

BACKWATER PREVENTION DEVICE INSTALLATION

SPECIFICATIONS AND FIGURES

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Water Services**

SECTION 1.

1. GENERAL

- A. This program is designed to eliminate basement flooding and to improve health conditions in individual buildings by the installation of overhead plumbing or backwater prevention devices. In most cases, these devices shall consist of either a backwater valve and/or a ball shut-off valve. Under special conditions, a submersible wastewater (ejector) pump may be required. In addition to converting the sanitary system to an overhead system, valves and pumps shall be installed beneath the basement floor as described in Section 2, Detailed Specifications. The excavated portions of the basement floor shall be backfilled with crushed stone, and new concrete floor sections shall be placed with a smooth and continuous surface.

Figures I through VI apply to backwater and ball valve installations. Figure IX illustrates a typical sanitary system converted to overhead plumbing using these specifications. Figure I illustrate the extension assemblies. Figure II presents a typical collinear valve installation. Figure III illustrates a deep installation (top of pipe greater than 18 inches beneath the basement floor surface) and Figure IV a shallow installation (top of pipe less than 9 inches beneath the basement floor surface). The positioning of the valves (see Figure VI) shall be such that all basement plumbing will be tributary to them (except washing machine standpipe connections, see Figure V and Section L Backwater and Ball Valve Installation). Figure VII illustrates a typical submersible sump pump installation. Figure VIII illustrates a typical submersible wastewater (ejector) pump installation.

- B. The Contractor shall provide all materials, labor and equipment to convert the existing system to overhead plumbing and/or install backwater prevention devices according to the following specifications to include reconnecting the flow from the first floor and above down stream of any control valves or backwater prevention devices.
- C. The following specifications do not include applicable Ohio Plumbing Law, Regulations and Code. However, all work is to be performed according to mandated Code procedures. The Plumbing Contractor must be licensed in the State of Ohio as well as in either the local jurisdiction or in Montgomery County, depending on where the work is being performed. In accordance with the Code, the Contractor must obtain a permit for this work, and a Plumbing Inspector shall be required to inspect all plumbing work. No homeowner permits

shall be allowed for this work.

- D. The contract to perform this work is between the plumbing contractor and the building owner. Payment for services to perform this work shall be the owner's responsibility. Montgomery County Water Services (MCWS) is providing these specifications to property owners who suffer from basement flooding or who have the potential to suffer from basement flooding due to a sanitary sewer backup. MCWS will be approving bid amounts for performance of the work. Following completion of the work, MCWS will inspect the installations to ensure adherence to these specifications. Upon inspection and approval, MCWS will issue a check to the owner for the previously approved bid amount. The amount of the check will not exceed the cost of the improvement for the sanitary plumbing as outlined in the Foundation Drain Disconnect Program.

2. **DETAILED SPECIFICATIONS**

The following sections list the work to be completed for a Backwater Prevention Device Installation. A backwater valve and a ball valve shall be installed unless otherwise indicated.

When air conditioning condensate drain(s), hot water heaters, pressure relief valve drain(s) or a combination are the only basement plumbing fixtures, a sump pump shall be installed to pump the flow up and out onto a splash block. If there is an existing sump pump for foundation drains in close proximity, it may be utilized and a new sump pump will not be required. The installation of a new sump pump, or the utilization of an existing sump pump shall be indicated on the bid.

When an existing foundation drain system is disconnected from the sewer system due to the Contractor's work, it will be connected to an existing or new sump pump which discharges onto the exterior ground with a splash block. Where valves are required to protect the basement plumbing, a sump pump will be installed for this purpose in addition to the valves. In instances where the presence of an underground system cannot be determined beforehand, the installation of the sump pump in addition to the valves will be paid by change order on a time and materials basis. Where the presence of a subgrade drainage system has been determined prior to submitting a bid, this work shall be indicated in the bid proposal.

When existing conditions have a bathroom facility in the below ground level of a structure, a submersible wastewater (ejector) pump may be required. Such installations shall be approved by MCWS as part of the bidding process.

A. **LOCATE SERVICE**

The Contractor will be responsible for locating the sewer service pipe to determine the specific point in the basement where the valves or pumps are to be installed.

B. CONCRETE EXCAVATION

The Contractor shall be required to excavate concrete from the basement floor as necessary to install the valves or pumps. The excavation may be accomplished by saw cutting or by scoring and jack-hammering. The Contractor is cautioned, however, that the building and its contents must be protected from potential damage resulting from the work, including settling dust.

Excavating basement wall concrete or floor concrete adjacent to walls shall be avoided if possible. This area is highly susceptible to groundwater leakage. If leaks occur in the newly placed concrete or at the joint between the new and old concrete after the installation, it shall be the Contractor's responsibility to repair such conditions.

All excavated material shall be placed directly into containers and removed from the building. It shall not be stored anywhere on the owner's property for removal later. **Any dust created shall be removed.**

The excavation shall provide for a minimum 4-inch wedge space underneath the remaining concrete floor all around (see Figures II-IV, VII and VIII). This area shall be filled with new concrete when the floor is replaced. This wedge of concrete must be provided to establish the best possible bond between the existing concrete floor and the new concrete.

