in effect at that time.

(iv) The contractor shall continuously maintain temporary paving for the entire period it remains in place; shall inspect trenches at such intervals as may be necessary, including but not limited to immediately following rainstorms, winter thaws, and similar occurrences which may cause settlement, erosion, or other problems; and shall promptly make necessary repairs to

maintain trenches in a satisfactory condition. In the event the applicant's contractor fails to make such repairs, the applicant may make such repairs as are deemed necessary and the contractor shall pay for the cost of this work.

- (v) The applicant's contractor is required to repair all areas that are damaged by his actions during construction. If the damaged areas are outside the maximum trench width shown on the detail, additional costs of restoring the damaged areas shall be borne by the Contractor.
  - (vi) The Engineer, giving one week's notice, may direct the applicant's contractor to remove the cold patch surface and replace it with the permanent base course (bituminous stabilized base). If, at the time of the placement of temporary pavement, it is demonstrated that the applicant's compaction method has achieved the specified soil densities within the 24 hour time limit for the placement of temporary pavement, the Engineer will approve the placement of the permanent base course in lieu of cold patch. If the specified soil densities are not achieved within this time limit, the applicant's contractor will be required to place cold patch as specified. The placement of cold patch should not be construed as relieving the applicant's contractor from any of the requirements of the backfilling specifications.
- (5) Pavement Repairs in County Roads.
- (i) The County road, when opened, shall be cut in straight lines; the pavement and the base shall be removed prior to repairing to at least twelve (12) inches beyond the outer limits of the sub-grade that is to be disturbed, leaving a twelve-inch shoulder of undisturbed material in each side of the excavated trench. The face of the remaining pavement shall be approximately

vertical. A power-driven concrete saw shall be used so as to permit complete breakage of concrete pavement or base without ragged edges. Asphalt paving shall be scored or otherwise cut in a straight line.

- (ii) Trench restoration shall be in accordance with the then current Middlesex County Road Department specifications.
- (6) Trench restoration with county roads right of way but outside of paving area.
- (i) The trench shall be open cut in a straight line; down to 6" below the invert of the pipe with trench walls almost vertical.
  - (ii) Immediately after the work is performed for which the opening was made, backfilling with 3/8" clean crushed stone to 6" below invert and up to the springline of pipe shall be completed and compacted by hand chocking method. Backfilling the remainder of the trench shall be free of excavated material from trench, clay, or black loam and be of dense graded aggregate compacted in maximum 8" thick layers with no exceptions unless authorized by the Middlesex County Roads Engineer. The backfill shall be compacted by mechanical means to a degree equivalent to that of the undisturbed ground in which the trench was dug to within four (4) inches of the surface. The remaining 4" of open trench shall be filled in with 4" thick topsoil, fertilized, seeded, type P, and straw mulched on top.

16. Existing Paved Surfaces.

- (a) Existing paved roads or streets shall be repaired to the satisfaction of the County Road Supervisor or the Township, as applicable, in conformance with the following requirements. Backfill shall be approved granular material compacted to at least 95% by ASTM D1557 full depth from pipe to subbase.

(1) Cutting and Removing Pavement.

- (i) The line between the trench and the existing pavement to remain shall be cut with a saw, pneumatically operated spade, or approved equal, so as to leave a smooth, straight, and vertical edge. The existing pavement may be bituminous, brick, block, non-reinforced concrete, reinforced concrete, etc. The excavated pavement shall be broken up and removed to a site approved by the Engineer of the Authority.
- (ii) Where excavations are to be made on concrete roads, the existing concrete shall first be saw cut and removed. All protruding reinforcing rods shall be cut off and removed. Any loose or broken longitudinal portions of adjacent existing lanes shall be removed and replaced as directed by the Engineer of the Authority.

17. Excavation and Preparation of Trench.

- (a) It shall be the applicant's contractor's responsibility to contact the utilities companies involved, acquire all local, state, county road opening permits in advance of cutting of the pavement or excavation within the R.O.W. , and to locate existing structures. Underground drains, electrical lines, sprinklers or other underground improvements in the public rights-of-way shall be maintained in service by the contractor during construction, and restored, after construction is complete, to at least the condition prior to construction.
- (b) As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and the excavation shall be done manually, as directed.

18. Existing Watermain Replacement.

- (a) Where existing active watermains are to be replaced, the work shall be done with materials and methods described elsewhere as far as possible. Other special conditions and requirements shall be as described hereafter or as required and approved by New Jersey Department of Environmental Protection or other authorities.

- (b) The applicant's contractor shall confer with New Jersey Department of Environmental Protection, local police, fire protection, school, street department, and other affected parties to properly coordinate the work and provide for their needs. At least 48 hours notice shall be provided to all parties of the time work will be done. All road closing requests by the contractor must be approved by the Monroe Township Council and all parties mentioned above.
- (c) The work shall be organized and performed so that discrete segments will be completed, tested and returned to service on a daily basis. Note that accurate elevations and grade of all pipes and inverts is critical to successful performance and completion.
- (d) The applicant's contractor will be required to correct any deficiencies.

19. Cut Sheets – Water.

- (a) Minimum 50' stationing with stake elevation, where curbs are installed. Where no curbs exist 25' stationing with stake elevation required.
- (b) Cut to top of pipe.
- (c) Stationing and proposed elevations at all fittings, services, pipe crossings, high points, low points, etc.
- (d) Alignment and offsets for piping, fittings, hydrants, curb stops, air releases, etc.
- (e) Proposed top of curb (where applicable).
- (f) Cut sheets must be submitted 48 hours (working days) in advance of construction.

20. Concrete Pipe Encasement.

- (a) Concrete encasement work shall include the construction of non-reinforcement structures used for encasement or plugging purposes, as indicated in the contract documents, and as directed by the Engineer of the Authority, and for which payment is not otherwise provided. Concrete shall have a minimum twenty-eight (28) day compressive strength of 3,500 lbs. Per square inch. All materials shall conform to the applicable provisions of the latest edition of

the American Concrete Institute Standards (ACI Standard 318, Building Code Requirements for Reinforced Concrete).

- (b) Construction in Acid Soil Areas.
  - (1) In the event that during excavation for sewer and water facilities construction through buried marshes, bogs, or where landfilling has taken place, the dewatering effluent contains excessive amounts of hydrogen sulfide, it is the contractor's responsibility to lower the hydrogen sulfide concentration to allowable levels before discharging the effluent to nearby surface waters. The allowable concentration of hydrogen sulfide in dewatering effluent, as stated by the U.S.E.P.A. shall be 0.01 mg/l (10 PPB). Any concentration greater than this is to be considered excessive. A standard for the surrounding air has also been set, and it is also the contractor's responsibility to ensure that the concentration of hydrogen sulfide (associated with construction) in the air, at any point, shall not exceed 45 PPB.
  - (2) Effluent may be treated by adding reasonable amount of hydrogen peroxide ( $H_2 O_2$ ) to the dewatering pipe.
    - (i) Polyethylene Tubing and Tape Wrap (only on D.I.P.).
      - [a] In all cases where acid soils are encountered and reported by the soils specialist, a Polyethylene tubing and tape wrap shall be placed round the pipe effectively bagging each length of pipe protecting it from the acid soils.
      - [b] Polyethylene tubing and tape wrap shall be installed in accordance with manufacturer's specifications and AWWA C105.
      - [c] The above bagging technique shall be used in addition to select backfill, 2 feet above pipe embedment zone.

