

## UNIFORM MATERIAL STANDARDS AND RELATED APPURTENANCE

<p>Item B-IS (9-2006)(MI) MC 12/06/2006</p>	<p>MI: WS (2006/03/018): MUNICIPAL INFRASTRUCTURE DEPARTMENT: WATER SERVICES DIVISION: UNIFORM MATERIAL STANDARDS AND RELATED APPURTENANCE</p>
---	--

(16/1/P)  
(16/5/P)

**RESOLVED:**

1. **That** the report to obtain approval to implement uniform material standards and related appurtenances in water and sewer infrastructure of Council **BE NOTED**.
2. **That** the material standards and related appurtenance as stated in **Annexure "A"** attached to the report, dated March 2006, **BE ADOPTED** as uniform standards for all developments and new water and sewer infrastructure within Ekurhuleni Metropolitan Municipality.
3. **That** in future all new technology/materials which could enhance the current material standards (**Annexure "A"** attached to the report) **BE CONSIDERED** by the Water Services Division (Planning Forum).
4. **That** no deviations and/or amendments to these standards **BE DONE** without the prior written approval of such deviation and/or amendments by the Director: Water Services (Planning and Construction).
5. **That** these standards **BE APPLICABLE** to all new developments as from 01 July 2006.
6. **That** where possible, these standards **BE APPLICABLE** on existing reticulations during maintenance and/or repairs.
7. **That** all Service Delivery Areas (SDA's) **CIRCULATE** these standards (**Annexure "A"** attached to the report) to all developers in their regions and that a notice **BE PUBLISHED** that these standards are available and **CAN BE OBTAINED** from the Council.

**ANNEXURE "A"**

**MUNICIPAL INFRASTRUCTURE DEPARTMENT  
WATER SERVICES DIVISION**

**Material Standards  
Water Services Infrastructure**

**WATER SERVICES DIVISION**

**DEVELOPER'S GUIDELINES TO INSTALLING WATER  
AND SEWER SERVICES IN EKURHULENI  
METROPOLITAN MUNICIPALITY - CHAPTER 7:  
MATERIAL AND DESIGN STANDARDS**

***DEVELOPED BY:  
WATER SERVICES  
PLANNING FORUM MEMBERS***

1<sup>st</sup> WORKSHOP REVIEW  
Draft 1-26 APRIL 2005

1<sup>st</sup> COMMENTS REVIEW - Members  
Draft 2-18 MAY 2005

2<sup>nd</sup> COMMENTS REVIEW — Regions/SDAs  
Draft 3-22 JULY 2005

3 COMMENTS REVIEW — Regions/SDAs  
Draft 4-04 NOV 2005

4<sup>th</sup> COMMENTS REVIEW — Regions/SDAs  
Draft 5 -07 FEB 2006

**FINAL ADOPTION DATE**  
12 JUN 2006

**IMPLEMENTATION DATE**  
01 JUL 2006

**REVIEW DATE**  
01 JUN 2007

## 7. MATERIAL STANDARDS

### 7.1 Approval and Compliance

The Engineering design for all water services (i.e. water and sewer) shall be based on the *Guidelines for the Provision of Engineering Services and Amenities in Residential Township Development* (hereinafter called the RED book) as well as the SABS 1200 series. The specific engineering design shall further be subject to the approval of the Executive Director: Municipal Infrastructure in terms of the extended/additional standards referred to within this section.

The following sections contain details of material standards that the Municipal Infrastructure Department's Water Services Division has standardised on, as well as specific details not contained or differed from in the documentation referred to earlier.

The references made within this section, relating to design standards / technical requirements shall be deemed to refer to the latest edition/version, since such references are subject to revision. Information on current valid national and international standards may well be obtained from the South African Bureau of Standards (refer to Paragraph 10).

All pipe diameters and component sizes reflected within this section shall be of nominal bore (NB) and nominal size (DN). All water service installations and components shall comply to the relevant SABS specifications and shall have the JASWIC approval.

**All deviations from these specifications shall be approved in writing by the Executive Director: Municipal Infrastructure, in conjunction with the Director: Water Services (Planning), prior to the finalisation of any plan / contract and / or services agreement.**

### 7.2 Water Reticulation

For normal residential, industrial and commercial developments, a water reticulation shall be installed according to the specifications of this Document within the road reserve of a public road. Upon completion, the water reticulation shall be inspected by the Department Municipal Infrastructure (Water Services) where after the ownership and maintenance of the network will be taken over by the Department Municipal Infrastructure (Water Services).