C. EARTH EXCAVATION

After the concrete has been removed, soil and any other material beneath the floor must be removed to expose the existing sewer service pipe. All excavated material shall be immediately placed into containers and removed from the building. It shall not be stored anywhere on the owner's property for removal later. **Any dust created shall be removed.**

The excavation shall provide for a minimum 4-inch wedge space underneath the remaining concrete floor all around (see Figures II-IV, VII and VIII). This area shall be filled with new concrete when the floor is replaced. This wedge of concrete must be provided to establish the best possible bond between the existing concrete floor and the new concrete.

D. DETERIORATED OR NON-STANDARD EXISTING PIPE

If pipe too deteriorated to permit connection in Conformance with the Ohio Plumbing Code is discovered, the Contractor shall notify MCWS of the condition of the pipe before proceeding with the work. MCWS will address the condition with the owner as a change order. The local Plumbing Inspectors have requested an inspection of any pipe sections removed from buildings within their jurisdiction. The Contractor shall be responsible for ensuring compliance with this provision.

E. NEW PIPING

The Contractor shall furnish and install Schedule 40 PVC pipe and other fittings as required to complete the installation of overhead plumbing and/or valves or pumps.

F. COUPLINGS

The Contractor shall use couplings to connect any new PVC pipe to existing piping. If the diameter of the existing piping is larger than 4-inch, refer to Section G, Reducers. Couplings that are used to connect pipe made of dissimilar material shall be designed for that purpose and for the specific types of pipe being joined. The couplings used shall be as manufactured by Mission Manufacturing, Fernco, or approved equal. All couplings must comply with the Ohio Plumbing Code.

G. REDUCERS

If pipe of diameter greater than 4 inches is encountered, the Contractor shall be required to furnish and install reducers to accommodate the 4-inch maximum valve size. Also, to reduce the protrusion of clean-out plugs, eccentric 4-inch by 3-inch reducers shall be required for shallow installations (top of pipe less than 9 inches from the floor surface) where a 4-inch pipe has been uncovered and 3-inch valves are being installed (see Figure IV).

The reducers used shall be eccentric such that the flow line of the piping will be maintained on its existing slope. The elevation of the crown of the pipe may vary, but the invert of the pipe must be maintained on a straight, smooth slope. The reducers may be reducing couplings as long as the integrity of the flow line can be maintained.

When a vault is required for the backwater valve, the Contractor shall use reducing couplings to form a water-tight seal between the pipe entering the vault and the 6-inch hubs (see Figure III and IV). It is imperative that no ground water infiltrate the vault once installed. The couplings shall be 6-inch by 4-inch flexible reducers as manufactured by Fernco or equal. When used for this purpose, eccentric reducers shall not be required since they do not form the flow line. They are only providing a seal between the entering pipe and the vault opening. However, eccentric reducers may be used. Eccentric reducers, if rotated around the hubs, will provide greater vertical latitude for positioning the vault and the hub openings at the appropriate elevation. Reducers shall not be allowed in the discharge piping from submersible sump pump or submersible wastewater (ejector) pump installations.

H. WASHING MACHINE and SINK CONNECTIONS

If a stand pipe connects directly into the side of the stack with an open receptacle for the purpose of catching discharge from a washing machine hose and if conditions do not require the stack to be tributary to the backwater and ball valves, the stand pipe shall be

extended to a height of 42 inches above the base of the washing machine and a properly sized PVC manual shut-off valve and check valve shall be installed. The shut off valve shall be installed vertically in the stand pipe and the check valve horizontally (see Figure V and Section H.2 Valves). The stand pipe shall not be disconnected and reconfigured to flow through the backwater and ball valves. Instead, it shall remain directly connected to the stack. No action shall be taken with regard to the washing machine discharge when an existing stand pipe extends higher than the ground elevation outside the basement.

If the stack must be tributary to the backwater and ball valves and MCWS has granted permission, then no shut-off valve shall be installed in the stand pipe, and it shall not be extended since the backwater and ball valves will protect this receptacle.

If a washing machine discharges through an adjacent sink, then both may be protected by a check valve and manual shut off valve located between the sink and the stack or as necessary to protect the lower level. The valves shall be located to make them accessible for operation and maintenance.

If the washing machine discharges into other receptacles such as a laundry sink or wash basin and backwater and ball valves are to be installed, no special methods shall be employed since these other receptacles will be reconfigured to flow through the backwater and ball valves. Where the reconfiguration of these items is impractical without extensive construction and cost and the laundry sink/wash basin drainpipe (properly trapped) is connected directly into the side of the stack or stand pipe, an exception may be allowed. In such cases, the laundry sink/wash basin drainpipe shall remain directly connected to the stack or stand pipe (see revised Figure V) and a properly sized PVC check valve and PVC manual shut-off valve shall be installed in the stand pipe or drainpipe as deemed necessary.

A sink that is not protected by valves or by a Sewage (ejector) pump shall be protected by installation of a check valve and gate valve as described in section H.2 Valves.

In cases where the washing machine discharges into other receptacles such as a laundry sink or wash basin (properly trapped) which is connected directly into the side of the stack or stand pipe and a submersible sump pump is to be installed, the laundry sink/wash basin drainpipe shall remain directly connected to the stack or stand pipe (see Figure V) and a properly sized PVC check valve and manual shut-off valve shall be installed in the stand pipe or drain pipe as indicated below.

H.1 Washing Machine Stand Pipe Where required, the Contractor shall furnish and install a properly vented washing machine stand pipe assembly. The stand pipe shall be a minimum 2-inch ID. The vent pipe shall be a minimum 1-1/2 inch ID. The vent pipe shall be connected in accordance with the Ohio State Plumbing Code unless a deviation is authorized by the Plumbing Inspector. A properly sized PVC manual shut-off valve shall be installed vertically in the stand pipe (see Figure V).

