



Engineering File Number:	_____
Date:	_____
Version #:	_____

PROJECT TITLE & PHASE: \_\_\_\_\_

PROJECT MANAGER/PROPONENT: \_\_\_\_\_

**ATTENTION:**

A design deviation memo shall be provided for all identified deviations from the Linear Design Manual (i.e.,  N checkbox checked off). Deviation memo is subject to approval of Commissioner of Public Works, or his/her designate.

REQUIREMENT DESCRIPTION <small>(PLEASE REFER TO THE LINEAR DESIGN MANUAL VERSION 5.0 and MECP DESIGN GUIDELINES FOR DRINKING WATER SYSTEMS, LATEST VERSION, FOR THE EXACT AND FULL WORDINGS OF THE PROVISIONS IN ORDER TO HAVE BETTER UNDERSTANDING OF THE REQUIREMENTS. THE DESCRIPTIONS BELOW ARE INDICATIVE, MEANT TO BE GUIDES AND MAY NOT BE COMPLETE)</small>	REFERENCE (E.G. PW LINEAR DESIGN MANUAL (LDM))	REQUIREMENT MET? Y=YES; N=NO; N/A = NOT APPLICABLE	COMMENTS
<b>DESIGN POPULATION, DEMAND, FACTORS, FORMULA</b>			
• Used the greater of Max Daily Demand (MDD) + Fire Flow or Max Hourly	LDM 2.2.1a&b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Halton Region's latest hydraulic model is used	LDM 2.2.2	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Individual hydraulic & capacity studies reqmts for development areas	LDM 2.2.4	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Population used: Table 2-1 if <= 300mm and where higher than typical densities are not available. For >300mm: population from Best Planning Estimates; service demands per Masterplan or DC Report	LDM 2.3	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• For wm>300mm: Design factors per Masterplan/Dev Charges Report	LDM 2.4.1	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• For wm<=300mm: Ave day=0.275 m <sup>3</sup> /cap; Peaking factor: MDD = 2.25; Max hrly per Table 2-2	LDM 2.4.2	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Hazen Williams eqn used; C values from Table 2-3; Actual C for existing	LDM 2.5.1	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Standard pipe sizes are used (50,100,150,200,300,400,500,600,750, etc)	LDM 2.5.2	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Distribution mains<400mm w services;feeder mains=>400mm services permitted; transmission mains=>400mm no service connections permitted	LDM 2.5.3	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Min pipe size in residential areas = 150mm	LDM 2.5.4b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Min 50mm at deadends as per RH411.010&RH411.020; wm sizing for the looping -- confirmed by designer	LDM 2.5.4d	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>WATER PRESSURE (AT GROUND LEVEL; SHOWN IN DESIGN REPORT OR CALCULATION)</b>			
• Min pressure => 20 psi at all points in the system under max day + fireflow	LDM 2.5.5a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Normal operating pressure range: 50 to 80 psi but not <40 psi (see Notes***)	LDM 2.5.5b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Maximum (working) pressure in system = 100 psi	LDM 2.5.5c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• (Max) velocity associated with low pressure <= 3.5 m/s	OP	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>SYSTEM LAYOUT</b>			