In the case of a "security" residential development, where access to the individual properties will be controlled, by means of a "private road" (or road stand), the internal water reticulation is installed on private property, and therefore shall remain the property and responsibility of the registered owner of the "private road". In this case, only a metered connection point will be provided by the Department Municipal Infrastructure to the boundary of the "private road".

Where a secondary reticulation is to be connected to a main (bulk) water *line/s*, a bulk water meter shall be provided.

The Council will only take over the operational and maintenance responsibility of any infrastructure from a developer (including connections) upon proclamation and/or registration of subdivisions where applicable.

#### 7.2.1 Water Pressure Pipes

- Water pressure pipes shall be uPVC/mPVC (i.e. DPI/Sekunjalo/Marley) class 9 minimum.
- Water pressure pipes shall be uPVC/mPVC (i.e. DPI/Sekunjalo/Marley) class 12 (solid wall) at road surface crossings, including 1000mm shoulder either side of road surface.
- All water pipes to be used shall be classed and sized according to design pressures with slip-on couplings (Lyng or Z Lock joints) — refer to design standard section.
- The minimum diameter for reticulation pipes shall be 110mm (NB) and 75 mm (NB) with special consent from the Executive Director: Municipal Infrastructure and Director: Water Services (Planning).
- All water pressure pipes shall be installed at 1.5 m from erf boundaries where possible.
- Detail where services share the same trench must be spelled out. It is not preferred to be norm, but could be considered with the necessary authorization.
- The minimum cover over water pressure pipes/mains shall be 1000mm. Water pipes should not be installed deeper than 2,0m, measured from the soffit of the pipe.
- Trenching, bedding and backfilling shall conform to SABS 1200 LB and SABS 1200 DB and in particular to class B bedding, backfill to 93% Mod.AASHTO. Copies of the test results shall be submitted to the Director: Water Services (Planning).
- No connections / tie-ins of new pipe/s onto the existing infrastructure shall be allowed unless all tests have been done, approved and accepted.
- Water pressure pipe/s/reticulation shall be tested in accordance with the relevant requirements of SABS 1200.
- In the case of testing all erf connections and/or draw off points shall be included in the final testing. No separate testing of the erf connections and/or draw off points shall be accepted.
- Consultants must ensure that the test is achievable and correct prior to calling of officials to witness the test.
- All pipelines shall be of uPVC/mPVC material, unless the relevant sizes are not available on the market, in which case only steel pipes shall be used.
- The following is a guide to the Consultant/s;
  - 15mm dia — 63mm dia (HDPe pipe)
  - 75mm dia — 400mm dia (uPVC/mPVC)
  - Above 400mm dia (steel)
- All steel pipes shall meet the requirements of the Water Services Cathodic Protection Manual.

### 7.2.2 Water Erf Connections

- All erf connections shall be constructed of HDPE (i.e. DPI/Sekunjalo/Marley), type V, class PN12.5, PE80 pressure pipe.
- The minimum cover over erf connections (connection leads) underneath road surfaces shall be 1000 mm, elsewhere 800 mm. (within road reserve).
- All new erf connections ("Residential 1") shall be a 25mm (road crossing 32mm) communication pipe (HDPE).
- Low cost housing shall have an erf connection off a 20mm (road crossing 25mm) communication pipe (HDPE).
- The developer shall be required to install the erf connection pipe off the mains for each erf up to the isolating ball valve — refer to drawings.
- All erf connections and/or communication pipes shall be fitted with the appropriate compression 'Plasson' fittings. (No other fittings shall be accepted unless otherwise approved by the Executive Director: Municipal Infrastructure in conjunction with the Director: Planning and Construction).
- No individual erf water meters shall be installed by the Developer.
- In the case of low cost housing development there shall be a bulk meter with a pressure reducing valve (PRV) installed at the inlet point of the development (The bulk meter must be properly sized as well as the pressure reducing valve). Should there be more than one inlet point to the development, both shall have a bulk meter and PRV.
- In the case of commercial and industrial stands, no connections need to be provided by the Developer since it requires a separate in-house design.
- Provision of water to private road reserves (private enclosed developments) — Bulk meter will be provided by Council at the boundary of the development.