[d] Remaining trench shall be backfilled as specified under "Backfilling".

(ii) Elimination of Unsuitable Backfill.

[a] If, in the opinion of the Engineer, the material at or below grade to which excavation would normally be carried is unsuitable for foundation, it shall be removed in such widths and depths as the Engineer may direct according to the item entitled, "Other Earth Excavation", and be replaced with sand, gravel, or crushed stone, all as specified entitled "Sand Choked Crushed Stone Backfill Subgrade", or filter fabric wrapped  $\frac{3}{4}$ " clean crushed stone.

[b] If, in the opinion of the Engineer, the material from any other part of the sewer/water trench is unsuitable for backfill, it shall be replaced with suitable surplus material excavated from other parts of the contract as specified below. The applicant's contractor's attention is directed to the presence of acid soils as outlined.

[c] If suitable surplus material is not available from other parts of the contract, then the contractor shall furnish suitable material when and where approved by the Engineer.

[d] The applicant may, as an alternate, provide a written recommendation from a licensed, professional engineer as to the suitability of on-site materials and its installation or the replacement with suitable off-site material.

(iii) Disposal of Unsuitable Material.

[a] The applicant's contractor shall note that all unsuitable backfill material



shall be separated from suitable material prior to disposal.

[b] Except as otherwise directed, the applicant's contractor shall dispose of unsuitable surplus excavated materials promptly, at locations selected by him and acceptable to all State and local regulations. The applicant's contractor's attention is directed to acid soil mitigation procedures under "Acid Soil Conditions".

(iv) Disposal of Suitable Materials.

[a] It is expressly understood that no excavated materials shall be removed from the site of work or disposed of by the applicant's Contractor except as approved by the Engineer.

[b] All suitable surplus material is to be stockpiled in areas separate from the unsuitable material, where required. Suitable surplus excavated material shall be used for fill or backfill on other parts of the work to replace unsuitable materials and for embankment, where required. Surplus material used under pipe for replacement of unsuitable material below subgrade shall conform with "Sand, Gravel or Crushed Stone Backfill Below Subgrade".

[c] Suitable surplus material not used as backfill or embankment shall be neatly deposited so as to flatten side slopes, fill depressions or for other uses as the Engineer may approve within the limits of the project area, but not within floodplains, or as to alter pre-existing drainage patterns,

or shall be dumped at a site approved by the Engineer.

21. Sand, Choked Stone, Crushed Stone, Backfill Below Subgrade – Concrete Cradle – Sand Backfill Above Pipe Bedding and Pipe.

(a) General.

- (1) Where required by the Engineer of the Authority, the applicant's contractor shall furnish and place sand, choked stone or crushed stone wrapped in filter fabric as specified underneath gravity sewers or force mains to replace material removed from below subgrade. Material shall be placed where existing pipe crosses trench of new sewer/water lines and support is required, or where special fill is required as determined by the Engineer or by local authorities or corporation.
- (2) Where required by the Engineer of the Authority, the applicant's contractor shall furnish and place concrete cradle under the sewer/water pipe. Concrete cradle shall be of Class "New Jersey Department of Environmental Protection" concrete.
- (3) Where required by the Engineer of the Authority, the applicant's contractor shall furnish sand backfill to be used to replace unsuitable material above the pipe bedding and the pipe, where no suitable material is available from any location within the contract area.
- (4) Where required by the Engineer of the Authority, the applicant's contractor shall furnish impermeable backfill.

(b) Sand and Crushed Stone.

- (1) Sand shall be bank run or mason sand comparatively free of clay and other deleterious materials.
- (2) Three-quarter inch crushed stone shall be either trap rock or limestone passing 1 inch mesh screen and retained by ¼ inch mesh screen. The mixture producing choked stone shall be 50% sand and 50% ¾" stone.

- (c) Placing and Compacting.
  - (1) The choked stone shall be spread in layers not over 6 inches thick and thoroughly compacted as specified.
  - (2) The 3/8" clean crushed stone shall be placed as follows:
    - (i) Excavation of trench established and stabilized (Shoring, dewatering, etc.).
    - (ii) Clean crushed 3/8" stone placed a minimum of 6" thick.
    - (iii) Sewer line/water line placed on line and grade and remaining excavation filled with clean crushed stone to 12" above top of pipe. The remaining trench may then be backfilled as specified.

22. Acid Soil Conditions.

- (a) Due to the possibility of encountering extremely acid soil conditions in the course of construction, special acid requirements and conditions will apply.
- (b) The top two feet of soil shall be stripped and stockpiled separately from the material to be excavated. A soils specialist, to be provided by the developer at no additional cost, will monitor the excavation operation.
- (c) When acid soils are encountered, as determined by the soil specialist, excavated trench material shall be returned to the trench in order of removal, i.e., lower material first followed by upper material. In addition, the top one to two inches of soil on which the deeper soil was stockpiled shall be scraped and placed below a depth of two feet. The quantity of material to be displaced by bedding and pipe as well as soil scraped from the stockpile area shall be subtracted from the deeper excavated material and this quantity of deeper material removed to a disposal site approved by the New Jersey Department of Environmental Protection. Any soil disposed of in this way shall be covered with a minimum of two feet of cover to prevent rapid oxidation and subsequent acid formation.

- (d) After backfilling the deeper soil, one ton of limestone per 2,000 square feet shall be spread over the deeper soil in the trench as a precautionary measure. This liming requirement shall be applicable in areas of well drained, non-saturated soils as determined by the soils specialist.
- (e) The top two feet of soil, stockpiled for this purpose, shall then be replaced.
- (f) The excavated acid soil material shall not be exposed for a period longer than 8 hours. As a result of this condition, when acid soils are encountered, the trench opened in any construction day must be backfilled and the area cleaned up by the close of the day.
- (g) Temporary restoration of vegetated areas shall consist of mulching and shall be implemented at the end of each day's construction. Permanent restoration of the area shall begin as soon as the area is no longer needed for access and after the results of incubation tests, where necessary, are available.
- (h) Where acid soils are encountered, a layer of topsoil of at least 6 inches shall be required, during restoration. The soil specialist will perform pH tests on the soil to determine the lime requirements. If the pH is below 4, this is an indication that extremely acid soils have been mixed into the soil, necessitating an intensive liming effort in order to make the soil suitable for plant survival. The soil specialist will be required to determine the lime requirement. This will necessitate an incubation test as follows:
  - (1) The incubation test requires that a sample be oxidized for six weeks. The sample must be air dried and ground so that the whole sample passes a ½ mm sieve. The lime requirements to reach pH 6.5 must be determined initially and again at 2 week intervals for six weeks using standard soil testing techniques. The lime requirement can be extrapolated to the area under consideration. A minimum of 30 tons of limestone per acre on the incubation test result must be applied prior to seeding and planting where the pH is less than 4. Where the pH is 4 or greater, liming and fertilizing requirements set out in "Fertilizing and Seeding" shall apply.