• Plan and profile drawings for all road infrastructure are included: showing 60 m plan & profile detail for existing easement or street; 120m for future	LDM 2.6.1a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• WM located accdng to local standard drawings or approved by Region	LDM 2.6.2a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Profile & alignment are based on topo survey incl locates. Utilities to be exposed to verify location within 1.0 m of the proposed pipe	LDM 2.6.2b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• WM are located 4.5m off the street line but can be within road allowance	LDM 2.6.2c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Dead-ends are avoided or if cannot, pipe is sized for max day + fireflow with hydrant and/or 50mm to manage water quality (RH411.010 &RH411.020)	LDM 2.6.3a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Easements are not used to loop watermains (discouraged)	LDM 2.6.3b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• There are no service connections off a main on an easement	LDM 2.6.3c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• There are no pipe barrel bending/deflections	LDM 2.6.3d	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• No pipe joint deflections but if necessary-- are allowed until 50% of mfr specs	LDM 2.6.3e	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• No flushing devices directly connected to storm or sewer main**	LDM 2.6.3g	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• There are no 90 degree-bends	LDM 2.6.3h	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• No distribution pipe is crossing pressure zone boundaries	OP	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>EASEMENTS</b>			
• Permanent easements have been avoided	LDM 2.6.4a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• 8m wide min for depth 1.7m – 3.7m for <600mm else 9m & if single wm	LDM 2.6.4b&c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Easement width increased by 3m for each m of depth below 3.7m	LDM 2.6.4e	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Watermains are offset at least 3m from easement limits	LDM 2.6.4f	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• No pipe w/in zone encumbered by 1:1 fictitious slope from deepest foundation	LDM 2.6.4g	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Encasement is not substituted for easement width or 1:1 slope	LDM 2.6.4h	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Multi-use easement: Min horizontal separation is 1.2m between utilities and wm; 2.5m bet storm or ww mains, and min 3.0m offset from easement limits	LDM 2.6.4i	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>CASINGS AND ENCASEMENTS</b>			
• Steel casing for crossings on: river/creek, railway, large storm culvert, etc	LDM 2.6.5a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Spacers are approved, runners are ultra-high molecular wt.; no wood blocks	LDM 2.6.5b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *WM are centred in the casing with min 200mm clearance all around and restrained along the entire length; grouted with 3:1 sand-cement ratio	LDM 2.6.5c&d&e	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Casing ends are sealed wrapped w/ hi quality rubber & secured w ss bands	LDM 2.6.5f	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• No concrete encasements of PVC WM. Encasement for other pipe mat'ls**	LDM 2.6.5g	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Water valve in box or chamber at each end of crossing & before first service connection. Depth of valve at standard depths not at casing depth	LDM 2.6.5h	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>SEPARATIONS (DISTANCE FROM NEAREST EDGES OR OUTSIDE SURFACES)</b>			
• Horizontal separation from nearest edge of sewers & MH >=2.5m but if closer, sewer s/b => 0.5m below; else, sewer joints s/b equivalent to wm stds	LDM 2.6.6a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	