### 7.2.3 Fire Hydrants (Dwg reference)

- All Fire Hydrants shall be of the ABOVE-GROUND type.
- For Industrial and Commercial areas the Industrial, high efficiency type with two outlets (1 x 100 mm and 1 x 65 mm) shall be provided.
- For residential areas the tamperproof type shall be provided.
- All underground fittings shall be flanged. (Table 1000, SABS 1123) and corrosion protected.
- The composition of the standpipe shall be as follows:
  - a) Cast Iron 75mm (NB) flanged fire hydrant tee,
  - b) 75mm (NB) flanged left hand closing isolating valve,
  - c) 75mm (NB) flanged mild steel pipe with weld-on 90deg. bend and
  - d) 75mm (NB) mild steel pipe with thread on top end to accommodate fire hydrant head, white fusion bond powder coated after welding with socket on threaded end to protect thread.
- All underground steel fittings shall be treated with a primer/base coat and wrapped with a bitumen based fabric backed tape and protected with plastic sheeting as per the Denso SA specification.

- Hydrants shall be installed between 300 mm and 600 mm from erf boundaries and spaced in accordance with the RED book — Refer to design standards section.
- A blue “cat’s eye” with a blue backing shall be fixed to the road surface on the centre of tarred/paved road, in line with the hydrant.
- In the case of residential type fire hydrants, the standpipe shall be painted with white fusion bond powder coat road marking paint (applied in one direction only) and the head of the hydrant shall be painted signal red (ex factory).
- In the case of industrial and commercial type hydrants, the hydrant shall be painted signal red (ex factory).
- All industrial/commercial type hydrants shall conform to the following requirements:
  - A flow rate in excess of 720 l/min.
  - Dimensions: 300mm L x 550mm B x 720mm H.
  - Cast in one iron signal red powder coated body with steel outlet caps.
  - Full bore opening.
  - Non rising spindle, left hand closing direction.
  - Table 1000 SABS 1123 flanged 100mm BSP inlet.
  - 100mm threaded large outlet.
  - 65mm London Round thread small outlet.
  - Minimum working pressure of 16 bar.
- All residential type hydrants shall conform to the following requirements:
  - A flow rate in excess of 720 l/min.
  - Tamperproof.
  - Cast in one cast iron body (not brass) to avoid leaks and theft of outlet parts.
  - Inlet seals to eliminate nuts and washers.
  - Right angle pattern.
  - Globe valve design.
  - Non-rising stainless steel spindle for unsurpassed strength and durability.
  - Clockwise closing direction.
  - Inlet 80 mm B.S.P. (150=80=B.S.P.).
  - 65 mm Female instantaneous outlet with cover sleeve and single lug pressure release action.
  - Minimum working pressure of 16 bar.
  - A screw-in socket to fit thread.
  - Removable, changeable propylene crack washer.
  - Adapters shall be manufactured of brass or stainless steel and **not** aluminium.

#### 7.2.4 Valves

All valves shall be anticlockwise, LEFT HAND closing. All sizes are nominal (DN) with a minimum working pressure rating of 16 bar (PN). All valves supplied must conform to the following relevant specifications:

#### **7.2.4.1 Isolating/Gate Valves**

- All isolating/gate valves in a water reticulation network and/or pipe shall be RSV gate valves (i.e. where possible only AVK), class 16 to SABS 664, cap top, non rising spindle and anti clockwise closing.
- The valve shall be of Ductile iron GGG 50, electro-statically applied fusion bonded epoxy resin coated (powder coating) body.
- The wedge shall be of ductile iron GGG 50 and fully encapsulated with EDK 70 rubber internally and externally to prevent corrosion and rubber failure, and ozone stabilised. The wedge shall be supported by guides in the side of the valve body with no metal contact. The wedge nut shall be of a fixed nut concept, press fit into the wedge not allowing any movement and manufactured from dezincification resistant high tensile navy brass.
- The stem shall be primarily sealed with an NBR rubber hydraulic 'U' seal. The secondary seals shall be at least two NBR O-rings inside and a nylon bush outside for galvanic corrosion protection. A wiper ring shall be included to prevent dirt ingress and housed such to prevent it from UV radiation.
- The thrust collar shall be manufactured from a dezincification resistant brass CZ 132.
- All bonnet bolts shall be manufactured from zinc coated, grade 8.8 high tensile steel, entirely sunk into the body casting, sealed and protected with a hot wax melt. The bonnet gasket shall be of a preformed NBR rubber gasket O- ring set in recess between the bonnet and the body. The gasket shall encircle the bolts as protection against corrosion.
- The valve shall be manufactured such to accommodate a non-rising spindle manufactured from 20 Cr 13 stainless steel.
- The valve shall carry a 10 year replacement warranty under normal operating conditions.
- All valves shall conform to the dimensional and performance specification of the latest SABS 664 standard and shall carry the JASWIC approval.
- The operating pressure of all valves shall be to Class 16 with cap tops and shall operate in an anti-clockwise closing direction,
- Hydraulic test certificates for all valves shall be submitted. These tests shall be carried out at the following pressure ratings: Body tests — 1.5 x nominal pressure rating and seat tests — 1.1 x nominal pressure rating.
- All isolating/gate valves shall be flanged and drilled to table 1000 SABS 1123.

#### **7.2.4.2 Ball Valves / Ball-o-stop**

- Only ball valves (i.e. Cobra) shall be used on erf connections/communication lead pipes.
- The body of the ball valves shall be of a one-piece construction.
- Ball valves shall be of DZR alloy composition.
- Ball valves shall be 12.5 bar rated and of nominal size (DN).
- Ball valve components shall conform to table 1 of SABS 1056 Part III.
- No gate valves will be used.



#### 7.2.4.3 Butterfly Valves

- Butterfly valves (i.e. Salvalve / Bermad) will **only** be considered in cases where the pipe diameter is greater than 300 mm and of which the use shall have prior approval from the Executive Director: Municipal Infrastructure.
- Butterfly valves shall be of the 'worm' gear operated system.
- Butterfly valves shall be left hand closing, flanged and drilled to table 1000 SABS 1123.
- The valves bodies shall be cast from SG 42 Iron with integral shaft hubs and an operator mounting flange in stainless steel.
- The valve disc offset shall be of a single eccentric type with a highly efficient hydrofoil profile to maximise the open flow area and cast from the same material as the body.
- The valve seal shall be precision injection moulded from Nitrile rubber and fitted within the body perimeter.
- The valve pressure and clamp rings shall be cast from SG 42 Iron, fitted with stainless steel grub screws.
- Twin stub valve shafts shall be machined from grade 431 stainless steel and shall be accommodated with double seals.
- The valve bearings shall be of the low friction PTFE type where no lubrication will be needed.
- Manual gear operators shall be of quadrant worm reducers, keyed to the valve shaft and fitted with hand wheel or cap top positioning bolts for disc adjustment.
- The valves may be painted with a primer coat and a final enamel, but preferably fusion bond powder coated.

#### 7.2.4.4 Scour Valves

- Scour valves shall be installed at all low lying areas within the mainline system to allow for scouring purposes, cleaning and emptying of the mainline.
- Scour valves shall be installed at end of network lines (i.e. dead ends).
- Fire hydrants should preferably be utilized instead on small reticulation/network lines for this purpose.
- Scour valves shall be of the same type and specification as for isolating RSV type valves.

#### 7.2.4.5 Pressure Relief Valves and Flow Control Valves

- All pressure relief valves and flow control valves **shall** be installed above ground and housed in an engineering brick building.
- All pressure relief valves and flow control installations **shall** be properly designed
- Pressure relief valves shall be installed where the Executive Director: Municipal Infrastructure (Water Services) in conjunction with the Director: Water Services (Planning) deems it necessary in order to maintain pressures in the reticulation within allowable limits.

- PRVs shall be sized and installed according to the manufacturer's specifications.
- PRV installations shall have properly designed anchor blocks.
- All PRVs shall be installed with a by-pass arrangement with flanged RSV gate valves on either side of PRV.

