Instructions:

1. The **Major Connections Certifier** is responsible of conducting the Pre-start Meeting including completing this form;
2. If Approved Plans (Drawings) are NOT presented at the meeting, the meeting is to cease and rescheduled;
3. The meeting **must** be attended by the following, in addition to the Major Connections Certifier:
    a. Construction Certifier;
    b. Contractor's Supervisor; and or
    c. Sub-Contractor – if not the Principal Contractor.
4. Each person at No: 3 above, must have a copy of the approved plans listed in Table 1 below; and
5. Each person attending the meeting must sign the attendance records as per Table 2 below.

Pre-Start Meeting Date: ..... Connection/OPW Application No: .....

Development/Estate Name: ..... Stage No: .....

Connection / Approval Date: .....

Table 1 – Approved Plans used for Construction

List ALL Approved Plans to be used for construction:

Title	Approved Plan No:	Revision	Date of Last Revision

Table 2 – Pre-Start Meeting Attendance Record

Stakeholder	Name	Phone	Email	Signature
Major Connections Certifier				
Construction Certifier				
Contractor's Supervisor				
Sub-Contractor (if relevant)				
Unitywater Auditor (if attending)				

*The **Major Connections Certifier** is to list any actions arising from the meeting in Table 3 below:*

Table 3: Actions and Responsibility Register

Action No:	Action Description (Brief description of what needs to be done)	Who Actions (Major Connections Certifier/Contractor)	Action Due (State either Before or During construction)

The following Actions are to be carried out prior to Pre-Start meeting:

☐ The Developers Consulting Engineer must complete the Project Deliverables Checklist Appendix-B in the SEQ Code and submit to Asset Knowledge and Performance Branch AKaPdrawingreview@unitywater.com

☐ The Developers Consulting Engineer must request *CAD Drawing Number and Drawing Templates* from Unitywater's Asset Knowledge and Performance Branch via email AKaPdrawingreview@unitywater.com

The following Actions are to be carried out post Pre-Start meeting:

☐ The Contractor must request a quote from Unitywater's Private Works Branch to connect the proposed works to Unitywater's networks via email with relevant documentation to: private.works@unitywater.com. Kindly note the following timeframes:

Notes:

1. Allow 20 business days for Unitywater Private Works Branch to quote for the works; and
2. Allow 20 business days for Unitywater Private Works Branch to carry out the connection works following payment of the quoted fee.

☐ Unitywater must be advised at least 7 days before the scheduled testing of any constructed water supply and sewerage mains.

☐ Complete the certification.

Certification

The Registered Certifier will need to authenticate this Pre-Start Meeting Record as follows:

I, _____ from _____ on _____, certify that:
Name of Registered Certifier *Accredited Entity* *Date*

1. This Pre-Start Meeting Record is a true and accurate record of the pre-start meeting undertaken on the construction site; and
2. All efforts will be made to complete the identified *Actions* before the due date by persons assigned.

Registered Connections Certifier Number: _____

Registered Connections Certifier Signature: _____

General Notes:

Recommended Checklist:

It is highly recommended that the Major Connections Certifier go through the following list of items with the Accredited Entity (Contractor) and the Registered Construction Certifier to ensure compliance to all relevant standards are maintained:

Item No.	Item
1	Applicable Approval Standards with amendments (if applicable) as per conditions of OPW Decision Notice ☐ SEQ D&C Code ☐ Previous Planning Scheme
2	Sewer Pipes to be used: *(Under no circumstances are Core Filled or Solid Core Sandwich pipes and fittings to be used)* Reticulation ☐ UPVC SN8 (Solid Wall Only) ☐ UPVC Class12 ☐ PE100 SDR21 White Wall Deeper than 3.0m ☐ UPVC Class 12 ☐ PE100 SDR21 White Wall Stormwater crossings ☐ UPVC Class 12 ☐ PE100 SDR21 White Wall Other: ---------- Accredited pipe layer, (name and accreditation number): ☐ DICL "Century Plus" - ☐ PVC "Pipelines Installation Course" - ☐ Polyethylene "Electrofusion/Butt Welding of Polyethylene Pipe" - ☐ Other Approved – ☐ Accreditation Details Not Available – (to be emailed)
3	Sewer Pipe embedment material: ☐ 5/7mm washed screenings nominal single sized aggregate (as per WSA PS-351) ☐ Other Approved -
4	Sewer Access Chambers to be used: ☐ Humes ☐ Rocla ☐ Insitu ☐ Other Approved -
5	Sewer Access Chamber base to be used: ☐ Humes ☐ Rocla ☐ Insitu ☐ Other Approved -
6	Water Main Pipe to be used: ☐ DICL PN35 ☐ PVC-O PN16 SN10 MRS450 ☐ PE100 PN16 SDR11 ☐ Other-
7	Water Main Pipe embedment: ☐ Sand (as per Table G3 of AS/NZS 2566.2) DICL pipes only ☐ 5/7mm washed screenings nominal single sized aggregate (as per WSA PS-351)