- (i) All efforts must be employed to avoid spreading and mixing of the subsoil and any topsoil contaminated with extremely acid soil around the site and beyond the site. To this end, areas used for stockpiling shall be minimized. Equipment used for excavation and backfilling shall be cleaned, to the extent practical, at the end of each day's operation and the soil removed must be placed in the trench below a depth of two feet. No construction shall take place during significant rain storms and while the area is saturated to avoid smearing or spreading of the extremely acid soil material over the area.

23. Final Cleanup.

- (a) On or before the completion of the work, the applicant's Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary building and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations, in a neat and satisfactory condition.
- (b) The applicant's contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operation. To this end the applicant's contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration.

24. Water Pressure Reducing Valve.

- (a) The applicant's contractor shall furnish all materials, equipment, tools, labor and other items when necessary for/or incidental to provide a complete, properly functional pressure reducing valve as described herein, and as

shown on the plans and in full compliance with all requirements of the local water utility.

- (b) Some of the work items, without limiting the work to these, include:
  - (1) Shop drawings
  - (2) Excavation and backfill
- (c) Furnish and install precast concrete meter pit (see Water Detail Sheets) complete with standard frame and cover, steps, pipe seal, sump, safety entrance device, etc.
- (d) Furnish and install pipe, couplings, fittings, valves, gauges, air release, etc.
- (e) Furnish and install the pressure reducing valves complete with pilot valve, piping and appurtenances.
- (f) Pressure testing, disinfection and flushing.
  - (1) Materials.
    - (i) Pipe and fittings, four (4) inch and larger, shall be ductile iron conforming to AWWA C151, C104, C110, C115 and C111 as described elsewhere in these specifications.
    - (ii) Flanges shall be standard flat faced 125 psi class with hard rubber full face gaskets.
    - (iii) Pipe and fittings smaller than four (4) inch shall be Schedule 40 galvanized iron and galvanized malleable iron fittings with national standard pipe threads conforming to applicable ASTM standards.
  - (2) Water Pressure Reducing Valve –Design.
    - (i) The reducing valve should be flanged globe body, fully bronze mounted, external pilot operated, with free floating piston (operated without springs, diaphragm or levers), single seat with seat bore equal to size of valve.
    - (ii) The minimum travel of the piston shall be equal to 15% of the diameter of the seat and for true alignment (to correct lateral

thrust and stem binding), the piston shall be guided above and below the seat a distance equal to no less than 75% of the diameter of the seat. The piston shall be cushioned and so designed as to insure positive closure.

- (iii) The valve shall be packed with leather (or other soft material) to insure tight closure and prevent metal to metal friction and seating; furnished with indicator rod, to show position of the piston, and pet-cocks for attachment to valve body for receiving gauges for testing purposes.
- (iv) The pilot valve, controlling operation of main valve, shall be easily accessible; so arranged to allow for its removal from the main valve while the main valve is under pressure; and easily adjustable without removal of springs, weights or use of special tools.
- (v) The design shall be such that repairs and dismantling internally of main valve may be made without its removal from the line.

(3) Operation.

The valve shall maintain a pre-adjusted downstream pressure for varying rates of flow through the positioning of the piston by the pilot without causing water hammer and without waste of water. In addition, the valve shall open to reverse feed whenever the normal supply pressure drops below discharge pressure.

(4) Physical and Chemical Properties.

- (i) The 125 lb. flanged assembly shall conform to A.S.A. standards for flange thickness and drilling and wall thickness of body and caps. The valve shall be constructed of first class grey iron free from cold shuts, defective or spongy spots and conforming to ASTM specification A-126 Class B.
- (ii) The bronze parts shall conform to ASTM Specification B-62.

(5) Test.

The test before shipment may be witnessed by a representative of the M.T.M.U.A. Staff Engineers for simulated field conditions and a cold hydrostatic test of at least 100% above the maximum pressure for which the valve is to operate.

(6) Painting.

(i) All iron castings shall be coated on all sides with at least two coats of a rust inhibiting synthetic resin and asphaltum enamel.

(ii) The valve will be equal in all respects to the Model 50WR (Fig. 11) Pressure Reducing Valve as manufactured by the Ross Mfg. Co., Inc. 6 Oakwood Ave., Troy, N.Y. 12181.

(iii) Couplings and adapters shall be cast iron ring and follower glands with reinforced rubber gaskets and plated bolts. All iron or steel surfaces shall be provided with epoxy or plated protective coating if exposed or bituminous coating if buried. Couplings and adapters shall be Dresser Style 135, 35, or 127 or approved equal. Standard mechanical joint solid sleeve shall be used in direct burial.

(iv) Pressure reducing valve chamber shall be cast in place reinforced concrete as detailed on the drawings or precast concrete providing equal function and dimensions. The chamber shall be precast concrete; capable of supporting all earth and water pressure and H-20 vehicle wheel loads (as shown on the Construction Details for Water Distribution Systems, Appendix A).

(v) Manhole steps shall be Aluminum alloy 6061, drop front, cast in place on 12 inch centers. Steps shall be New Jersey Aluminum No. F-14-2-A or approved equal with embedded parts bitumen coated. Pipe seal shall be Link-Seal or approved equal resilient sealing system providing residual



contact pressure on pipe and manhole wall or cast into manhole wall with labyrinth anchor. Manhole section joints shall be sealed with a rubber gasket.

- (vi) Precast concrete pit access cover shall be 24" x 24" as manufactured by Bilco door.
  - (vii) Precast concrete pit entrance ladder shall be fitted with two safety entrance posts. The unit shall be securely and permanently clamped to the ladder rung and shall have a collapsible or telescoping extension bar extending at least 36 inches above manhole rim. The principal members and fittings shall be hot dip galvanized to prevent corrosion. The unit shall be Model CJ-2 "Ladder Up" as manufactured by the Bilco Co. of New Haven, Conn.
  - (viii) Air release fittings shall be provided on each side reducing valve. The fittings shall be standard 3/4 inch corporation stops tapped into the pipe and fitted with adapter to 3/4 inch heavy duty rubber garden hose two (2) feet long with a standard male end fitting.
  - (ix) Pressure gauges shall be provided on each side of each pressure reducing valve. They shall be tapped into the pipe and permanently mounted with shut off stainless steel ball valve, pet-cock and pressure relief pipe which shall be directed towards floor of pit, and pressure vibration damper device. The gauges shall be standard stainless steel body, four (4) inch diameter dial, oil or silicone filled bourdon tube type for range of 0-150 psi at 2% accuracy.
- (7) Installation Methods.
- (i) All installation work shall conform to good practice, other applicable sections of these specifications (M.T.M.U.A.), utility requirements, and all requirements of Township, County, Freehold Soil

Conservation District and other having jurisdiction.