<ul style="list-style-type: none"> <li>WM crosses =&gt;0.15m over mainline sewers &amp; laterals; =&gt;0.5m if under; if min cover is not met when crossing sewer, wm is placed under the sewer or pre-insulated until 1.7m; if req'd, foam insulation at storm crossing</li> </ul>	LDM 2.6.6b(ii)&(iii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*WM passing under a sewer has adequate structural support for the sewers</li> </ul>	LDM 2.6.6b(iv)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Cover of WM casing under a creek &gt;=3 m or as per CA/geotech report</li> </ul>	LDM 2.6.6b(v)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*When crossing under closed bottom culvert, cover =&gt;1.7m or as per CA, etc</li> </ul>	LDM 2.6.6b(vi)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>PIPE DEPTH (&amp; COVER FROM TOP OF PIPE TO FINISHED GRADE)</b>			
<ul style="list-style-type: none"> <li>Cover &gt;=1.7m; Cover on open ditch and unimproved roads &gt;=2.3 m; Protection for live loads &amp; freezing if min. cover is not met → Dev memo</li> </ul>	LDM 2.6.7a,b,c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>VALVES</b>			
<ul style="list-style-type: none"> <li>Valves on wm =&gt;400mm in chambers; Single valves &lt;400mm is direct-bury not at junctions (RH 413.010); chamber in high traffic areas (RH 402.010)</li> </ul>	LDM 2.6.8a(i)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Resilient seat gate valves met AWWA C515 or C509 if &lt;=400mm; else C515</li> </ul>	LDM 2.6.8a(ii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Butterfly valves, if any, for =&gt;400mm met AWWA C504 &amp; access reqmts**</li> </ul>	LDM 2.6.8a(iii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Have non-rising stem, 50mm AWWA square nut, opens counter-clockwise</li> </ul>	2.6.8a(iv&v)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*All valves &amp; flexible joints are restrained</li> </ul>	LDM 2.6.8a(vi)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Same size as the watermain; one size smaller for 750mm &amp; larger</li> </ul>	LDM 2.6.8b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>3 at T-intersections; 4 at Cross; all in chambers on flange fittings</li> </ul>	LDM 2.6.8c(i)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Max line valve spacing: 150-400mm → 300m; 500- 750mm → 1 km; else TBD</li> </ul>	LDM 2.6.8c(ii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Multi-unit commercial, employment, residential have 3 valves in a chamber per RH 402.080</li> </ul>	LDM 2.6.8c(iii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>AIR RELEASE VALVES AND DRAIN VALVES</b>			
<ul style="list-style-type: none"> <li>On wm=&gt;400mm mains in 1.2m dia chambers (minimum) – RH 404 series</li> </ul>	LDM 2.6.8d(i)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Sizing, type &amp; location of combination air valves confirmed by Designer</li> </ul>	LDM 2.6.8d(ii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Installed directly on main w/o offsets and vented to atm (RH 404 series)</li> </ul>	LDM 2.6.8d(iii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Air vent pipe is minimum 2m behind curb and 1.5m above final gr-RH404.012</li> </ul>	LDM 2.6.8d(iv)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Drain valve at low points on =&gt;300mm; in chambers ≥1.2m dia.-RH403.010</li> </ul>	LDM 2.6.8e	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>PRESSURE REDUCING/SUSTAINING VALVES (PRV) – SET-UP AS PER RH 410 SERIES</b>			
<ul style="list-style-type: none"> <li>Use of PRV* when pressures &gt; 100 psi in special circumstances** - RH410</li> </ul>	LDM 2.6.8f(i)&(v)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>If feeding a sub-zone, one larger for fireflow + another as low-flow bypass</li> </ul>	LDM 2.6.8f(ii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Have isolation valves upstream and downstream of PRVs</li> </ul>	LDM 2.6.8f(iii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Hydrant + valve downstream of PRV for isolation of both; anti-stagnation devices &amp; has ability to monitor water quality thru sampling ports or hydrants</li> </ul>	LDM 2.6.8f(iv)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>VALVE BOXES, BYPASS, &amp; ZONE VALVES</b>			
<ul style="list-style-type: none"> <li>*All valves in boxes, roof slab cored, flushed in w/ finished grade; at gravel shoulders, has 1.0m dia. 0.05m thick circular asphalt collar; no extension if direct bury &lt;2.3m deep</li> </ul>	LDM 2.6.8g	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Bypasses for all valves &gt;400mm; size and location as per AWWA C500</li> </ul>	LDM 2.6.8h	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Zone valves as per Halton standard drawing RH 402.070</li> </ul>	LDM 2.6.8i	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>VALVE CHAMBERS</b>			