General Construction Notes:	
G1	Construction to comply with Unitywater's Connections Policy and the South East Queensland Water Supply and Sewerage Design and Construction Code and is not negotiable.
G2	All work to be undertaken in accordance with relevant Workplace Health and Safety Standards, including confined space entry, trench shoring etc.
G3	Levels of existing water/sewer services and connection points to be verified prior to commencing construction.
G4	As per the conditions of the Private Works quotation; You must ensure work can commence within 60 days once quote has been paid to Private Works. Unitywater reserves the right to requote beyond the stated period.

Sewer Main Construction:	
SA	Unitywater's Development Inspector must be notified to inspect construction of all sewer property connections House connections: Minimum 0.5m into property Minimum 1m off sewer line Minimum 0.6m and Maximum 1.5m deep unless approved
SB	Minimum cover of sewer mains 600mm
SC	The invert of all ends of all sewer lines and house connection are to be marked by single length, 2m long, ∅40mm, orange, PVC conduit in accordance with SEQ-SEW-1106-2 to 5
SD	All SEQ Service Providers accept only **Plain Wall uPVC** for non-pressure sewerage system. Other type of uPVC such as foam core sandwich and solid core sandwich are not accepted. Ensure all fittings such as long radius bends, moulded oblique junctions, bends, inspection I.O junctions, shorts, sanded shorts, maintenance shaft rise's and maintenance shaft connections have been constructed from Plain Wall uPVC.
SE	Pre-Cast Manhole are not acceptable in the following cases • NUSEWERS (PE) systems. • Deeper sewer systems greater than 6 meters • In areas subject to Q100 flooding • In areas where there is a risk of surcharge • in water charged ground • in conjunction with bolt down lids • in sulphide control sewer maintenance hole (e.g. rising main receiving manhole) • in areas with unsuitable soil conditions
SF	Sewer MH internal joints are **NOT** to be bagged or repaired, unless approved prior by Unitywater in accordance with SEQ-SEW-1300-1.
SG	Apply a 150mm wide external bitumastic seal tape (DENZO) over a coat of manufacturer's recommended prime seal to all external joints in accordance with SEQ-SEW-1300-1.
SH	PE sewer pipe cannot be connected to Pre-Cast Manhole bases
SI	Maintenance Shaft rises minimum DN300. DN225 diameter risers are not accepted.
SJ	All Maintenance Shaft connection pipes, couplings, flat top taper etc. shall be Plain Wall uPVC, rubber ringed and fibreglass reinforced
SK	All uPVC house connection branch fittings such as moulded oblique junctions, bends, inspection I.O. junctions and Maintenance shaft connections shall be Plain Wall uPVC, rubber ringed and fibreglass reinforced in accordance with SEQ-SEW-1 104-1.
SL	Detectable cream marker tape "SEWER" shall be provided either above the embedment zone of the sewer main or 1000 below the F.S.L., whichever is closest to F.S.L.
SM	Vacuum Testing of all sewer mains and manholes, and Pressure Testing of rising mains to be undertaken by a NATA accredited testing agent. Unitywater must be notified of scheduled test time. Refer to attached "Unitywater Testing Requirements Summary". Manholes and sewers are not to be tested before all earthworks have been completed and large machinery has been removed from site.
SN	CCTV of all sewers on USB drive and accompanying independent consulting RPEQ report and certification to be forwarded to Unitywater with both the on and off-maintenance application submissions. All CCTV inspections in general shall be carried out in accordance with the latest version of the WSAA Conduit Inspection Reporting Code of Australia WSA 05. Manholes and sewers are not to be CCTV's before all earthworks have been completed and large machinery has been removed from site. The CCTV surveys shall comply with but not limited to the following requirements. a) The CCTV survey shall be carried out from the centre of the start maintenance structure to the centre of the finish maintenance structure. Each maintenance structure shall be fully scanned using the pan/tilt and zoom functions of the CCTV camera and the video footage recorded as part of the overall CCTV survey. b) All pipe joints shall be scanned by a 360 degree pan. Refer to attached "Unitywater Testing Requirements Summary" for the general CCTV requirements. All of the requirements shall be complied with. The operator shall use Appendix F to highlight all unacceptable defects in the CCTV report.
SO	Proving Tool (Ovality) testing of all sewer lines to be undertaken by NATA accredited testing agent. Refer to attached "Unitywater Testing Requirements Summary". All of the requirements