- (ii) Excavation, backfill, pipe installation, sterilization and flushing, and water control shall be as described elsewhere herein.
- (iii) Valve access manhole shall be installed on a crushed stone bed 12 inches thick properly aligned with piping and level. Manhole frame shall be set on brick as necessary with full mortar joints. Backfill shall be well compacted in 6 inch lifts. The pressure reducing valve shall be set in proper alignment with support pier installed in accordance with manufacturer's recommendations. Valve installation and fitting up shall be done in accordance with manufacturer's recommendation. Services of a manufacturer's installation representative shall be furnished as needed to verify installation, setting and operation. The initial outlet pressure setting shall be at 80 psig.

25. Testing of Completed Water System.

- (a) All water system facilities including all valves, piping, hydrants and appurtenances shall be subjected to leakage and pressure testing, utilizing hydraulic pressure
- (b) Prior to making pressure tests, the water system must be complete; including, but not limited to, curb stops, valves, hydrants and all appurtenances in proper locations and to grade; as-builts reviewed and approved by the MTMUA; all permits to operate watermains (4 copies) and all punch list items completed. Where lines are located in paved areas, the base course must be constructed prior to testing. Where lines are located in easements, they must be final graded. Prior to pressure testing, the 8 gauge tracing wire must be tested for continuity between each valve.
  - (1) Disinfection – As per AWWA 651-92

Three methods of chlorination are available for disinfection; granule, continuous feed and slug. The MTMUA recommends utilizing the granule

method. Utilizing this method requires the contractor to maintain a clean pipe, dewatering and water tight plugs to ensure that no trench water enters the main during breaks or end of days work. If these conditions are not satisfied, the continuous feed or slug method will have to be utilized to disinfect the main and the main's bacteriologically tested at 200' intervals.

- (i) The granule method consists of placing calcium hypochlorite granules in the watermain as it is installed and then filling the main with potable water at 1 ft./S when installation is complete, under observance of MTMUA representatives. The MTMUA will make a determination if flushing after disinfectant contact time may be done during the day (peak). If nighttime cleaning is required, it shall be done between the hours of 11pm and 4am.

Pipe Diameter (in.)	Pipe Diameter (mm)	Calcium Hypochlorite Granules (oz.)	6.5% Chlorine by weight (g)
4	(100)	0.5	(14)
6	(150)	1.0	(28)
8	(200)	2.0	(57)
12	(250)	4.0	(113)
16 and larger	(400 or larger)	8.0	(227)

(2) Filing

After the granules are installed and the watermain and appurtenance is complete, the lines shall be filled slowly with potable water at a maximum rate of 1 ft/S while venting all air. At least one terminal hydrant shall remain open to expel air. The hydrant is to be completely shut when main is full so that disinfectant is not wasted. The minimum contact period of disinfection is 24 hours. Extended contact period of disinfection is not recommended as per manufacturer recommendations, due to the

possible effects of high chlorine damage to the gaskets or corrosion of pipe.

- (3) Hydrostatic Testing.
- (i) General. To prevent pipe movement, sufficient backfill shall be placed prior to filling the pipe with water and field testing. When local conditions require that the trenches be backfilled immediately after the pipe has been laid, the testing may be carried out after backfilling has been completed but before placement of permanent surfacing. The constructor shall ensure that thrust blocking or other types of restraining systems will provide adequate restraint prior to pressurizing the pipeline. Refer to section on backfilling requirements.
  - (ii) Cross-connection control. When existing watermains are used to supply test water, they should be protected from backflow contamination by temporarily installing a double check-valve assembly between the test and supply main or by other means approved by the purchaser. Prior to pressure and leakage testing, the temporary backflow protection should be removed and the main under test isolated from the supply main.
  - (iii) Procedure. The following procedure is based on the assumption that the pressure and leakage tests will be performed at the same time. Separate tests may be made if desired. If separate tests are made, the pressure test shall be performed first. Tests shall be performed only after the pipeline has been properly filled, flushed, and purged of all air. The specified test pressure shall be applied by means of an approved pumping assembly connected to the pipe in a manner satisfactory to the purchaser. The test pressure shall not exceed pipe or thrust-restraint design

pressures. If necessary, the test pressure shall be maintained by additional pumping for the specified time during which the system and all exposed pipe, fittings, valves, and hydrants shall be carefully examined for leakage. All visible leaks shall be stopped. All defective elements shall be repaired or removed and replaced and the test repeated until the allowable leakage requirements have been met.

- (iv) Test Method. The constructor may perform simultaneous pressure and leakage tests or perform separate pressure and leakage tests on the installed system at test durations and pressures specified in Table 2 of paragraph (vi) below. Tests shall be witnessed by the purchaser or the purchaser's agent, and the equipment used for the test shall be subject to the approval of the purchaser or the purchaser's agent.
- (v) Allowable Leakage. The constructor shall furnish the gauges and measuring device for the leakage test, pump, pipe, connections, and all other necessary assistance to conduct the test. The duration of each leakage test shall be 2 h, unless otherwise specified. During the test, the pipeline shall be subjected to the pressure listed in Table 2. Leakage shall be defined as the quantity of water that must be supplied into the pipe section being tested to maintain a pressure within 5 psi (34 kPa) of the specified leakage-test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No installation will be accepted if the leakage is greater than that determined by the formula:(If the number of joints has not been accurately recorded, then refer to paragraph (viii) of this section)

$$L = \frac{ND}{P} \quad (\text{Eq 1})$$

7,400

Where:

L = allowable leakage, in gallons per hour

N = number of joints in the length of pipeline tested

D = nominal diameter of the pipe, in inches

P = average test pressure during the leakage test, in pounds per square inch (gauge)

In metric units,

$$L_m = \frac{NDP}{130,400} \quad (\text{Eq 2})$$

Where:

L = allowable leakage, in liters per hour

N = number of joints in the length of pipeline tested

D = nominal diameter of the pipe, in millimeters

P = average test pressure during the leakage test, in killivolts per ampere

(vi) Table 2 System Test Methods

<b>Procedure</b>	<b>Pressure</b>	<b>Duration of Test</b>
Simultaneous Pressure and Leakage Tests	150% of working pressure* at point of test, but not less than 125% of normal working pressure at highest elevation.	2 h
Separate Pressure Test	150% of working pressure* at point of test, but not less than 125% of normal working pressure at highest elevation.	1 h
Separate Leakage Test	150% of working pressure* of segment tested.	2 h

\*Working pressure is defined as maximum anticipated sustained operating pressure.