<ul style="list-style-type: none"> <li>Chamber is used for valves in pipes at depths &gt;3m per RH405.020</li> </ul>	LDM 2.6.7d	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Floor to ceiling =&gt;1.7m; Clearances: walls =&gt;0.5m, bottom = pipe D within 0.3m - 1 m; all valves contained; fully-restrained connections; swab ports,</li> </ul>	LDM 2.6.9a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Std 2.4m square (RH 402.020) for all valves &lt;=300mm</li> </ul>	LDM 2.6.9b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Std 1.8m x 2.4m for 3-valve connections for wm150-300mm (RH 402.080)</li> </ul>	LDM 2.6.9c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Top of roof slab &gt;=0.6m below finished pavement; eng'g collar used</li> </ul>	LDM 2.6.9d	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Chamber joints have continuous rubber gasket adhered to concrete (mfr)</li> </ul>	LDM 2.6.9e	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Watertight; waterproofing around all exterior section joints, waterproof membrane extends around all joints w min. 300mm wide strip</li> </ul>	LDM 2.6.9f	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Reducers are placed outside chamber walls</li> </ul>	LDM 2.6.9g	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*No drain pipe connections from valve chambers to sewer mains</li> </ul>	LDM 2.6.9h	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Valve extension stems for distances of top of operating nut to finished grade &gt; 3m; s/b 1.3m below final grade (RH 405.020)</li> </ul>	LDM 2.6.9i	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*When located inside travelled portion of road, has buried removable concrete access slab; std frame &amp; cover for chamber access</li> </ul>	LDM 2.6.9j	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>HYDRANTS</b>			
<ul style="list-style-type: none"> <li>Max spacing: 150m (residential); 90m (ICI and high density resid'l)</li> </ul>	LDM 2.6.10a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Connections to mainline has anchor tee w 150mm mech joint gate valve</li> </ul>	LDM 2.6.10b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*All joints on hydrant lateral are restrained</li> </ul>	LDM 2.6.10c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Fire hydrant at end of watermain, if there is a dead end; 1 between valves</li> </ul>	LDM 2.6.10d,i	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>In new residential areas: offset locations accdng to local area municipality</li> </ul>	LDM 2.6.10e	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Located outside of ditch line, cover over lateral =&gt; 1.7m, if main valve seat &gt; 1.7m, suitable hydrant bottom extension is used as per RH 407.010</li> </ul>	LDM 2.6.10f,g	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*Hydrants at high points adjusted for installation;</li> </ul>	LDM 2.6.10h	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>As replacement, hydrant is max. 45m from bldg &amp; w Siamese ports; same location; one bet. valves in undeveloped lands, valleys &amp; non-buildable lands</li> </ul>	LDM 2.6.10j	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>SWAB/ACCESS PORTS (NOTE: SWABBING OF MAINS 150-300MM THRU HYDRANTS)</b>			
<ul style="list-style-type: none"> <li>150mm hydrant barrel for wm 150mm-300mm; For pipe D =&gt;400;swab access provided; access port minimum size=D/2 &amp; as per Table 2-5; 1 km apart unless approved**</li> </ul>	LDM 2.6.11	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>*PIPE DESIGN pressure rating ≥ 150 psi &amp; as per AWWA &amp; Table 2-6</li> </ul>	LDM 2.7.1	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>*STRUCTURAL REQUIREMENTS &amp; TRACER WIRE (WRITTEN IN THE SPECS OR NOTES)</b>			
<ul style="list-style-type: none"> <li>Thrust restraints for max operating pres + transients (abrupt stoppage at 0.6 m/s); design pressure =&gt; 150 psi; restraints for all plugs, caps, tees &amp; bends</li> </ul>	LDM 2.7.2a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<ul style="list-style-type: none"> <li>Pipe bedding, cover &amp; trench backfill based on type of pipe, depth &amp; soil</li> </ul>	LDM 2.7.2b(i)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	