SO Con't	shall be complied with. Do not conduct deflection testing until at least 14 days after completion of placement and compaction of trench and embedment fill material and not before all earthworks have been completed and large machinery has been removed from site.
SP	Compaction test results of all embedment, trench fill and site filling works in accordance with WSAA requirements. Please take special note of trafficable testing requirements. Refer to attached "Unitywater Testing Requirements Summary". All of the requirements shall be complied with.
SQ	Work Health and safety requires all live sewer works undertaken by the developer's contractor to be supervised by Unitywater's Private Works Staff. Noncompliance of the requirement will result in Unitywater reporting the unsafe work process to Work Health Safety Queensland
Water Main Construction:	
WA	All water main fittings are to be fusion powder coated.
WB	Water service connections to use pre-tapped connectors (i.e. Ready Taps) in accordance with SEQ-WAT-1108-2. Tapping bands are not an approved product and are not to be installed on water mains.
WC	Approved water meters in accordance with Appendix A of the 'South East Queensland Water Supply and Sewerage Design and Construction Code' to be provided to each lot in accordance with SEQ-WAT-1108 series drawings. An excel spread sheet file of lot No's and their associated water meter No's is to be forwarded to Unitywater as part of the on-maintenance application submissions. All water meters are to have a Unitywater coded number. All Unitywater meters numbers will begin with a letter "U"
WD	Water Meters shall be installed in accordance with SEQ-WAT-1108-1 to 3 The Water Meters construction shall comply with but not limited to the following requirements at both the on-maintenance and off maintenance inspections. a) Ball Valve must be lockable and unobstructed within the box. b) Ball Valve must be 500mm from front boundary and 300 from side boundary c) Lockable ball valve, water meter and meter box to be approved fitting as per SEQ code IPAM List. d) Meter box lid shall have non slip pattern, lettering cast into lid indicating "water meter" and be black in colour. e) Meter box lid to be left so that it sits flush with turf surround. f) Turf surround to extend a minimum of 600 mm on all sides of meter box. g) Geotextile fabric to be laid around and underneath meter box taped each side & around pipe to prevent ingress of sand, soil and mud. h) Water Meter Box must be void of all sand, soil and mud at on maintenance inspection. i) Water meters must be clean of all mud and facing straight upwards. j) Water Meter components to sit high, level & centred within the box with a min. 20mm air gap between the bottom of the water meter and bottom of the water meter box.
WE	Water Service Pipes shall be installed in accordance with SEQ-WAT-1108-1 to 3 The Water Service Pipes shall comply with but not limited to the following requirements. a) Water service pipework shall be PE100 PN16 black polyethylene pipe with blue stripe in accordance with AS/NZS 4130. b) DN25 pe100 pn16 pipe with blue stripe for service < 20 m long c) DN32 pe100 pn16 pipe with blue stripe for service > 20 m long d) Any pipework showing signs of kinking or strain from over bending will be rejected. e) All connections to polyethylene pipe to be approved brass or plastic mechanical fittings. f) PE100 pipe shall be laid with 100 mm minimum surround of sand or approved granular material. g) PE100 pipe must be continuous without joints. No Joints permitted between the ready tap/tapping saddles and water meters
WF	Water main alignment – 1.5 m from boundary (±0.05m tolerance)
WG	Detectable blue marker tape, thrust blocks and strapping of valves required to all PVC mains in accordance with WSAA.