#### **7.2.4.6 Air Valves**

- Air valves shall be installed at all negative gradients and high lying points only on the mainline system.
- All air valves shall be of the Vent-C-Mat type or similar of which shall be approved by the Executive Director: Municipal Infrastructure.
- The type — single small orifice or double orifice - utilised shall be designed to allow for the optimal operation.
- The function of single orifice valves is for pressurised discharge and is for pipeline operating.
- The functions for the double orifice valves are for pipeline filling, draining and operating.
- Single small Orifice valves;
  - The body and bonnet shall be of Cast Iron and sintered epoxy powder coated.
  - The valve shall be fitted with a stainless steel dirt inhibitor cover.
  - All fastening bolts shall be galvanised.
  - The nozzle shall be of 304 Stainless steel.
  - A Nitrile seal shall be fitted between the body and the bonnet with a natural rubber seat on the float.
  - The float shall be of a high density polyethylene material.
  - The inlet size shall be 25mm.
- Double Orifice Valves:
  - The body halves shall be of Cast Iron and sintered epoxy powder coated.
  - The valve shall be fitted with a die cast aluminium dirt inhibitor cover.
  - All fastening bolts shall be galvanised.
  - The nozzle shall be of 304 Stainless steel.
  - A Nitrile large orifice seal shall be fitted between the body and the bonnet with a natural rubber seat on the float and shall be fitted with a polycarbonate basket.
  - The float shall be of a high density polyethylene material.
  - The inlet size shall be 50mm.

#### 7.2.4.7 Re flux/Non-return Valves

- Non-Return valves may be of the Swing check type with a pressure rating of 16 bar and shall be flanged and drilled to Table 1 000 SABS 1123.
- The valves shall be suitable for either horizontal or vertical mounting with the angle of the door being such as to ensure that closure starts at the point where forward flow declines.
- The disk and hinge shall be fixed in the valve bonnet for easy access and maintenance.
  - The body configuration shall allow for a full flow area during normal operation (full bore) to minimize pressure losses.
  - The disc shall be fully encapsulated with rubber to prevent corrosion and ensures a drop tight shut-off.
  - The seat shall be hydraulically pressed into the body.
  - The hinge shall be designed such to adjust itself accurately to the plane of the seating under load.

#### 7.2.5 Valve Markers

- A concrete/impregnated polymer (plastic) valve marker shall be placed within 500mm from the closest en boundary.
- Powder blue impregnated valve markers with blue caps with a “V” moulded into the marker shall be positioned opposite normal isolating valves.
- Powder blue impregnated valve markers with red caps with a “ZV” moulded into the marker shall be positioned opposite zone isolating valves.
- No valve marker for hydrants since the hydrant stand pipe is the marker.
- All existing valves, where applicable shall be paint marked with a ‘V’ / ‘ZV’ template in the relevant colour of the type of valve on the kerbstone closest to the valve.
- In the case of new developments the ‘V and/or ‘ZV’ shall be moulded/formed in the relevant kerbstone and paint marked accordingly.

#### 7.2.6 Valve Boxes / Chambers

All reticulation isolation valves referred to in 7.2.4 above shall be **installed in** valve boxes whilst zone valves, air valves, isolating valves on mainline systems, scour valves and control valves shall be installed and housed in engineering brick constructed chambers with the relevant designed thrust blocks and puddle flanges where necessary.

##### 7.2.6.1 Valve boxes

- The valve boxes shall be supplied complete: assembled and tested.
- All valve boxes and lids shall be manufactured to the specifications of SABS 558.
- Valve boxes and lids shall be of ultraviolet proof, polypropylene thermoplastic material.
- Valve boxes and lids shall be able to withstand temperatures ranging from -300°C to +800°C and shall not deform within these limits.
- Built-in stainless steel cable shall secure all lids.

- The configuration of these valve boxes shall be as follows:
  - a) The shaft shall be 150mm minimum PVC pipe — depending on the depth of the valve - installed on top of the body of the valve,
  - b) The valve box placed on top of the pipe shaft to protrude 50mm maximum above ground level and supported by four engineering bricks or any other acceptable means of support approved by the Engineer.
  - c) Backfilling shall be with 3% soilcrete in order to maintain all components true to the installation.
  - d) No concrete surround shall be cast with valve box in concrete.