I. WATER STOPS

For backwater and ball valve and wastewater (ejector) pump installations, bentonite-based water stops which expand with hydration shall be used to prevent groundwater infiltration into the basement. The water stops shall be installed within the new concrete where it bonds to the PVC extensions, the vault (if used), the wastewater (ejector) pump basin (if used), and to the existing concrete (see Figures II-IV, and VIII). The water stops shall be Volclay Waterstop-RX (American Colloid Company, Arlington Heights, Illinois) or Greenstreak Swellstop (Greenstreak Plastic Products Company, St. Louis, Missouri) or equal. The 1 inch by 3/4 inch size shall be used.

The water stops shall be wrapped around the outside of the two cleanout adapters or the vault (if used), around the outside of the wastewater (ejector) pump basin (if used), and around the cut concrete edges of excavations prior to pouring new concrete. The 1 inch side of the water stop shall be pressed against the vertical faces. The faces, including the jack-hammered or saw cut concrete, shall be clean, dry and free of soil, dust or other debris.

The water stops must fully encircle the adapters, the vault (if used), the wastewater (ejector) pump basin (if used), and the edges of the excavation. It must be firmly pressed against the point of installation. If adhesive is necessary to maintain its position while pouring the concrete, a water based adhesive for this application such as RX Primer is available from suppliers of the water stop. There shall be no gaps between the water stop and either the cleanouts, the vault (if used), the wastewater (ejector) pump basin (if used), or the concrete. When reaching the end of the wrap, the water stop shall be cut, overlapped with the other end and meshed together. During application, the water stop shall not lose its cross sectional area by either elongation or deformation. It shall be installed so that it will be encased within the concrete pour. There shall be a 2-inch minimum clearance between the edge of the water stop and the top of the 6-inch pour. The water stop shall be kept dry during storage, preparation, and installation and while awaiting the concrete pour.

If existing concrete floors as thin as 2 inches are encountered, saw cut edges may be best for attaching the water stop. The 2-inch minimum concrete cover shall be maintained even if this requires wrapping a portion of the water stop under the existing cut concrete floor and adhering it to the underside. If this is the case, this underside area shall be clean, dry, and free of dust, soil or other dirt.

J. CRUSHED STONE BEDDING AND BACKFILL

Once the work has been approved by the Plumbing Inspector, all areas around the pipe, the valves, the extensions, the vault (if used), the wastewater (ejector) pump basin (if used), and the sump pump basin (if used) shall be bedded and backfilled with coarse aggregate conforming to Section 703 of the State of Ohio, Department of Transportation, Construction and Material Specifications. Backwater and ball valve and wastewater

(ejector) pump installations may be backfilled with either #8 or #9 coarse aggregate. Sump pump installations shall be backfilled with #9 coarse aggregate. Crushed stone bedding and backfill shall have a minimum thickness of 6 inches.

The backfill shall stabilize the excavation by filling all spaces except those reserved for the new concrete floor and the wedge space beneath the existing floor. The backfill shall be placed in lifts no deeper than 6-inches each. Each lift shall be compacted with a hand tamper applied to all areas before the next lift is placed. Special care must be taken to not damage the valves, the piping, the extensions, the couplings, the vault (if used), the wastewater (ejector) pump basin (if used), or the sump pump basin (if used) when placing the stone and tamping. If any of these elements or the water-tight seals are damaged, they shall be repaired.

The backfilled area shall provide for a 6-inch minimum concrete floor depth to be poured back around the top of the extensions, the vault (if used), the wastewater (ejector) pump basin (if used), or the sump pump basin (if used). Please see Figures II-IV, VII and VIII. For a shallow backwater and ball valve installation this 6-inch depth may require concrete to be poured directly against the valves and piping. This concrete shall extend a minimum 4 inches radially from the outside of the extensions, the vault (if used), the wastewater (ejector) pump basin (if used), or the sump pump basin (if used).

In backwater and ball valve installations where a vault is required and in wastewater (ejector) pump and sump pump installations, crushed stone backfill shall be used as a bedding for the vault, the wastewater (ejector) pump basin, and the sump pump basin as well as for backfill around the outer walls and on top of the extended circular bottom plate (see Figures III, VII and VIII).

K. CONCRETE

The Contractor shall place new concrete as shown on Figures II-IV, VII and VII. The concrete shall form a new floor for all areas where concrete was excavated. The new concrete floor sections shall be poured against the stone backfill and shall have a minimum thickness of 6 inches defined by the backfill placement. The concrete shall completely fill the 6-inch minimum depth areas around the extensions, the vault (if used), the wastewater (ejector) pump basin (if used), the sump pump basin (if used), and the wedge space beneath the existing floor. To obtain this wedge the new floor thickness may need to exceed the 6-inch minimum depth depending upon the thickness of the existing floor. The concrete shall extend a minimum of 4 inches radially from the outside of the extensions, the vault (if used), the wastewater (ejector) pump basin (if used), and the sump pump basin (if used); although in most cases the new concrete will extend further because of the concrete excavation required to perform the work. When a backwater valve and a ball valve are installed very near to each other, the mass of concrete for each extension, or extension and vault, if used, may connect. For shallow installations the 6-inch depth may require that portions of the valves and piping be encased in concrete.