<table>
<tr><td>WH</td><td>Minimum cover to water main:
<table>
<tr><td>Location</td><td><=150NB</td><td>>=200NB</td></tr>
<tr><td>Non-roadways /Sealed Roads</td><td>600</td><td>1000</td></tr>
<tr><td>Major Roads/embankment</td><td>750</td><td>1000</td></tr>
<tr><td>Freeway</td><td>1200</td><td>1200</td></tr>
</table></td></tr>
<tr><td>WI</td><td>No bending or curving of oPVC pipes</td></tr>
<tr><td>WJ</td><td>Polythene sleeving of D.I.C.L. pipe and fittings as per manufacturer’s specifications.</td></tr>
<tr><td>WK</td><td>Maximum 1° deflection out of a RRJ oPVC spigot joint or 105mm over 6 metre
Maximum 5° deflection out of DICL fittings or 502mm over 6 metre
Unitywater prefer the use of DICL RRJ Connectors when there is a requirement to deflect pipes within joints
Deflection out of RRJ oPVC spigot joints requires an approved certified design, detailing lengths and offset distances. Pipes deflected without this approved certified design will be required to be removed from the trench.</td></tr>
<tr><td>WL</td><td>Water mains (future extensions) must be constructed and terminated in accordance of SEQ-WAT-1303-1.</td></tr>
<tr><td>WM</td><td>Hydrant Spacing on water mains shall strictly comply with the following requirements:
a) Every property shall have a hydrant within 40 m of its front boundary
b) hydrants shall be installed at a maximum spacing of 80 m;
c) hydrants shall be installed at crests, low points and other points determined by the SEQ-SP for operational purposes;
d) in urban areas, every property, other than properties that are part of a community title scheme, shall have a hydrant within 90 m of the furthest point of any existing, proposed or future Class 1 buildings, measured along the street to the property entrance and around the perimeter of the building (where this requirement cannot be met from hydrants on SEQ-SP mains in public streets, a private fire main must be provided on the property);</td></tr>
<tr><td>WN</td><td>Hydrants must be installed in accordance to SEQ-WAT-1302-1. The hydrants shall comply with but not limited to the following requirements at both the on-maintenance and off maintenance inspections.
a) Top of hydrant lugs/claws to be a maximum 225mm and minimum 75mm in depth
b) Hydrants shall be located in line (+/- 200 mm) with the side real property boundary.
c) Hydrant must be centralised within box
d) Blue marker tape must be accessible from within the hydrant box
e) Hydrants and hydrant boxes to be void of mud and dirt
f) Hydrants are to be installed so that the lugs/claws are either side of the main.
g) Hydrants at the end of lines shall be installed so that the lugs/claws and lid are at 90º to the main.</td></tr>
<tr><td>WO</td><td>Hydrants identification in accordance to with SEQ-WAT-1300-1.
• Blue Bi-Directional Raised Reflective Pavement marker (RRPM)
• Golden Yellow (AS2700 Y14) Thermoplastic Reflective Direction Arrow
• 200m wide Golden Yellow (AS2700 Y14) Thermoplastic Kerb Marking
Brass (only) “HP” Marker with inscribed (8mm high) distance</td></tr>
<tr><td>WP</td><td>Valve must be installed in accordance to SEQ-WAT-1301-1. The valves shall comply with but not limited to the following requirements at both the on-maintenance and off maintenance inspections.
• Top of valve spindle to be a maximum 225mm and minimum 75mm in depth
• Valves must be centralised within box
• Blue marker tape must be accessible from within the valve box
• Valve and valve box to be void of mud and dirt</td></tr>
<tr><td>WQ</td><td>Valves identification in accordance to with SEQ-WAT-1300-1.
• White (AS2700 Y35) Thermoplastic Reflective “V” and Direction Arrow
• 200m wide White (AS2700 Y35) Thermoplastic Kerb Marking
• Brass (only) “V” Kerb Marker</td></tr>
<tr><td>WR</td><td>Pavement marking paint shall be of an approved thermoplastic reflective paint, incorporating applied glass beads, manufactured and applied as per the requirements of Main Roads MRTS45. Refer to attached “Unitywater Testing Requirements Summary”.</td></tr>
<tr><td>WS</td><td>Pressure Testing of reticulation water mains to 1200 KPA, as close as practicable to the lowest point of the main by NATA accredited testing agent at completion of all water main works. Unitywater must be notified of time of test. Refer to attached “Unitywater Testing Requirements Summary”.</td></tr>
</table>