#### **7.2.6.5.1 Valve box sizes**

- Round: Non lockable 150mm dia box with one stainless steel cable.
- Round: Non lockable 250mm dia box with one stainless steel cable.
- Rectangular: Non lockable 480mm x 380mm x 300mm box with 2 stainless steel cables.
- Square: Lockable 238mm x 238mm Heavy duty box with 2 locks.
- Square: Lockable 238mm x 238mm Medium duty box with 2 locks.

#### **7.2.6.5.2 Valve Box Lid Colours**

- All isolating valves boxes shall be blue pigment impregnated.
- All zone isolating valves boxes shall be red pigment impregnated.
- All fire hydrant boxes shall be yellow pigment impregnated.
- All erf connection valve boxes > **80mm** connections shall be white pigment impregnated.

#### **7.2.6.2 Valve Chambers**

- All chambers shall be designed to suite the purpose of the specific valve/valve w.r.t. size and type and shall be built with engineering bricks and/or constructed from reinforced concrete.
- The relevant SABS specification pertaining to water retaining structures shall be adhered to.
- All zone isolating valves shall be protected with Manzi-lock type locking mechanisms built into a brick chamber.
- Provision shall be made within all brick/concrete (reinforced) chambers for sufficient workspace (minimum all round space to be 400mm — refer to drawing)
- All chambers shall be equipped with a sump (500mm x 500mm x 300mm) deep.
- All chambers shall have a removable reinforced concrete slab cover designed for the specific chamber and load conditions.
- All chambers shall have a lockable steel (galvanized) lid — refer to drawing
- Provision shall be made in the slab for 100mm diameter holes above all isolating valves.

### **7.2.7 Corrosion Protection**

- All underground mild steel fillings shall be treated with a primer/base coat and wrapped with bitumen based fabric backed tape.
- Different methods are available for various applications which can be obtained from Denso Gauteng.
- All materials shall be cleaned thoroughly and be free from any debris, dirt grime or grease and can be washed down with accepted solvents — from Denso.
- Apply Denso Primer D at a coverage rate of 8m<sup>2</sup>/l at an even film with no runs or sags. Only prime those areas which will be wrapped the same day.
- Follow the procedure for each application as required.

### **7.2.8 Underground Mild Steel fittings**

#### **7.2.8.1 Viking Johnsons (VJ's) Couplings**

VJ couplings shall be manufactured from hot rolled asymmetric steel T sections with a profiled rolled steel sleeve and accommodated with an EPDM gasket. All bolts shall be of D cup head low carbon steel. All fittings shall be fusion bond powder coated.

#### **7.2.8.2 Bolts and Nuts (on flanges/couplings)**

All bolts and nuts shall be of galvanized Gr 8.8 mild steel.

#### **7.2.8.3 Flanges**

All flanges shall be of Gr 8.8 mild steel finished to an acceptable machined finish.

#### **7.2.8.4 Flange Adaptors**

All flange adaptors shall be of powder coated mild steel.

#### **7.2.8.5 Valve Flanges**

All valve flanges shall be manufactured from mild steel, drilled to Table 1123.

#### **7.2.8.6 Tee-Pieces**

All tee-pieces shall be cast iron complete with rubber/s

### **7.2.9 Fire Fighting Connections**

- No individual/separate fire fighting connection/s will be permitted to a property.
- Appropriate and adequately sized combination meter/s shall be installed by the Council.
- Also refer to latest water meter specification of Ekurhuleni Metropolitan Municipality in this regard.

### **7.2.10 Mild Steel Pipes**

- Mild steel pipes shall only be considered in the case where the size of uPVC/mPVC cannot be provided (diameters larger than 400mm).
- Mild steel pipes shall be designed and manufactured according to the applicable SABS code.

- All mild steel pipes shall be spirally welded and butt welded (Longitudinal welded pipes shall **not** be considered in these circumstances).
- Lining shall be repaired after cutting/welding and shall be cement mortar lined and externally coated with 'SINTEC' coating or similar approved by the Executive Director: Municipal Infrastructure in conjunction with the Director: Water Services (Planning).
- All steel main lines shall be subject to cathodic protection evaluation and protection and in terms of the requirements of the Water Services Cathodic Protection Manual.