K.1 Concrete Mix The concrete shall be Sakret, Quikrete or equivalent. The Contractor shall follow the mixing instructions listed on the packaging. The mix shall be as dry as possible while maintaining workability. Excess water will weaken the concrete and make it permeable. Waterproof concrete must be achieved.

All equipment used for handling and/or placing concrete shall be such that it will accommodate concrete of the appropriate proportions and consistencies. No adjustments in mixture proportions shall be made to accommodate equipment which is not capable of handling concrete of appropriate proportions and consistencies.

K.1.1 Concrete Admixture. For backwater and ball valve and submersible wastewater (ejector) pump installations the Contractor shall add 6 fluid ounces of Ipanex as manufactured by IPA Systems, Philadelphia, Pennsylvania to each 80 pounds of bagged concrete. The admixture shall be thoroughly mixed into the concrete according to the manufacturer=s guidelines prior to deposition into the excavation. Alternate admixture products may be considered if documentation indicating equivalency is submitted to MCSED prior to placing any concrete. Concrete admixtures shall not be required for submersible sump pump installations.

K.2. Placing Concrete All water present at the elevation where concrete is being poured, shall be completely removed from the excavation before concrete is deposited. The method and manner of placing concrete shall avoid segregation or separation of aggregates. If the Contractor does not employ sufficient consolidation methods, groundwater may infiltrate through the segregated concrete once the installation is complete. If such infiltration causes a problem at the surface, it shall be the Contractor=s responsibility to correct this condition.

A bonding agent shall be used to adhere new concrete to existing concrete surfaces.

Concrete shall be compacted and consolidated by thorough tamping and rodding using spading tools. The Contractor shall thoroughly rod the concrete throughout the pouring process. Such practices shall be required to prevent formation of honeycombs, voids, and air pockets. Compaction and consolidation must begin immediately after concrete has been deposited in the pit. Spading tools for tamping and rodding shall be applied to the concrete. They shall be moved throughout the mass, thoroughly working the concrete around the extensions, the vault (if used), the wastewater (ejector) pump basin (if used), and into the wedge space beneath the existing floor. Tamping and rodding shall be of such duration to accomplish through compaction but shall not be unduly prolonged to cause segregation at the surface.

The Contractor shall only use tools which are clean and free of soil.

Concrete shall be deposited and compacted to form a dense, and impervious mass of uniform texture having smooth faces on exposed surfaces. When any section of concrete is

defective, it shall be removed and satisfactorily replaced or repaired.

The use of long chutes, troughs, belts, and pipes for conveying concrete from the point of delivery to the pit shall be allowed. Troughs, pipes, or chutes used as aids in placing concrete shall be arranged and used in such a manner that ingredients of the concrete are not separated.

Where steep slopes will be necessary, the chutes shall be equipped with baffle boards or shall be in short lengths that change the direction of movement. All chutes, troughs and pipes shall be maintained clean and free from coating of hardened concrete by thoroughly flushing with water after each run or when out of operation for more than 30 minutes. Water used for flushing shall be discharged clear of concrete in place. The troughs, pipes and chutes shall be either metal or metal-lined and shall extend as nearly as possible to the point of deposit. Aluminum or aluminum alloy troughs, pipes, or chutes shall not be permitted.

Dropping concrete in excess of 5 feet without the use of pipe or tremies shall not be permitted. The discharge end of the pipe shall be maintained as close to the point of deposit as is feasible.

Special care shall be exercised to fill each part of the pit by depositing concrete as near to its final position as possible to work the coarser aggregate back from the face.

K.2.1 Placing Concrete Around A Vault Lid, Wastewater (Ejector) Pump Basin Cover or Sump Pump Basin Cover When the installation of a vault around the backwater valve or a wastewater (ejector) or sump pump basin is required, the concrete must be prevented from bonding to the vault lid or pump basin cover. Vault lids shall be positioned so that the top is flush with the existing floor. The Contractor shall employ sufficient means to provide for a 1/8 inch space between the circular edge of the vault lids and the adjacent concrete for easy lid removal. All concrete edges and corners shall be sharp, clean and smooth. Pump basin covers shall be installed as directed by the manufacturer.

K.3. Surface Finish During concrete placement, care shall be taken that methods of compaction used will result in a smooth surface of even texture free from honeycombs, water, and air pockets. Special care shall be taken to keep the orange indicator ring around the outside of the cleanout adaptor on all ball valve extensions completely visible.

All cavities, depressions, holes, honeycomb spots and other defects shall be cleaned thoroughly, saturated with water, carefully pointed and precisely trued with a mortar extracted from the remaining concrete. The mortar used shall not be more than 30 minutes old. When required, honeycomb areas shall be chipped out before pointing. The objective of these requirements is to obtain a smooth and even surface flush with the existing floor and for uniform color and texture without bulges, patched areas, depressions or other imperfections.

L. BACKWATER AND BALL VALVE INSTALLATION

The installation of a backwater and ball valve may require that certain basement plumbing elements be re-routed to run through the valves before exiting the home (see Figure VI). Figures II, III and IV illustrate collinear installations, but the new piping may require numerous turns to transport the wastewater through the valves and back into the existing piping. The final configuration shall protect all basement plumbing fixtures from backwater including all drains (floor, shower, tub, etc.), toilets and sinks (see Section H. Washing Machine and Sink Connections). If an exterior drain at the basement floor elevation (for instance in a stairwell leading to the basement) attaches to the basement plumbing, then it too must be disconnected from the sanitary sewer system. When valves are used there is the possibility of flooding in the stairwell due to rain water when the valves are closed. The plumber must advise the property owner of this condition.