WT	Water mains must be flushed, chlorinated, pressure and bacterial tested and samples to be collected by NATA registered laboratory, prior to Unitywater connecting to existing system. (WSA19.5.3). Refer to Unitywater's "Procedure for determination of acceptance of new water mains" and "Unitywater Testing Requirements Summary". Bacteriological testing is valid for a maximum period of **10 days**. As such Unitywater will permit bacteriological results being submitted after a successful On Maintenance inspection of the new water main works (and subsequent defects, if applicable, rectified). Bacteriological test results ***must*** be submitted directly to Unitywater within 48 hours of the date of result being issued.
SU	All construction works on Unitywater mains water mains can only be undertaken by Unitywater staff under a private works agreement/quote.
On-Maintenance Acceptance Process:	
MA	Prior to the issuing of the Certificate of Completion, all water supply and sewerage construction works must be accepted "On-Maintenance" Request for the On-Maintenance Inspection must be made by the consulting engineer by completing the On-Maintenance Inspection Request Form. The form, together with all the mandatory testing items specified on the form and in the SEQ WS&S D&C Code Asset Information Specification must be submitted to Unitywater by email to: development.certification@unitywater.com as a single submission package at least 7 business days before the intended inspection date. Incomplete and non-compliant applications may be failed, which will require resubmission of a complete application and with the relevant application fee. Once Unitywater have audited the submission for compliance and completeness the Unitywater Development Services Inspector will contact the Consulting Engineer to arrange an On-Maintenance inspection.
MB	All email correspondence for the project shall include the Unitywater Development Approval Application Number (UW) within the subject title.
MC	The On-Maintenance Submission will include an As- Constructed Information Package, in accordance with SEQ WS&S D&C Code Asset Information Specification - Appendix B. The As-Constructed Information Package will comprise of the following: 1. RPEQ certified design redline mark-ups in adobe .pdf format 2. ADAC XML data file 3. Documentation for approvals for changes to approved design 4. RPEQ Certified As-Constructed drawings a. AutoCAD .dwg drawing file b. RPEQ signed .pdf file
MD	Provide easements over all water & sewerage mains and or rising mains in accordance with the South East Queensland Water Supply and Sewerage Design Code. Easement term will be Unitywater's most current registered dealing held by the Department of Natural Resources & Mines and will not be altered or amended
ME	Provide completed SEQ WS&S D&C Code - Appendix B, with as constructed information package submission
MF	Water/Sewer connection, cut-ins, modification of existing water/sewer systems (live works) and Water Meter installation require a quote from Unitywater Private Works to enable the works to be completed. Complete the "Water supply and sewerage services private works application" form. Attach approved design drawings and all relevant information to enable Unitywater to quote the job correctly, and email to privateworks@unitywater.com. Provide a copy of the Private Work quote letter and receipt of payment in the single On-Maintenance Submission Package. Authorisation of the live works to proceed will occur upon successful On Maintenance acceptance of the works. This includes satisfactory submission of all On Maintenance acceptance documents, successful bacteriological test results and payment of the appropriate maintenance security bond and Infrastructure charges.
MG	The Maintenance security bond amount must be approved and a copy of the receipt of payment must be provided in the single on-maintenance submission package.

"Unitywater Testing Requirements Summary"

Trench Backfill Compaction Testing

(Water Supply (225mm and greater) and Sewerage)

a) The consulting engineer shall be responsible for all compaction testing and shall arrange for the testing to be carried out by a NATA certified Test Laboratory. Modified compaction tests to be used.

b) Prior to commencing work the consulting engineer shall prepare test plan showing the number of tests and depths in each zone where tests are to be carried out.

c) The Laboratory shall randomly select test locations in each zone. The road authority supervisor may direct the Laboratory to undertake additional tests in any zone. The test locations shall be uniformly distributed over the works.

d) Testing shall not be clustered within a zone or at boundaries of a zone. In deep trenches where more than 1 layer is to be tested, the test locations shall, where practicable, be staggered from those layers above or below by at least 5 m for water mains and 2 m for water services.