#### **7.2.11 Bulk Meters (Refer to Meter Specifications — April 2004)**

- No connection of secondary reticulation networks shall be permitted off main water lines without the provision of a bulk meter and approval from the Executive Director: Municipal Infrastructure.
- A bulk meter shall be installed according to the latest Meter Specifications as compiled and approved by the Executive Director: Municipal Infrastructure.
- Bulk meters shall be sized and installed according to the manufacturer's specifications.
- Bulk meters shall be installed above ground where possible. In the case it need to be installed below ground level and approved accordingly the chamber shall be constructed of engineering bricks.
- Bulk zone meters shall be installed with a by-pass, with RSV gate valves (see 7.2.4.1) on either side of the by-pass (refer to drawing).
- Non return valves shall be provided with all bulk consumer meter installations. In the case where a combination meter is used where the meter has a "built-in" non return valve, no additional non return valve shall be required separately.

#### **Additional specs still required:**

Blue cats eye epoxy

Pump stations

    Pumps

    Minimum rising mains

    Pipe material

    Valves

    Chambers

    Motors, etc.

### 7.3 Sewer Reticulation

For all types of developments, a gravity sewer reticulation shall be installed according to the specifications of this Document, either within the road reserve of a public road or within the necessary servitude on private property. Upon completion, the sewer reticulation shall be inspected by the Water Services Division of the Municipal Infrastructure Department where after the ownership and maintenance of the network will be taken over by the Water Services Division.

Private sewer pump stations will only be allowed on a site where a connection point to a gravity sewer system exists. No private rising sewer line will be allowed within a public road reserve or within a servitude on any private property other than the property it serves.

The Water Services Division of the Municipal Infrastructure Department will only allow the construction of new sewer pump stations in exceptional cases (no other alternative, size of the development, other future developments using same pump station etc.).

**No new private development shall make use of septic tanks, conservancy tanks. "French drains" or any other sewer system other than the system as described above.**

#### 7.3.1 Sewer Reticulation lines

- All sewer reticulation pipes shall be Vitrified Clay (VC) or class 34 solid wall or 400KPa uPVC (i.e. Maincore/Mainlite or similar approved) with slip on couplings (Lyng joints) according to SABS 1601, Heavy duty structured wall pipe 400kPa pipe stiffness.
- All sewer reticulation pipes shall be installed at 2.5 m from erf boundaries in road reserves where possible
- In the case of midblocks, all pipes shall be installed at 1300mm from the erf boundary.
- Minimum pipe size for reticulation pipes shall be 150mm (NB).
- The minimum cover over sewer reticulation pipes shall be 1000mm. where possible. Cover of less than 600mm within road reserve shall be encased in soilcrete.
- The minimum cover over erf connections underneath the road surfaces shall be 1000 mm. Cover of less than 800mm under road surface shall be encased in soilcrete.
- Trenching, bedding and backfilling shall conform to the SABS 1200 LB and SABS 1200 DB.
- Sewer reticulation to be tested in accordance with the relevant requirements of SABS 1200
- Minimum longitudinal gradients and associated pipe sizes shall be in accordance with the RED book.
- Pipes at gradients between 1:6 and 1:10 should be anchored at the joints with concrete anchor blocks designed by the Engineer.
- With the establishment of all reticulation systems, a starting manhole shall be introduced.

- Installation Criteria:  
The procedures for trenching are based on the Standard Specification for Civil Engineering Construction, issued by the SABS, Sections 1200DB, LD, LB, and LD OF 1982. Additional standards and recommendations are based on SABS 0112.  
The pipes shall however, be backfilled immediately after laying and not be covered with less than 500mm of backfill of not less than 90% MOD AASHTO.
- Visual inspections shall be carried out continuously to ensure the maintaining of the pipe shape.
- Rodding eyes (ABCs) shall be installed by stand owner/developer at each connection to the municipal system.
- CCTV inspection/s of newly laid pipes to be submitted to council before it will be taken over. The inspection must provide the gradient of the installed line.
- In the case of testing all erf connections and/or draw off points shall be included in the final testing. No separate testing of the erf connections and/or draw off points shall be accepted.
- Consultants **must** ensure that the test is achievable and correct prior to calling of officials to witness the test.