• 150 mm of Granular 'A' bedding ( conforming OPSS 401) as bedding	LDM 2.7.2b(ii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• SPMDD: Backfill is 100% beneath roads, sidewalks, curbs, and 95% elsewhere or select native soil. Loose material compacted to 95% per layer	LDM 2.7.2b(iii)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• 'High performance' bedding, cover or backfill is not used	LDM 2.7.2b(v)	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Trench plugs used when wm is below water table and as per geotech report	LDM 2.7.2c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Rock squeeze mitigation recommendations as per geotech report	LDM 2.7.2d	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Tracer wire for all new pipes and services > 50mm; solid 10 gauge TWU copper wire @ 6m intervals	LDM 2.7.3a	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Installed bet. each valve and/or end of new wm; loop wire until top per valve	LDM 2.7.3b	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Tracer wire for directional drilling/pipe bursting as per Region Amendments	LDM 2.7.3c	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>REMOVAL AND ABANDONING</b>			
• *Abandoned pipes are completely removed, or left in place-OPSS MUNI. 510	LDM 2.8.1	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Valves in chambers are removed; chambers are broken down (within) 1.0m below final grade & backfilled w unshrinkable fill	LDM 2.8.2&5	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Wm connected to live main, valve & tee removed for a sleeve or as per**	LDM 2.8.3	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Hydrants are removed and ready for disposal	LDM 2.8.4	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Ends of abandoned wm capped & mech'ly restrained not concrete-plugged	LDM 2.8.6	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>*SERVICE CONNECTIONS (WRITTEN IN SPECS OR CONSTRUCTION NOTES)</b>			
• No connection to transmission main as per DWW By-Law 71-19	LDM 2.9.1	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Each property has individual service up to the property line	LDM 2.9.2	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Service connection size based on peak water use, available pressure & relative elev of area/bldg.; at least 25mm	LDM 2.9.3	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Connected perpendicular to the wm where possible	LDM 2.9.4	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Not tapped off the fire hydrant lateral	LDM 2.9.5	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Pipe including 25, 38 & 50mm is type 'K' soft copper tubing (AWWA C800)	LDM 2.9.6	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• PVC used as per AWWA C900 for 100mm WM and larger	LDM 2.9.7	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• DI cement lined as per AWWA C104** used (for dia =>100mm)	LDM 2.9.8	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Single connections to private property serving more than 1 building as per DWW ByLaw 71-19 & Urban Services Guidelines, Regional OP Guidelines	LDM 2.9.9	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• With main stop and curb stop with service box at property line; extension rods are used on 25mm; top of stem rods 0.5 -1.0 m from finished ground	LDM 2.9.10	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Oversized service box is used on 38 & 50 mm w no stem extension rods	LDM 2.9.11	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• For new water services: copper at least 1 m beyond curb stop on private side	LDM 2.9.12	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Major service connections =>100mm have valves at main & at property line	LDM 2.9.13	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Fire & domestic services installed per RH 409.010; 200mm min (fire service)	LDM 2.9.14	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Tapping to mains, service saddles are used as per mfr recommendations	LDM 2.9.15	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• Depth at property line within 1.7 m and 2.0 m from finished ground elev or if min 1.7m cover is not met, service is pre-insulated (RH408.020;408.030)	LDM 2.9.16; LDM 2.9.17	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• No pre-servicing connections (valve + blind flange are provided)	OP	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
<b>CORROSION PREVENTION</b>			
• *All metallic components in WD system are protected from corrosion	LDM 2.10.1	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Petrolatum coatings per AWWA C217 for metallic stuff in & out of chambers	LDM 2.10.2	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• * Corrosion-resistant steel (AWWA C111) restraining rods & T-head bolt w nut inside chambers	LDM 2.10.3	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *Accepted methods: anodes for CI & DI installed along entire length spaced as per MUNI. 442, etc.; zinc anode for service connections otherwise same as metallic wm; Anodes as per ASTM B-418	LDM 2.10.4	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	
• *No PET encasements for corrosion for metallic wm and appurtenances	LDM 2.10.5	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N/A	

- Notes:** CA = Conservation Authority  
 LDM = Region of Halton Linear Design Manual, version 5.0, issued October 2019  
 MECP = Ministry of Environment & Conservation & Parks Design Guidelines for Drinking Water Systems (latest version)  
 OP = Operational preference  
 SPMDD = Standard Proctor Maximum Dry Density (a soil compaction test)  
 \* = Should be written in the construction contract specifications or notes in the engineering drawings  
 \*\* = With Regional approval  
 \*\*\* = Individual PRVs are used to reduce house pressures to 80 psi as per Ontario Bldg Code; common PRV could be used

<b>Reviewer:</b>	<b>Name, Position, Name of Firm (if any)</b>	<b>Signature &amp; Date</b>
Designer Completing the Checklist:		
<b>Comments:</b>		
Reviewed by Project Manager (DPM or E&C PM)		

No.	REVISION	DATE	INITIALS
1			
2			
3			

**Noted:**

Technical Reviewer's Name and Signature (Region)  
 Infrastructure & Systems Improvement