The nature of the original piping installation below the basement floor may result in the proposed valves not performing correctly. In order for the valves to perform correctly there must be a positive slope on the pipe. A negative slope will result in debris settling in the pipe causing the flapper to be obstructed and not properly seat. Prior to removal of pipe sections and installations of valves, the Contractor shall check to confirm that a positive slope exists. If the slope is not positive then the contractor shall contact MCWS to receive further direction.

The valves shall be located to permit ball valve operation and cleanout lid removal including the necessary rotation of the T-wrench. The owner shall be consulted for approval of the valve location prior to excavation. Unless impossible to achieve, the valves shall be positioned so that only the basement plumbing passes through them. Exceptions shall be allowed on a case-by-case basis with prior approval by MCWS.

If the location initially excavated to install the valves is incorrect, the Contractor shall be required to repair and restore all damage and to find the correct location at their own expense. Any concrete replacement shall be performed according to the concrete specifications herein, including water stop installation.

The owner is required to disconnect all downspouts and those sump pumps which collect and discharge surface drainage, foundation drains and groundwater from direct connection to the sewer as a prerequisite for reimbursement.

M. BACKWATER VALVE

The backwater valve to be installed shall be a 4-inch (Model PBF-382) or a 3-inch (Model PBF-380) valve manufactured by Plastic Oddities, Inc., Shelby, North Carolina or a 4-inch (Model 3285) or a 3-inch (Model 3287) valve manufactured by CanPlas Industries, LTD, Barrie, Ontario, Canada, or equal. Each is a PVC valve with a non-corrosive flexible PVC flapper. The Contractor shall carefully inspect the

flapper supplied. No manufacturing flaws shall be permissible. The flapper must be completely flat with no notches along the outer edge. Any detectable concavity or convexity shall be unacceptable.

When a vault is necessary (see Section Q. Vaults), a brass lid shall be required for the Plastic Oddities backwater valve. This is indicated by adding a “b” to the end of the part number for either the 3 or 4-inch valve. The backwater valve shall be installed in accordance with the flow arrow on its side and shall be positioned behind the ball valve as the flow exits the building.

When a vault is necessary (see Section Q. Vaults), for installation of a CanPlas backwater valve, the access sleeve and lid shall not be required.

Once the backwater valve and ball valve have been installed, the Contractor shall test the backwater valve to ensure that it functions correctly. The downstream pipe shall be completely drained prior to conducting the test. To test the valve the Contractor shall completely close the ball valve and fill the pipe between the valves by removing the backwater valve bonnet and pouring water into the top of the valve. Once the pipe has been partially filled, the water level shall be observed through the top of the backwater valve. If this level falls, the ball valve is not sealing properly and water is seeping into the downstream pipe. Any leakage shall be unacceptable, and if observed it shall be corrected by installing a new flapper or even a new valve if necessary until the valve seals correctly.

The work shall include the installation of PVC pipe and all necessary fittings such as traps, wyes, T’s, and elbows in order to accommodate the valves.

N. BACKWATER VALVE EXTENSION AND CLEANOUT ADAPTER

When the distance from the top of the basement sewer pipe to the floor surface is less than or equal to 18 inches, the Plastic Oddities valve shall require an extension adapter. A Plastic Oddities (Part number PBX-390) extension adapter shall be used (see Figure I). If the pipe exceeds this depth, the backwater valve shall be installed in a vault without an extension (see Section Q. Vaults and Figure III). The tapered adapter and the gasket provided with the valve shall be properly bolted to the top of the valve to form a water-tight connection. The gasket shall be positioned so that a portion of it extends over the top of the flapper slot, thus securing the position of the flapper. A section of 6-inch inside diameter (ID) Schedule 40 PVC pipe shall be cut and cemented to this tapered extension adapter. Because of the taper, special care shall be taken to form a water-tight seal between the two pieces. A 6-inch cleanout adapter, shall be cemented to the top of this pipe section. The section’s length shall provide for the cleanout adapter lip and plug to be flush with the basement floor.

The lid shall be a 6-inch cleanout plug. The T-wrench (see Section R T-Wrench) must fit into the counter-sunk slot in the plug in order to tighten or loosen it. The location of the backwater valve must permit full rotation without restriction of the T-wrench in order to

turn the plug. This plug must be water-tight or backflow from the sewer will enter the home. Extension connections and cleanout plugs which are not water-tight shall be unacceptable. The plug shall be tightened into a flush, water-tight position before the work is complete.

It is imperative that the top of the cleanout adapter be installed as near to flush with the floor as possible. Protrusions, where avoidable, shall not be tolerated. If shallowness of the basement sewer pipe forces the cleanout adapter to protrude from the floor even when the 6-inch extension pipe is cut to a minimum dimension, the cleanout adapter and, if necessary, the extension adapter shall be trimmed. However, when cutting these members, a cement surface area large enough to provide a water-tight connection and to conform to the plumbing code shall be maintained. If trimming cannot fully eliminate the protrusion, the pieces shall still be cut in order to fit the plug as near to flush with the basement floor as possible.