### 7.3.2 Sewer lines

- Sewer lines shall either be class 34 solid wall or 400Kpa uPVC (i.e. Maincore/Mainlite or similar approved) with slip on couplings or reinforced concrete pipes with sacrificial layer (class according to load conditions).
- Trenching, bedding and backfilling shall conform to the SABS 1200 LB and SABS 1200 DB.
- Sewer lines to be tested in accordance with the relevant requirements of SABS 1200
- Minimum longitudinal gradients and associated pipe sizes shall be in accordance with the RED book.
- In the case of testing all connections and/or draw off points shall be included in the final testing. No separate testing of the erf connections and/or draw off points shall be accepted.
- Consultants **must** ensure that the test is achievable and correct prior to calling of officials to witness the test.

### 7.3.3 Sewer Manholes

- Maximum manhole spacing shall be not more than 80m for sewer reticulation lines and 200m for outfall sewer lines.
- Circular concrete manhole covers of 560mm dia. with acceptable lifting mechanisms and 750mm dia. frame constructed of dolomitic origin aggregate shall be used:
  - a) Heavy duty in road reserves with a breaking strength of not less than 135 kN.
  - b) Medium duty elsewhere with a breaking strength of not less than 45 kN.
- Manhole concrete rings for manhole depths up to 3m shall be 1000mm dia with a wall thickness of not less than 65mm.



- Manhole depths deeper than 3m shall be 1500mm dia. With a wall thickness of not less than 85mm. as indicated on the drawings, including a reducing shaft with a minimum thickness of 150.
- All cover slabs shall have 560mm dia. holes with a recess to accommodate the covers.
- Round spacers may be used with 560mm dia. holes for slabs.
- All manholes shall stand proud/protrude not less than 150mm. above finished ground level.
- All manhole concrete rings shall be supplied with Calcamite step irons staggered in the chamber.
- Joints between the, manhole rings shall be sealed with a bitumen sealant and wrapped with a fabric backed bitumen tape to the approval of the Executive Director: Municipal Infrastructure.
- Starter rings for all manholes shall be founded on 20 MPa concrete mixture on compacted soil strata.
- In and/or outlet pipe/s shall be installed such to accommodate differential movement of manholes.
- All manholes shall be provided with benching and shall be constructed from dolomitic origin aggregate at a max slope of 1:1 and minimum of 1:2.
- All benching in manholes shall be constructed in concrete, no PVC piping shall be considered as benching/channeling in sewer manholes.
- Channeling inside manholes shall be vitrified clay embedded in the foundation concrete. Precast channeling will be allowed.
- All manholes installed next to a spruit or in the open veld must be installed to have its manhole cover to be 1000 mm above the surrounding ground level.
- Manholes to be installed on proper foundations of at least 150 thick and with a diameter of at least 500 mm greater than the manhole diameter.

#### **7.3.4 Sewer Erf Connections**

- All erf connections shall be Vitrified clay (VC) or uPVC 110mm dia. with slip on couplings.
- All erf connections shall be Vitrified Clay (VC) or uPVC 150mm dia. with slip on couplings for larger users (i.e. cluster developments and Commercial/Industrial).
- All erf connections shall be terminated at the road reserve boundary and 1000 mm from the lateral boundaries at the erf/stand's lowest hydraulic point.
- All erf connections shall be provided with plastic end caps.
- A concrete marker with wire attached to the end cap as detailed on the drawings shall be provided at the terminal point/s.
- No private connection/s shall be allowed after the sewer reticulation has been taken over by the Water Services Division of the Municipal Infrastructure Department.
- Additional connection point/s shall only be constructed by the Water Services Division against the applicable promulgated tariff.

#### **7.3.5 Sewer Pump stations — Under Construction**

- Stand-by pumps type and material
- Retention capacity

- Dry well installations
- Minimum rising main diameter
- Material of rising main
- Flanged pipes / valves
- Chambers
- Motors
- Overflow facilities / arrangements, etc.

Version	Activity	Date	Status
Draft 1	Workshop review	26 April 2005	Done
Draft 2	1 <sup>st</sup> Comment phase	18 May 2005	Done
Draft 3	2 <sup>nd</sup> Comment phase	22 July 2005	Done
Draft 4	3 <sup>rd</sup> Comment phase	04 November 2005	Done
Draft 5	4 <sup>th</sup> Comment phase	7 February 2006	Done
Version 1	Adoption	12 June 2006	Done
Version 1	Implementation	01 July 2006	Done
Version 1	Review	01 June 2007	Still to commence