In no case shall the test pressure be allowed to exceed the design pressure, for pipe, appurtenances, or thrust restraints

(vii) Table 3, Allowable Leakage per 50 Joints of PVC Pipe (gph)

Nominal Pipe Diameter,

Average Test Pressure

Nom. pipe diameter		4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36 (in.)
psi	(kPa)	(100)	(150)	(200)	(250)	(300)	(350)	(400)	(450)	(500)	(610)	(760)	(915) (mm)
300	(2,070)	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51	4.21
275	(1,900)	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3.36	4.03
250	(1,720)	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85
225	(1,550)	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04	3.65
200	(1,380)	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44
175	(1,210)	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22
150	(1,030)	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48	2.98
125	(860)	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72
100	(690)	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43
75	(520)	0.23	0.35	0.47	0.59	0.70	0.82	0.94	1.05	1.17	1.40	1.76	2.11
50	(340)	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	0.96	1.15	1.43	1.72

\*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

To obtain leakage in liters per hour, multiply the values in the table by 3.72.

These formulas are based on an allowable leakage of 10.5 gpd/mi/in.

(0.978 L/day/km/mm) of nominal diameter at a pressure of 150 psi (1,030 kPa).

7.3.5.1 Leakage values determined by the above formulas are presented in Table 3.

7.3.5.2 When testing against closed metal-seated valves, an additional leakage per closed valve of 0.078 gph/in. (0.0012 L/h/mm) of nominal valve size shall be allowed.

7.3.5.3 When hydrants are in the test section, the test shall be made against closed hydrant valves.

7.3.5.4 All visible leaks shall be repaired, regardless of the amount of leakage.

7.3.5.5 Alternative allowable-leakage criteria may be used if specified by the purchaser.

- (viii) For commercial/industrial watermain testing, the pipe shall be filled and remain filled with water for a period of at least twelve hours. After absorption is complete, the pipe, valves, hydrants and appurtenances shall be tested under a pressure equal to twice the maximum possible pressure or 150 psi, whichever is greater. All valves and hydrants shall be independently tested with sections of the tested watermain by isolation valve and hydrant testing (valve to valve, hydrant to valve). No leakage will be permitted over a two hour period. Prior to making the wet cut, wet tapping sleeves and insertion valves will be tested by the same method.
- (ix) The applicant's contractor shall furnish all labor, material and equipment necessary for the testing.
- (x) Any new pipe, joint, or other part of the water construction found to show leakage shall be removed and replaced.
- (xi) Air testing of facilities may be substituted for the above listed requirements only if existing facilities and conditions are ideally suited to this use, to be determined by the Authority Engineer. Details of testing procedures shall be established by the Authority. Requirements for testing of wells, treatment plants, and pump stations and for equipment performance testings shall be established by the Authority.

(4) Flushing

After filling and pressure and leakage tests have been satisfied and approved by the MTMUA, the lines shall be flushed at a minimum of 3 ft/S under observation of an MTMUA representative. A minimum of three changes of treated water shall be used in flushing operations. Valves shall be closed slowly to prevent excessive surges while



maintaining positive pressure at all times throughout the pipeline. If there is any possibility that the chlorinated discharge will cause damage to the environment, a neutralizing chemical shall be applied to the water discharge to meet all regulatory provisions for the disposal of chlorinated water. It is the sole responsibility of the contractor to provide all equipment necessary for disposal of water.

(5) Bacteriological Testing

After flushing, the system shall be flushed with water and a bacterial analysis, by an MTMUA/State approved laboratory, shall be made. The test samples shall be taken by a certified testing lab's representative under the observance of the MTMUA. The results shall meet standards as set forth by the N.J. Department of Environmental Protection.

The first sample is to be taken after the chlorine residual is field verified to be at normal dosage levels which is determined by the lab. A second sample shall be taken a minimum of 24 hours after the first test has been completed. The samples shall be taken. The results are to clearly indicate if the water is safe for human consumption. The samples shall be appropriately labeled and recorded and the results are to be forwarded to the MTMUA directly from the lab. If it has been observed by the MTMUA that trench water or excessive debris has entered the main during construction, samples are to be taken every 200 feet after chlorination by continuous feed or slug.

(6) Disinfection, Filling, Testing of Tanks

To be completed as per most current AWWA standards.

## **W:6 INSPECTION OF WATER SYSTEM DURING THE COURSE OF CONSTRUCTION.**

### **W:6-1 General.**

a. Authority.

All construction of water systems shall be under the jurisdiction of the engineer for the Authority, either directly or through inspectors under his supervision. He shall enforce compliance with these regulations, approved plans and specifications. He shall have the authority to stop work in the event of non-compliance.

b. Pre-construction Meeting Required.

Prior to construction of any watermain project the following is required:

1. A pre-construction meeting with the M.T.M.U.A. Staff Engineer, the developer, and the contractor must be scheduled well in advance of construction.

(a) Agenda items to be covered at pre-construction meeting are permits, cut sheets, shop drawings, material, pipe bedding, dewatering, installation, backfill, trench compaction, paving, punch lists, as-builts, testing and any other conditions pertaining to the project.

c. Hours of Testing.

Testing of water systems shall be performed during the regular M.T.M.U.A. working hours of 8:00 A.M. to 4:30 P.M. Monday thru Friday unless otherwise approved by the Authority.

d. Notice to Authority.

At all times applicant shall give 48 hours notice to the Authority prior to the construction of or testing of water systems. Should any water system 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.

e. House Connections.

1. 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 watermain during the month.

2. When a section of watermain has been satisfactorily tested, then all individual house connections must also be satisfactorily tested.

## **W:7 AS-BUILT DRAWINGS, EASEMENT MAPS, DESCRIPTIONS AND MANUALS.**

- a. After certain stages of construction, before reduction of Performance Bonds, and before final acceptance by the Authority, the applicant is required to submit As-Built information in the following form:

### **W:7-1 Stage 1.**

After construction of the watermain but before the Authority issues preliminary construction punch lists, before water pressure/bacteria testing is started, and before watermain may be used, the applicant shall furnish two (2) sets of prints (blue on white). Additionally, maps shall also be supplied in digital format and the digital data shall comply with all NJDEP Mapping and Digital Data Standards and/or NJDEP GPS Data Collection Standards for GIS Data Development requirements. The prints shall show As-Built alignment and grade of watermain, offsets to easement boundaries (if applicable), deeds and descriptions (if applicable), locations of other utilities (gas, electric, telephone, cable TV, storm sewers, etc.), stationary light poles, transformers, pads, telephone boxes, manholes and conduits, concrete thrust blocks, and concrete encasements, indicating clearance dimensions to the utility crossed. The Authority may require the verification of other utilities locations which appear to be closer than the required design separation via test pits. Should any of these stationary items be located 3' apart or closer, then those stationary objects shall be relocated to the 5 foot offset. Upon completion of these As-Builts, completion of punch list items and testing, the applicant may activate the watermains, but not tie the services into the proposed buildings until Section W:7-2, below is completed.