In the shallow case (top of pipe less than 9 inches below floor surface, see Figure IV) where a 4-inch sewer pipe is encountered, the Contractor shall be required to install a 3-inch backwater valve and a 3-inch ball valve with eccentric reducers such as those specified in Section G Reducers.

When using the CanPlas backwater valve the access sleeve and lid are provided with the valve. The sleeve shall be cut to allow the top of lid to be flush with the finished floor, if possible.

O. BALL VALVE

The Contractor shall furnish and install a ball valve in either the 3 or 4 inch size as required. If the existing pipe is of the 4-inch size and if its top is less than 9 inches below the floor surface, the Contractor shall be required to install a 3-inch ball valve with 4-inch by 3-inch eccentric reducers (see Section G Reducers and Figure IV). Otherwise the valve size shall match the existing pipe size. If the valve has a side stem which encases the operating shaft, then the valve shall be provided with a mount cemented to the stem (see Figure I). The valve shall be installed with the mount pointing vertically toward the ceiling. Each valve shall also be provided with an appropriately sized drive coupling fastened to the operating shaft inside the mount. The driver head of the T-wrench (see Section R T-Wrench) shall fit into the drive coupling to operate the valve.

The ball valve shall be positioned downstream of the backwater valve. Its location shall permit the T-wrench to both operate the valve and open and close the cleanout adapter plug by rotating without restriction. The Contractor shall leave the valve in the open position.

The work shall include the installation of PVC pipe and all necessary fittings such as P-traps, wyes, T's, and elbows to accommodate the valves.

P. BALL VALVE EXTENSION, CLEANOUT ADAPTER, CLEANOUT PLUG AND LOCATING RING

The Contractor shall furnish and install a ball valve extension which will permit access to the driver adapter. The extension shall consist of a section of PVC pipe and a cleanout adapter (see Figure I). For a 4-inch valve, a 4-inch ID section of pipe shall be required for the extension. Likewise, for a 3-inch valve, a 3-inch ID section of pipe shall be required for the extension. The ID of the pipe shall be cemented around the outside of the mount on the valve. A schedule 80 PVC cleanout adapter with locating ring, shall be cemented to the other end of the pipe at the floor surface.

The extension pipe shall be cut to a length which permits the lip of the cleanout adapter and the top of the plug to sit flush with the basement floor. All connections must be water-tight. Special care must be taken not to apply cement to elements which must rotate freely in order to operate the valve.

Recessed Head Cleanout Plug shall be provided to cap the extension by screwing into the cleanout adapter. This plug is being used so that the T-wrench (see Section R, T-Wrench) may be inserted into the slot to tighten or loosen it. The plug shall be tightened into a flush, water-tight position before completing the work.

Around the outside of the top of the cleanout adapter is the locating ring. This ring shall indicate whether the valve is open or closed by the position of its wording with respect to the T-wrench handle. The adapter and the attached ring shall be oriented so that the long end of the T-wrench handle points to the word "OPEN" when the valve is open and to the word "CLOSED" when closed. The Contractor shall take special care while replacing the basement floor to maintain easy visibility of the ring and its wording.

It is imperative that the top of the cleanout adapter be installed as near to flush with the floor as possible. Protrusions, where avoidable, shall not be tolerated. If shallowness of the basement sewer pipe forces the cleanout adapter to protrude from the floor even when the extensions pipe is cut to a minimum dimension, the adapter coupling may be trimmed. However, when cutting it, a cement surface area large enough to provide a water-tight cement connection and to conform to the plumbing code shall be maintained. If trimming cannot fully eliminate the protrusion, the pieces shall still be cut in order to fit the plug as near to flush with the basement floor as possible. Even if the mount itself, without the extension attached, protrudes from the floor, a short section of pipe, the cleanout adapter and the locating ring shall still be required.

Q. VAULTS

When the Contractor encounters a basement sewer pipe whose top is greater than 18 inches beneath the basement floor surface, installation of a vault to encase the backwater valve shall be required (see Figure III). No vault shall be required for the ball valve at any depth, only the extension.

The vault shall be installed such that the top of the access lid rests flush with the basement floor. To achieve this, the pit shall be excavated to a depth which permits the pipe to enter through the hub openings of the vault. The top portion of the vault shall then be cut evenly to the appropriate height. The lid shall then rest evenly on the cut edge of the vault and flush with the floor.

R. T-WRENCH

The Contractor shall furnish the homeowner with a T-wrench to open the cleanout plugs on the valve extensions and to operate the ball valve. The Contractor shall be responsible for demonstrating to the owner the operation of this T-wrench both for opening the plugs and for operating the ball valve. The valves shall be positioned to permit full free T-wrench rotation in order to tighten and loosen both the 3-inch and 6-inch adapter plugs as well as to operate the ball valve.

S. SUBMERSIBLE SUMP PUMP INSTALLATIONS

The installation of a submersible sump pump may require that certain basement plumbing elements be re-routed. Figure VII illustrates a simplified installation, but the new piping may require numerous turns to connect all clean water to the sump pump basin. The final configuration shall route all area drains and any existing subsurface drainage piping to the sump pump basin.

The submersible sump pump shall be installed at a location which considers both plumbing and electrical accessibility. A location near an existing floor drain or a washer/dryer is preferred. The owner shall be consulted for approval of the sump pump location prior to excavation.

A ½ inch vertical swing check valve shall be installed in the pump discharge at a point not more than 24 inches above the basin lid. Use of a valve with a mechanical coupling will facilitate future pump removal and shall be required. A 1/8 inch hole shall be drilled into the discharge pipe not more than 6 inches above the bottom of the basin to prevent vapor lock in the discharge piping.