Trafficable Areas: "Defined as

a) The full width of any existing or proposed road carriageway plus shoulders and extending
b) To 1 m beyond the shoulders or kerbs.
c) The full width of any property access driveway and extending 1 m either side.
d) The full length of any constructed footway including, but not limited to, concrete, asphalt And crushed rock pavements.
e) The full width of any median strip.
f) Any other areas subject to vehicular traffic.

- Conduct one test for each 300mm layer of fill above bedding layer for each:
  - 300m2 of trench backfill area or part thereof for water mains
  - 50 lineal metres for sewer mains

Non-Trafficable Areas:

- Conduct one test for each 900mm layer of fill for each:
  - 1200m^2 of trench backfill area or part thereof for water mains
  - 100 lineal metres for sewer mains

Manholes:

- Conduct one test within each 1m layer depth within 300 mm of each manhole.

General Notes:

- Dynamic Cone Penetrometer Testing (DCP) is not an acceptable test method

Compaction Required:

		Minimum Value (%)	Minimum Value (%)
Material Type	**Test Method**	**Trafficable Areas – Trench Fill & Embedment**	**Non Trafficable Areas – Trench Fill & Embedment**
Non Cohesive	Density Index (ID) AS 1289.5.6.1	70	60
Cohesive	Dry Density Ratio or Hilf Density Ratio (Appropriate part of AS 1289)	95	90

NOTE: *Graded gravels and sands having fines (silts and clays) greater than 5% shall have their compaction determined by the dry density ratio test method*

Vacuum Testing (Sewer):

Manholes and sewers are not to be tested or CCTV'd before all earthworks have been completed and large machinery has been removed from site.

Manholes (Water drop testing is not acceptable)

- *Apply –34 kPa and record time to drop to –30 kPa.*

Maximum time allowed for 1050mm dia. manholes.

Depth	Time in seconds
0 – 2.4m	17
2.4 – 3.0m	21
3.0 – 3.7m	25
3.7 – 4.3m	30
4.3 – 4.5m	34
4.5 – 5.5m	38
5.5 – 6.1m	42

Sewer pipe (Pressure testing is not acceptable):

- *Apply -27 kPa for 3minutes and allow to stabilise. Once stabilised establish -23.6kpa and record time and drop (not greater than 7kpa).*

Minimum time to record vacuum drop:

Length	50 m	100 m	150 m	200 m	250 m	300 m
Dia.						
100mm dia.	2 min.	2 min.	2 min..	2 min.	3 min.	3 min
150mm dia.	3 min.	3 min.	3 min.	5 min.	6 min	6 min
225mm dia.	4 min.	5 min.	8 min.	10 min.	13 min.	15 min
300mm dia.	6 min.	9 min.	14 min.	18 min.	23 min.	29 min

* Timing in table above shall not commence until after initial 3min stabilising period is completed.

Deflection (Ovality) Testing (Sewer):

All flexible sewer pipes are to be deflection tested in accordance with WSAA Sewerage Code of Australia

Do not conduct deflection testing until at least 14 days after completion of placement and compaction of trench and embankment fill material.

Test sewers in sections from maintenance structure (IS, MH, MC, MS or TMS) to maintenance structure.

Pressure Testing (Water):

Shall be done after water services are connected and electrical conduits installed.

- *All dead ends lines are to be tested. This may require temporary hydrants or tapping bands. Temporary tapping bands to be cut off when connection to live main occurs.*
- *Preliminary pressurise the mains to 75% of the test pressure for a minimum of twelve (12) hours.*
- *Apply test pressure (1200kPa) at the highest point of the water main for four (4) hours.*
- *Ideally there should be no pressure loss after four (4) hours or alternatively as per below*

Volume of makeup water after a 3 hour test is to be not more than:

Length	50 m.	100 m.	200 m.	300 m.	400 m.
Dia.					
100 mm dia.	0.27 L	0.55 L	1.09 L	1.64 L	2.18 L
150 mm dia.	0.41 L	0.82 L	1.64 L	2.46 L	3.28 L
200 mm dia.	0.55 L	1.09 L	2.18 L	3.28 L	4.37 L
250 mm dia.	0.68 L	1.36 L	2.73 L	4.10 L	5.46 L
300 mm dia.	0.82 L	1.64 L	3.28 L	4.91 L	6.55 L
375 mm dia.	1.02 L	2.05 L	4.09 L	6.14 L	8.19 L
450 mm dia.	1.23 L	2.46 L	4.91 L	7.37 L	9.83 L

Chlorination/Disinfection and Bacteriological Testing:

Chlorination/disinfection and bacteriological testing must be undertaken in accordance with Unitywater's "Procedure for Determination of Acceptance of New Water Mains".

Following test results are required:

Water Quality Parameters	Unit	Acceptable range (new main)
PH		>6.5 – <8.5 +/- 0.5
Apparent Colour	PCU	<=15 +5
Turbidity	NTU	<=5 +5
EC	uS/cm	<=1250 +50
Free Chlorine Residual (Health)	Mg/L	<5 +/-0.2
Free Chlorine Residual (Aesthetic)	Mg/L	<0.6 +/-0.2
Total Chlorine Residual	Mg/L	<5 +/-0.2
Faecal Coliform Count or E. Coli. Count	orgs/100mL	<1
Total Coliform Count	Cfu/100ml	<1
Heterotrophic Plate Count (HPC)	Cfu/100mL	<100

CCTV Inspection Requirements:

Manholes and sewers are not to be tested or CCTV'd before all earthworks have been completed and large machinery has been removed from site.

All sewers and maintenance structures shall be inspected by CCTV after all backfilling operations have been satisfactory completed and all junctions are installed. This inspection is required to ensure that the pipe is without any construction defects, the pipe has no internal flow obstructions and all approved junctions are in right location. Further the inspection will verify the information provided with the 'As Constructed 'drawings.

A secondary inspection is also required prior to but not more than two (2) weeks before onsite inspection for off maintenance certification.

The sewers and maintenance structures shall be cleaned prior to the CCTV inspection.

All CCTV inspections in general shall be carried out in accordance with the latest version of the WSAA Conduit Inspection Reporting Code of Australia WSA 05. The operator shall use Appendix F to highlight all unacceptable defects in the CCTV report.

In addition to the WSAA WSA 05 requirements the CCTV surveys shall comply with the following additional requirements:

a) All CCTV surveys shall be accompanied by an inclination report in the form of a scaled graph that plots the pipe's altitude over the distance travelled. The inclinometer shall be accurate to +/-1%. The inclinometer reading shall be on screen display at all times during the recording of the CCTV survey.

b) The CCTV survey shall be carried out from the centre of the start maintenance structure to the centre of the finish maintenance structure. Each maintenance structure shall be fully scanned using the pan/tilt and zoom functions of the CCTV camera and the video footage recorded as part of the overall CCTV survey.

c) All pipe joints shall be scanned by a 360 degree pan.

d) Additional welding defects to be coded for PE sewers with electro fusion joints:

   a. A PE pipe end not cut square in a joint shall be coded as circumferential welding defect (Code WC)

   b. Visible welding wires in a joint shall be coded as circumferential welding defect (Code WC)

   c. Partially melted fusion couplings in a joint shall be coded as circumferential welding defect (Code WC)

e) All changes in horizontal and vertical direction of the pipe along the survey shall be coded using the appropriate WSA 05 codes.

   a. A number of general photographs shall be taken along the sewer surveyed, as a minimum to satisfy the requirements of this standard:
   b. one photograph in each maintenance structure showing the condition of the structure above the pipe obvert level
   c. one photograph each showing the connection point between the maintenance shaft/maintenance hole and the incoming/ outgoing pipes
   d. a general photograph every 20-25m of the pipe condition not related to any defect over the distance surveyed
   e. a photograph of each junction installed
   f. photographs of all welding defects identified

Two copies of the following information shall be provided prior to commissioning of the assets:

a) A digital video file (MPEG 1 or MPEG 2 format) for each sewer segment (Maintenance shaft/hole to Maintenance shaft/hole),

b) Digital photographs (JPEG format) of certain defects as stated in Appendix F of WSA 05 and for all the situations mentioned above

c) One digital file with the asset information, coding information and Inclinometer readings (to an acceptable version of the WinCan software or other digital formats stated in future editions of the WSA 05 standard)

d) Hardcopy of the WinCan report with the coding information including the photographs taken

e) Hardcopy of the inclination report

All digital files shall be provided as data files on USB drive (‘vob‘ files not acceptable).