### **W:7-2 Stage 2.**

After construction of the buildings with all plumbing from the building completed to the curb line, but before tying into newly constructed water service curb stops, the applicant shall:

- a. Furnish either individual plot plans containing building foundation outline, triangulation from foundation outline to water facilities and related items further described under Section W:7-4. As an alternative, the applicant may submit continuously updated full size plan sheets with the same information required under Section W:7-4.
- b. Additionally, maps shall be supplied in digital format that meet the GPS Data Collection Standards For GIS Data Development requirements. Upon completion of those items the applicant may request from the Authority their endorsements of their request for Certificate of Occupancy. Upon endorsement by the Authority the applicant may connect to the water service curb stop or watermain.

### **W:7-3 Stage 3.**

After 95% of the Certificates of Occupancy in the proposed development have been endorsed by the Authority, the applicant is required to submit full size plan view and plan and profile view with same information provided under items W:7-1 and W:7-2 containing all items outlined under Section W:7-4. Maps shall also be supplied in digital format and the digital data shall comply with all NJDEP Mapping and Digital Data Standards and/or NJDEP GPS Data Collection Standards for GIS Data Development requirements

### **W:7-4 Stage 4.**

At completion of the project but before final acceptance by the Authority, the applicant shall submit one (1) complete set of reproducibles, approved by the Authority's Engineer and four (4) sets of prints (blue on white) of each drawings showing the details of the distribution system, all facilities, connections, etc., as actually constructed in plan and plan and profile. The data including depth at curb box, length of lateral from curb to main, location by GPS and triangulation of corporation stop, gang meter pit, curb box, stationing of service corporations which will be based on watermain centerline and will always begin with 0+0 from the nearest intersection valve on that watermain. Mapping data shall also be supplied in digital format that meet the NJDEP GPS Data Collection Standards for GIS Data Development requirements. Underground utilities (electric, telephone, gas, cable TV, storm sewer, irrigation lines, proposed or existing sewer mains) shall be shown along with their crossing clearance dimension and elevation. Also to be shown on the drawings shall be concrete encasements, above ground structures (such as transformers, concrete pads, telephone ground boxes, light poles, etc.) if they are within three feet of services and clearances at crossing with other utilities, offsets to watermains from curbing or edge of pavement, details at special connections, easements with offsets to watermain and easement boundaries, and triangulation to any valve not in pavement. As-Built drawings shall be signed and sealed by a licensed professional land surveyor. All above grade features shall be physically located using GPS technology and referenced to New Jersey State Plane Coordinate System, NAD '83.

## **W:8 USE OF SYSTEM PRIOR TO ACCEPTANCE.**

### **W:8-1 After Satisfactory Completion.**

- a. After all structures are proposed, and before use, the Authority shall be in receipt of the following:
  1. The facilities shall be final tested.

2. As-Builts
3. All test certification shall be given to the Authority.
4. Easements (shall include offsets to mains from edge of easement).
5. N.J.D.E.P. Construction Certification Report (may be necessary). For the water construction permit to remain valid, the facilities approved in the permit shall be constructed and placed into service within three (3) years from the effective date of the permit. Within 10 days of completion of the approved facilities the applicant's engineer shall certify to N.J.D.E.P. and MTMUA that the facilities were constructed in accordance with the approved plans and specifications.
6. Any other approval from other Agencies.

## **W:9 ACCEPTANCE OF NEW WATER SYSTEM BY THE AUTHORITY.**

### **W:9-1 Satisfactory Completion.**

- a. After satisfactory completion of all structures proposed, including roadways final paved, all water easements restored, and landscaped according to project drawings and Township requirements, and prior to acceptance by the Authority, the applicant will:
  1. Give proper title to all lands, easements, structures, appurtenances by deed or appropriate dedication.
  2. Post a maintenance guarantee in a form acceptable to the Authority's attorney and equal to 10% of the Performance Guarantee guaranteeing the satisfactory performance of the system for a period of two (2) years.
  3. Certify to the Authority, and the State where necessary, that all plans were prepared in conformance with the Authority's Rules and Regulations and with N.J.D.E.P. requirements, and that construction has been in conformance with the approved Plans and Specifications and in full compliance with the Authority's Rules and Regulations.
  4. Where required, the Authority's Engineer will certify to the State that the system has been inspected and tested in accordance with and complies with all State performance standards and regulations.

**W:9-2 Approval**

- a. Upon receipt and approval of the above listed items, the Authority will:
  - 1. Release the applicant from the Performance Guarantee.
  - 2. Accept the title to all lands, easements, structures, appurtenances and improvements.
  - 3. Assume the routine operation and maintenance of the system thereafter.

**W:9-3 Partial Reduction of Performance Guarantee.**

- a. The developer may request not more than one reduction in the amount of the performance guarantee and only when in excess of 50% of the improvements to be installed are completed. The reduction shall only be made upon favorable recommendation of the Authority's Engineer and shall not exceed 70% of the dollar value of the improvements installed.

**W:10 USE OF SYSTEM.**

**W:10-1 Use of Water System by Authority.**

- a. During construction and before final acceptance, the Authority shall have the right to use any portion of the system completed without waiving their right to order correction of any defects.
- b. No water service will be provided where sanitary sewer facilities are to be installed until the sanitary sewer facilities are in operation.

**W:10-2 Unauthorized Use of System.**

Use of the active portion of the water system for construction, flushing of sewers, filling pools, irrigation and the like, is strictly prohibited without the express permission of the Authority.

## **W:11 COMPLIANCE WITH RULES AND REGULATIONS.**

### **W:11-1 General.**

The Applicant shall comply with all of the Rules and Regulations as forth herein. Failure to do so will result in a stop work directive by the Authority.

The Applicant shall exercise all construction restraints required to conform to the New Jersey Department of Environmental Protection regulations.

### **W:11-2 Noncompliance.**

The Authority reserves the right to refuse to any applicant the privilege of connecting to the Authority's system, or to discontinue providing use of the water system if the non-compliance is not corrected within 24 hours of written notice from the M.T.M.U.A. to cease and desist.

## **W:12 REIMBURSEMENT REGULATIONS.**

### **W:12-1 Reimbursement Regulations**

The Authority has determined that it is totally impractical to continue to calculate reimbursement on the basis of certified costs after construction. Subsequent developers' projects were being delayed waiting for certified costs from original developers, and the process has become unmanageable, hence these revised reimbursement regulations.

### **W:12-2 Definitions**

"Developer" - See W:2 Definitions of the MTMUA Rules & Regulations

"Original Developer" - Any developer who installs a "dead end" water improvement pursuant to these Rules and Regulations to be owned by the Authority which improvement is capable of being utilized by other developers.

"Subsequent Developer" - Any developer or owner of a vacant lot who utilizes a "dead end" water improvement installed by an original developer. Once a subsequent developer has paid the reimbursement amount chargeable to it pursuant to these Rules and Regulations, the subsequent developer will in turn be eligible for reimbursement from other subsequent developers.

"Unit Price Matrix" - A schedule of standardized unit prices for various elements of water construction to be used in calculating reimbursable amounts. This

matrix will be revised by the Authority from time to time to keep pace with price changes. See appendix A.