If the location initially excavated to install the pump basin is incorrect, the Contractor shall be required to repair and restore all damage and to find the correct location at their own expense. Any concrete replacement shall be performed according to the concrete specifications herein.

The owner is required to disconnect all downspouts, foundation drains and those sump pumps which collect and discharge surface drainage and groundwater from direct connection to the sanitary sewer as a prerequisite for reimbursement.

T. SUBMERSIBLE SUMP PUMP

The Contractor shall furnish and install a submersible sump pump with a rated minimum pumping capacity of 31 gallons per minute at 0.5 foot head, 29 gallons per minute at 10 foot head, and 19 gallons per minute at 15 foot head.

The pump motor shall be a sealed, submersible type operating in a dielectric oil for cooling and lubrication, and have a minimum rating of 1/4 horsepower at a maximum of 1600 rpm [115V, 60 Hz, 8-amps]. The motor housing shall be cast iron. The motor shall have a maximum temperature rating of not less than 120 degrees F and be equipped with thermal overload protection. The pump motor shall be automatically controlled by a piggy back float switch. The pump shall be equipped with a minimum 9 foot, UL listed, 3-wire cord and plug.

The pump impeller shall be a non-clogging design and shall be capable of passing 1/4 inch spherical solids. The pump volute shall be cast iron or heavy-duty thermoplastic with a 1 ½ inch NPT discharge.

The submersible sump pump shall be non-automatic Model SW-25M1 and a WAPS piggy back float as manufactured by Aurora/Hydromatic Pumps, Inc., a Model SSM33MP-1 submersible pump as manufactured by F. E. Myers Company, or a Model 53 submersible pump as manufactured by Zoeller Pump Company. Alternate models shall be considered if documentation indicating equivalency is submitted to MCSED with the bid proposal. **Piggy back floats shall be used to control the pump's on/off operation.**

The Contractor shall provide to the homeowner all operation and maintenance manuals, installation instructions, warranties and other items provided by the submersible sump pump manufacturer.

U. SUBMERSIBLE SUMP PUMP BASIN

The Contractor shall furnish and install a circular sump pump basin constructed of heavy duty polyethylene or fiberglass. It shall be supplied with a one-piece heavy duty plastic lid, discharge pipe, and all wiring. The minimum basin dimensions shall be 18 inches inside diameter and 22 inches deep. The sump pump basin and cover shall be as manufactured by Zoeller Pump Company, Jackel Company, or accepted equal.

The basin shall be installed in accordance with the manufacturer's recommendations and in conformance with the Ohio Plumbing Code, if applicable (see Figure VII). The basin shall be bedded and encased in #9 crushed stone with a minimum 6-inch thickness, (see Section J Crushed Stone Bedding and Backfill).

All area drains and any existing subsurface drainage piping shall be connected to the sump pump basin.

Prior to final installation, a minimum of 8 equally spaced 1/4 inch holes shall be drilled in the outer rim of the basin 2 inches below the bottom of the basement floor to allow groundwater from beneath the basement floor to enter the basin. Holes shall not be drilled in the bottom of the basin.

V. ELECTRICAL REQUIREMENTS FOR SUBMERSIBLE SUMP PUMP AND PIGGY BACK FLOATS INSTALLATION

The Contractor shall be responsible for providing adequate electrical service to the piggy back float and sump pump installation. Submersible sump pumps and piggy back floats shall not share a convenience outlet with laundry appliances. A licensed electrician should be consulted when determining the adequacy of any circuit serving an existing outlet and/or to install new wiring and fixtures if an appropriate outlet is not accessible. All new wiring and fixtures shall be of materials consistent with the existing building wiring unless the installation of similar wiring violates current electrical code requirements. All materials used shall be acceptable in appearance to the owner.

All electrical work shall conform to the National Electrical Code, the Ohio Building Code and to all other applicable state and local electrical codes and regulations. Documented proof of inspection and compliance with these codes and regulations shall be provided by the Contractor if requested by MCWS.

W. SUBMERSIBLE WASTEWATER (EJECTOR) PUMP INSTALLATIONS

The installation of a submersible wastewater (ejector) pump may require that certain basement plumbing elements be re-routed. Figure VIII illustrates a simplified installation, but the new piping may require numerous turns to connect basement plumbing fixtures to the wastewater (ejector) pump basin. The final configuration shall route all shower and tub drains, toilets, lavatories, and sinks connections to the wastewater (ejector) pump basin. If one or more area drains, or a subsurface drainage system are attached to the basement plumbing, these shall be disconnected from the sewer and be capped and a submersible sump pump, basin and lid conforming to these specifications shall be installed to discharge to the exterior onto a splash block.

The submersible wastewater (ejector) pump shall be installed at a location which considers both plumbing and electrical accessibility. The owner shall be consulted for approval of the wastewater (ejector) pump location prior to excavation.

The pump discharge shall be connected into a wye or tee installed in the existing plumbing stack just below the first floor. Connection of the pump discharge to an existing cleanout shall not be allowed. A 2-inch vertical swing check valve shall be installed in the pump discharge at a point not more than 24 inches above the basin lid. Use of a valve with mechanical couplings will facilitate future pump removal and shall be required. A 1/8 inch hole shall be drilled into the discharge pipe not more than 6 inches above the bottom of

the basin lid to prevent vapor lock in the discharge piping.