Transport and Main Roads Specifications MRTS45 Road Surface Delineation - Technical Specification for hydrant and valve Identification:

SEQ-WAT-1300-1 Note 1 states

6 Material requirements:

6.1 Pavement markings

6.1.2 Paint

Paint shall be suitable for use on roads surfaced with a sprayed seal, hot and cold mixed asphalt and concrete.

Except where specifically shown otherwise on the design documents, paint shall be white, equivalent to or whiter than Y35, Off White as detailed in AS 2700. Where yellow paint is shown on the design documents or otherwise required by the Contract, the colour shall be equivalent to Y14, Golden Yellow as detailed in AS 2700

Paint used shall be water-borne road marking paint conforming to the requirements of AS 4049.3 and having approval under the Australian Paint Approval Scheme – Specification 0041/5.

6.1.3 Reflective glass beads

Reflective glass beads shall comply with the requirements for Type B, C or D glass beads as described in AS 2009. The type to be used shall be as stated in Clause 2 of Annexure MRTS45.1.

6.2 Raised retro-reflective pavement markers

Raised retro-reflective pavement markers shall comply with the requirements of AS 1906.3 and shall be Type A1 bi-directional.

7 Installation of pavement markings:

7.1 Setting out

The Contractor shall carry out all work necessary to establish satisfactory alignment of pavement markings, within the specified tolerances, using any device or method which will not damage the pavement nor conflict with other traffic control devices.

7.2 Weather conditions

Pavement markings shall not be applied when freshly applied pavement markings may become damaged by rain, fog or condensation before they have dried or set. Pavement surfaces shall be thoroughly dry immediately prior to the application of pavement markings.

7.3 Surface preparation

Surfaces which are to receive pavement markings shall be cleaned of all dirt, loose material and other contaminants. Pavement surfaces shall be thoroughly dry immediately prior to the application of pavement markings.

7.5 Application of pavement markings

7.5.1 Procedure

The Contractor shall submit its procedure for application of pavement markings. The procedure shall include details of the materials, application rates, equipment and method, including manufacturer's recommendations, to be used when applying pavement markings.

7.5.2 Paint

7.5.2.1 Mixing

Mixing of paint shall be carried out strictly in accordance with the manufacturer's recommendations.

7.5.2.2 Application equipment

Mechanical means shall be used to apply painted pavement markings.

All equipment used in the application of pavement markings shall produce pavement markings of uniform quality which conform to the requirements of this standard.

Stencils, boards and hand spray equipment shall be used to paint markings. Stencils shall conform to the dimensions shown on the design documents or in the Manual of Uniform Traffic Control Devices.

7.5.2.3 Application of paint and glass beads

All markings shall be of uniform thickness and intensity. Care shall be taken to avoid overspray on to the surrounding area.

Water-borne paint shall not be heated to a temperature greater than 65°C.

Two coats of paint and glass beads shall be applied on longitudinal lines to new surfaces. The first coat shall be cured to 'no pick up time' prior to the application of the second coat.

Glass beads shall be uniformly incorporated in all coats of paint concurrently with the application of the paint.

7.6 Raised pavement markers

7.6.1 Application of retro reflective pavement markers

The use of raised retro reflective pavement markers shall be in accordance with Clause 4.6.3 of the MUTCB

7.9 Tolerances

7.9.1 Pavement markings

Completed pavement markings shall:

a) be uniform
b) have clean and well-defined edges without running or deformation, and
c) conform to the dimensions shown on the design documents or in the Manual of Uniform Traffic Control Devices (Qld)

When completed, pavement markings shall conform to the tolerances. Additionally, arrows and letters shall be placed square to the centerline of the traffic lane. Drips, overspray, improper markings, and paint and thermoplastic material tracked by traffic shall be immediately removed from the pavement surface by methods which do not damage the pavement surface.