### **W:12-3 Developers Eligible for Reimbursement**

A Developer who installs a water improvement pursuant to these Rules and Regulations to be owned by the Authority which improvement is capable of being utilized by other developers shall be entitled to reimbursement for a portion of the cost of the improvement in accordance with this section, provided the Authority can readily and accurately determine the proportionate utilization of the improvement. THIS CAN ONLY BE ACCOMPLISHED FOR SINGLE (I.E. DEAD END) PIPES. Therefore, the Authority will entertain reimbursement for dead end pipes only. Any subsequent developer who has paid reimbursement to an original developer shall also be entitled to reimbursement pursuant to these Rules and Regulations for a portion of the cost of his reimbursement. Any such agreements shall be subject to the following:

- a. The decision to enter into a reimbursement agreement shall be within the full discretion of the Commissioners of the MTMUA made only pursuant to a written request from the developer. Reimbursement agreements shall only be entered into when the proposed water improvements are in the best interests of the Authority as determined by the Authority Board of Commissioners, such as when a regional approach is required or desirable.
- b. The amount which the Authority shall be required to collect from each and every subsequent Developer who utilizes the "dead end" water improvement shall be based upon the anticipated percentage of units that said Developer shall require and shall be calculated in accordance with W:12-4.

### **W:12-4 Projects Required to Reimburse:**

Any developer who utilizes dead end water improvement installed and paid for by another developer, who also has entered into a reimbursement agreement with the Authority, shall be required to reimburse that developer in accordance with this section.

- a. The amount of the reimbursement shall be calculated as follows:

$$\frac{A}{B} \times C = \text{reimbursement amount}$$



Where:

A = The total number of Equivalent Dwelling Units (EDU's) for the subsequent Developer's entire project. An EDU shall be determined annually by the Authority as required by NJSA 40:14B-21.

B = The sum of all the EDU's of any and all developers including the EDU's reserved for the subsequent developer currently being required to reimburse, the total amount of which will be expressed in EDU's, as determined by the Authority Engineer.

C = Cost of the project eligible for reimbursement based on a unit price schedule as determined by the Authority Engineer to be reviewed and updated periodically.

- b. Example 1 - Developer 1 constructs a "dead end" water improvement for his 10 unit development at cost determined by the Authority Engineer of \$30,000.00. After the project is complete, Developer 2 applies for approval of a project of 5 EDU's which utilizes all of the facilities which comprised the \$30,000.00 cost. Developer 2 must reimburse Developer 1 for \$10,000.00, calculated as follows:

A = Developer 2's total # of EDU's = 5 EDU's

B = Sum of all developers' capacity needs = 15 EDU's

C = \$30,000.00

$(5 \text{ divided by } 15) \times \$30,000.00 \text{ (1's project cost)} = \$10,000.00$

If developer #2 had used only half of the facilities comprising the \$30,000.00 cost, then "C" would have been \$15,000.00 in the formula above, and the reimbursement would have been  $(5/15) \times \$10,000.00 = \$5,000.00$ .

- c. Example 2 - The facts are the same as in example 1 except that after Developer 2 finishes its project, Developer 3 seeks approval of a separate project with a capacity requirement also of 4 EDU's, which utilizes all the facilities comprising the total \$30,000.00 cost. Developer 3 would be required to reimburse Developer 1 and 2 in the amount of \$6,315.00, calculated as follows:

A = Developer 3's total # of EDU's = 4 EDU's

B = Developer 1 & 2 & 3's combined total # of EDU's = 19 EDU's

C = \$30,000.00

4 divided by 19 x \$30,000.00 (1's project cost) = \$6,315.00

This reimbursement would be split between developers 1 and 2 as follows:

Developer 1 =  $\$6,315.00 \times \frac{10 \text{ EDU's}}{10 + 5 \text{ EDU's}} = \$4,210.00$

Developer 2 =  $\$6,315.00 \times \frac{5 \text{ EDU's}}{10 + 5 \text{ EDU's}} = \$2,105.00$

#### **W:12-5 Reimbursement Collection**

The amounts to be collected from each subsequent Developer shall be collected within 60 days of the Final Approval. Final Approval will be subject to reimbursement within 60 days. Approval will become null and void if the reimbursement amount is not paid within the 60 day time period. Subsequent developers will not be allowed to connect to existing lines until the reimbursement has been paid.

#### **W:12-6 Allocation of Reimbursement Amounts**

Any amount reimbursed pursuant to these regulations shall be allocated to prior developers in proportion to their total number of EDU's utilizing the dead end line.

The Authority shall be entitled to withhold from any reimbursement payments received, prior to remitting the same to the Developer, an amount equal to its administrative costs associated with the implementation of this Agreement. Such costs shall be calculated based upon the hourly compensation paid to the employee(s) or consultant(s) involved, including overhead costs.

#### **W:12-7 Costs Eligible for Reimbursement**

The cost of a project eligible for reimbursement shall be based upon the Authority Engineer's approved estimate of project cost based upon the unit price matrix attached hereto as Appendix A. Eligible costs include construction costs plus "soft" costs. Soft costs include construction design, survey work, review and inspection fees, easement acquisition, permit fees, bonds payable to the Authority and any other costs determined by the Authority to be directly related to the construction of the project. These soft costs will be added to the construction costs as 40% of the construction costs. (See Appendix B to see how the 40% was derived.)

**W:12-8 Terms and Conditions of Reimbursement**

- a. Upon written request from a developer, the Authority may enter into an agreement with each developer entitled to reimbursement at the time of final approval covering, among other things, any fees to the Authority to reimburse for administrative time in handling the reimbursement and any other matters agreed to by the developer and the Authority. Among the factors to be taken into consideration in negotiating such agreement may include:
1. The size of the development.
  2. The estimated time to complete the development.
  3. The amount of improvements to be constructed by the developer.
  4. The likelihood that the facilities may be utilized by other developers.
  5. The dollar value of the improvements.
  6. The number of EDU's utilized by the developer.
  7. The term of all reimbursement agreements shall be no more than ten years.
  8. Any governmental entity, pre-existing residence or business on a well shall be exempt from any and all reimbursement terms and conditions. Vacant Lots are not exempt.

**W:12-9 Indemnification**

The Authority will use its best efforts in accordance with existing law to collect the reimbursement amounts from subsequent parties but, in no event, shall be liable to the Developer for failure to collect.

**W:12-10 Assignability**

This agreement shall not be assignable by the Developer without the prior written consent of the Authority, which will not be unreasonably withheld or delayed and which consent shall be conditioned upon the posting of proper Performance Guarantees, if any, and the execution of such documents as deemed appropriate by the Authority attorney to assure that the assignee shall be entitled to all the obligations and benefits to Developer under this agreement.

The Authority will include indemnification provisions in the reimbursement agreements that require the Developer who enters said agreement to hold harmless, indemnify and defend the Authority in the event that the reimbursement agreement is subjected to legal challenge. Said agreements may also provide that any legal defense that the Developer may provide to the Authority shall be under the direct supervision and control of the Authority attorney and that any settlement decisions with respect to any such litigation shall be within the full discretion of the Authority.