If the location initially excavated to install the pump is incorrect, the Contractor shall be required to repair and restore all damage and to find the correct location at their own expense. Any concrete replacement shall be performed according to the concrete specifications herein, including water stop installation.

The owner is required to disconnect all downspouts, foundation drains and those sump pumps which collect and discharge surface drainage and groundwater from direct connection to the sewer as a prerequisite for reimbursement. If such an item is tributary to the point of installation, it must be disconnected and routed to the exterior ground.

X. SUBMERSIBLE WASTEWATER (EJECTOR) PUMP

The Contractor shall furnish and install a submersible wastewater (ejector) pump with a rated minimum pumping capacity of 80 gallons per minute at 5 foot head, 60 gallons per minute at 10 foot head and 30 gallons per minute at 15 foot head.

The pump motor shall be a sealed, submersible type operating in a dielectric oil for cooling and lubrication, and have a minimum rating of 4/10 horsepower at a maximum of 1800 rpm [115V, 60 Hz, 13-amps max.]. The motor housing shall be cast iron. The motor shall have a maximum average temperature rating of not less than 104 degrees F and be equipped with thermal overload protection. The pump motor shall be automatically controlled by a float switch mounted on the pump housing. The pump shall be equipped with a minimum 10 foot, UL listed, 3-wire cord and plug.

The pump impeller shall be a non-clogging design and shall be capable of passing 2-inch spherical solids. The pump casting shall be cast iron or heavy-duty thermoplastic with a 2-inch NPT discharge.

The submersible wastewater (ejector) pump shall be a Model 2SE411A submersible pump as manufactured by Barnes Pumps, Inc., a Model WW0511A a submersible pump as manufactured by Goulds Pumps, Inc., a Model CMV-5 submersible pump as manufactured by F.E. Myers Company, or a Model 266 submersible pump as manufactured by Zoeller Pump Company. Alternate models shall be considered if documentation indicating equivalency is submitted to MCWS with the bid proposal.

The Contractor shall provide to the homeowner all operation and maintenance manuals, installation instructions, warranties and other items provided by the wastewater (ejector) pump manufacturer.

Y. SUBMERSIBLE WASTEWATER (EJECTOR) PUMP BASIN

The Contractor shall furnish and install a circular wastewater (ejector) pump basin constructed of heavy duty polyethylene or fiberglass with a one-piece steel lid capable of providing a gas-tight seal with the wastewater (ejector) pump basin, the discharge pipe,

the vent pipe and all wiring. The vent shall be 2-inch PVC or as directed by the Plumbing Inspector. When using a lid with vent holes larger than 2 inches, the Contractor may use a reducing fitting in the vent pipe. The minimum basin dimensions shall be 18 inches inside diameter and 30 inches deep. The wastewater (ejector) pump basin and cover shall be as manufactured by Zoeller Pump Company, Jackel Company, or approved equal.

The basin shall be installed in accordance with the manufacturer=s recommendations and in conformance with the Ohio Plumbing Code, if applicable (see Figure VIII). The basin shall be bedded and encased in #8 or #9 crushed stone with a minimum 6-inch thickness (see Section J Crushed Stone Bedding and Backfill).

Z. ELECTRICAL REQUIREMENTS FOR SUBMERSIBLE WASTEWATER (EJECTOR) PUMP INSTALLATION

The Contractor shall be responsible for providing adequate electrical service to the wastewater (ejector) pump installation. Submersible wastewater (ejector) pumps shall not share a convenience outlet with laundry appliances. A licensed electrician should be consulted when determining the adequacy of any circuit serving an existing outlet and/or to install new wiring and fixtures if an appropriate outlet is not accessible. All new wiring and fixtures shall be of materials consistent with the existing building wiring unless the installation of similar wiring violates current electrical code requirements. All material used shall be acceptable in appearance to the owner.

All electrical work shall conform to the National Electrical Code, the Ohio Building Code and to all other applicable state and local electrical codes and regulations. Documented proof of inspection and compliance with these codes and regulations shall be provided by the Contractor if requested by MCWS.

3. DEMOLITION AND RESTORATION

- A.** All areas within the building except the actual excavation site and immediate surroundings must be covered with a canvas type “drop cloth” if they are experiencing worker traffic.
- B.** The tasks listed in Section 2 Detailed Specifications above assume the immediate work area where the backwater prevention devices shall be installed is unfinished. That is, there are no floor coverings, walls or other structures that will encumber or interfere with the installation. However, in some cases the Contractor may have to remove existing structures and/or coverings in order to properly excavate and install the backwater prevention devices. The work shall include removal and restoration of any floor coverings, appliances, walls or other structures necessary to install the devices. Restored floor coverings shall permit easy access to the backwater prevention devices.
- C.** Care shall be taken in removing existing appliances, floors, walls and ceilings. The disturbed area shall be kept to a minimum. Sharp, clean edges shall be provided to allow

for easy restoration. Any material removal shall be done with reasonable care to allow potential reuse of suitable materials in the restoration. Restoration shall be of sufficient quality to return the disturbed area to an equal or better condition than the pre-construction condition.

- D.** In those cases where the Contractor heat cuts the existing plumbing, an exhaust fan shall be placed in the nearest window to ventilate the work area. If the window is not already included in the enclosed work area, the area enclosure shall be expanded to include it. The fan shall operate while any heat cutting is taking place.