**W:12-11      Legal Challenge**

Any Developer wishing to enter a reimbursement agreement may be required by the Authority to provide an appropriate Bond or Letter of Credit in the form and amounts required by the Authority attorney in order to protect the Authority in the event that the reimbursement agreement is subject to legal challenge

**W:13 APPLICATION FORMS.\***

- a. Preliminary Application for Water Service – See Form W1.
- b. Tentative Application for Water Service – See Form W2.
- c. Final Application for Water Service – See Form W3.
- d. Application for Extension of Approval for Water Service – See Form W4.
- e. Individual Water Connection Application – See Form W5.
- f. Approval to Obtain Building Permit for Water – See Form W6.
- g. Irrigation Water Connection Application – See Form W7.
- h. Approval of Water and/or Sewer Facilities for C.O. – See Form W8.
- i. Deed of Easement – See Form W9.

\*Editor's Note: Forms may be found at the end of this section.

**W:14 FILING, REVIEW AND INSPECTION FEES**

- a. Where mains are to be constructed by anyone other than the Authority, the applicant shall make application and pay fees on an hourly basis to draw down against the deposit as listed below:
  - 1. Application for Review of Preliminary Plans:
    - Minor.....\$250.00
    - Major - Deposit..... \$ 7.25 per unit  
\$450.00 minimum
  - 2. Application for Tentative Approval
    - Review Fee.....1 1/2% of est. construction cost
  - 3. Application for Final Approval:
    - Review Fee.....1 1/2% of est. construction cost
    - Inspection Fee.....5% of est. construction cost
- b. Wetlands Waiver. Request for wetlands waiver processing must be made by the owner of the property. A \$363.30 processing fee made payable to the Monroe Township Municipal Utilities Authority must accompany the request.
- c. Extensions and Revisions. Applications for extensions of approval with no changes must be accompanied by a review fee deposit of \$290.00. Application for revisions after submittal and initial review must be accompanied by a review fee deposit of \$450.00.
- d. Depletion of Deposit Prior to Completion. If the deposit is depleted before completion of review or inspection, the applicant shall deposit an additional amount to complete the review or inspection as estimated by the Authority Engineer within five (5) days of notification or all review and inspection will cease at the end of five (5) days after notification. Any deposit monies not used will be returned to the applicant within two (2) months after acceptance of the maintenance bond for the project.
- e. Calculation of Fees. The amount charged by the Authority shall be calculated by the Authority's budget for the coming fiscal year, and shall be based on the hourly salary cost to the Authority, the cost of fringe benefits payable to said individual and the cost of the overhead of the Authority allocable to that employee.  
(Revised 6-19-03)

Applicant is required to submit IRS Form W-9 (Request for Taxpayer ID # & cert) with filing, review and inspection fees.

**FORM W1 PRELIMINARY APPLICATION FOR WATER SERVICE, SEE SEPARATE FILE**

**FORM W2 TENTATIVE APPLICATION FOR WATER SERVICE, SEE SEPARATE FILE**

**FORM W3 FINAL APPLICATION FOR WATER SERVICE, SEE SEPARATE FILE**

**FORM W4 APPLICATION FOR EXTENSION OF APPROVAL FOR WATER SERVICE, SEE SEPARATE FILE**

**FORM W5 INDIVIDUAL WATER CONNECTION APPLICATION, SEE SEPARATE FILE**

**FORM W6 APPROVAL TO OBTAIN BUILDING PERMIT FOR WATER, SEE SEPARATE FILE**

**FORM W7 IRRIGATION WATER CONNECTION APPLICATION, SEE SEPARATE FILE**

**FORM W8 APPROVAL OF WATER AND/OR SEWER FACILITIES FOR CERTIFICATE OF OCCUPANCY, SEE SEPARATE FILE**

**FORM W9 DEED OF EASEMENT**

DEED OF EASEMENT

This Deed, made on This                      day of                      ,

BETWEEN \_\_\_\_\_, referred to as Grantor, whose address is \_\_\_\_\_

AND THE MONROE TOWNSHIP MUNICIPAL UTILITIES AUTHORITY, a public body corporate and politic of the Township of Monroe, County of Middlesex and the State of New Jersey, with its principal office at 143 Union Valley Road, in the Township of Monroe, County of Middlesex and State of New Jersey, referred to as the Authority.

WITNESSETH, that the Grantor, in consideration of LESS THAN ONE HUNDRED AND NO/100 DOLLARS (LESS THAN \$100.00), the receipt of which is hereby acknowledged, does hereby grant and convey to the Authority, an Easement across the property in the Township of Monroe, County of Middlesex and State of New Jersey, being part of the premises known as Lot \_\_\_\_\_,

Block \_\_\_\_\_ on the Tax Map of Monroe Township, Middlesex County, New Jersey and more particularly described in Schedule A and shown on Schedule B attached hereto .

The easement herein granted and conveyed by the Grantor to the Authority gives the Authority the right to construct, maintain, replace, or supplement its sewerage/water and appurtenant facilities on or under the surface of the said premises and to have free access to and across the said premises without need of notice, insofar as such right of access is necessary to the proper use of any right granted herein, on the condition that the Authority, after doing any work on the premises, shall restore the premises substantially to its original condition, to the extent possible.

With respect to the easement herein granted, the GRANTORS, their heirs and assigns, shall have the right to surface use of the said premises, but agree to be limited as follows:

Prepared by:

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1. No obstruction or encumbrance, physical or otherwise, shall be placed in or about the said premises which will obstruct the Authority's purposes as expressed herein. This prohibition includes, but is not limited to, the planting of trees, placement of permanent structures, the storage of materials or the erection of fencing.

2. No fill, material, machinery, appliances, or similar objects may be placed on the said premises which will impose an additional loading in excess of one hundred pounds per square inch (100 lbs./sq. inch) without the prior written approval of the Authority.

3. Fencing may be erected, as approved by the Authority, provided the Grantor or his/her successor is responsible for all costs associated with removal and/or reinstallation of the fencing if and when it becomes necessary for the Authority to work within the easement.

THE GRANTOR promises that the Grantor has done no act to encumber the property. This promise is known as a "covenant as to Grantor's acts". (N.J.S.A. 46:4-6).

IN WITNESS WHEREOF, the said Grantor has hereunto set his/her hand and seal the day and the year first above written.

ATTEST:

\_\_\_\_\_ BY:  
STATE OF NEW JERSEY, COUNT OF \_\_\_\_\_ SS:

I certify that on \_\_\_\_\_, under oath, to my satisfaction, that This person (or if more than one, each person):

- (a) is named in and personally signed This Deed;
- (b) signed, sealed and delivered This Deed as his/her or her act and deed; and
- (c) made This Deed for less than \$100.00 plus other valuable consideration as the full and actual consideration paid or to be paid for the grant of easement.

FOR RECORDING RETURN TO:  
MONROE TOWNSHIP MUNICIPAL UTILITIES AUTHORITY  
143 UNION VALLEY ROAD  
MONROE TOWNSHIP, NEW JERSEY 08831