6.0 WATER

6.1 GUIDELINES

The requirements of the Queensland Water Resources Commission "Guidelines for Planning and Design of Urban Water Supply Schemes" shall be followed in general. The requirements of this Livingstone Shire Council document take precedence over the QWRC Guidelines.

6.2 MASTER PLAN

Where a development will result in a substantial water demand such as a subdivision incorporating a large number of lots with multiple stages, the Consulting Engineer shall submit a Master Plan of the water reticulation showing proposed main sizes, connections to existing mains and valve positions. The Master Plan shall be supported by a computer network analysis where requested by Council..

6.3 NETWORK ANALYSIS

Livingstone Shire Council maintains a network analysis program and maybe approached for a quote to carry out an analysis. The criteria in Section 21 of the QWRC Guidelines shall be used to ascertain if the reticulation can achieve the appropriate level of service at maximum hourly and fire fighting flows. Computer variables shall be as follows:-

(i) Hazen Williams "C"

Nominal diameter (mm)	"C"
100-300	110
>300	120

(ii) Maximum Hour Flows

ZONING	L/SEC/LOT	L/SEC/HECTARE
Residential single up to 10 lots	0.15	
Residential A		5.08
Residential B		12.7
Residential C		35.5
All Commercial		6.1
Park Residential	0.18	
Rural Residential	0.18	

(iii) Fire Flow:- 15 l/s

(iv) Pressure Heads at Connection Points

Hydraulic grade lines at connection points to existing trunk mains can be obtained from Council's computer model.

6.4 ALIGNMENT

The Standard water reticulation alignment is 2.5m within road reserves (measured from the property boundary) as detailed on Livingstone Shire Council's Standard Drawing. The water main shall be on the opposite side of the road reserve to the electricity supply with house connection points at alternate property boundaries to electricity connection points wherever possible. Water mains shall generally not be acceptable within private property except in exceptional circumstances.

6.5 FITTING LAYOUT

(i) **Fire Hydrants**
Hydrants shall be at 80m maximum centres for all urban areas at a common side boundary where possible, and at every second allotment boundary for Rural and Park Residential allotments.

(ii) **Valves**
Section valves are to be placed to minimise disruption to water consumers during watermain maintenance incidents. In general, valves should be placed so that a maximum of 30 lots are affected by maintenance in any location.

Cul-de-sacs should have an isolation valve if more than 4 lots are served. A single tee and valve should be used for cul-de-sac valve installation.

(iii) **Dead End Caps**

Dead ends, temporary and permanent shall have a fire hydrant adjacent to the dead end.

In cul-de-sacs, a 50 N B (50mm internal diameter) ring main shall be extended completely around the head to avoid dead ends in the service. Four (4) allotments only shall be serviced from the ring main. The ring main shall have a scour point adjacent to the ring reconnection point, which shall flush to a gully pit or the kerb and channel.

(iv) **Gibaults**

Gibaults shall be elongated and centred, with type 316 stainless steel bolts. If heavy galvanised mild steel bolts are used, the entire gibault shall be covered with "Denso Tape and grease" or similar approved.

(v) **Construction - General**

Construction is to be in accordance with AS 2032 (Code of Practice for Installation of UPVC systems) and/or in accordance with the manufacturer's recommendations..

(vi) **Bedding and Backfill**

In coastal sand terrain no special bedding is required. In all other soil types, sand bedding and surround shall be clean medium river sand. For 100 $\rightarrow$ 200mm pipes, a minimum of 100mm bedding and 100mm of sand above the pipe obvert shall be required.

Backfill material on footpaths shall be approved material compacted to 90% standard compaction. Watermains and conduits under roads shall be laid prior to completion of the gravel pavement. Where construction is delayed beyond that stage, lean-mix concrete or approved cement stabilised material backfill to trenches across roads shall be required as detailed in IMEAQ Standard Drawings. Mains laid prior to the pavement being constructed shall be backfilled with gravel and compacted to standards as set in the IMEAQ Standard Drawings to the level of the subgrade.

(vii) **Thrust Blocks**

Suitably designed concrete thrust blocks shall be placed on all tees, bends and dead end caps

(viii) **Cover**

Minimum cover for mains shall be in accordance with the following table:-

Main Nom Dia (mm)	Cover (mm) In Footpaths	Cover (mm) In Roads
100-200	600	900
250-375	750	900
>450	1000	1000

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Minimum cover for road crossing conduits shall be 600mm.

(ix) **Conduits**

Conduits shall be 100 diameter uPVC to AS 1477-1988 OR AS 2977-1988

6.6 PIPELINE

Unnecessary joint deflections shall be kept to an absolute minimum to limit "form" pressure losses. Pipes shall not be laid to a radius. Changes in angles shall be affected by DICL or fibreglass socketed bends.

6.7 VALVE AND HYDRANT INSTALLATION

Valve and hydrants installed shall be in accordance with IMEAQ Standard Drawings. All hydrants shall have a flanged riser to achieve the maximum distance measured from top of hydrant box to riser flange of 300mm.

6.8 PIPE MATERIALS

Pipe Definitions:-

UPVC - AS2977-1988 Rubber Ring Joint, DICL compatible outside diameter.
DICL - AS2280-1988, Class K9, Rubber Ring Joint, poly wrapped to manufacturer's specifications.
HD Black Polyethylene - AS1159-1979
All pipes shall have a minimum working pressure of 120m at the end of its expected economic life.

6.9 POLY SLEEVING

Ductile iron pipes and cast/ductile iron fittings shall be wrapped, taped and sealed completely in accordance with Tubemakers of Australia Ductile Iron Pipeline Manual. Iron fittings on UPVC pipelines shall be poly-sleeved.

6.10 ROAD CROSSINGS - WATERMAINS

On normal subdivisional developments no special pipeline materials are required under road pavement. Conduits are to be laid for services to the other side of the road from the water main. A brass plaque (marked "W") is to be placed in the kerb, where the conduit crosses the kerb. A similar brass plaque "W" shall be used for watermains. See IMEAQ Standard Drawings for details of conduits.

6.11 HYDRANT VALVES - COATED

The hydrant is to have a mushroom whose metal surface is generally in accordance with NSWGWSS Design 1384 (coated) for 80mm spring hydrants and machined to allow Livingstone Shire Council and Fire Services hydrant standpipes to seat firmly on the metal seat and not on the mushroom rubber.

The hydrant valve flange is to be in accordance with Queensland Water Resources Commission's specifications. Fasteners are to be type 316 stainless steel or heavy galvanised steel coated with "Denso grease and tape" or similar approved.

The minimum distance between the side of the flange (hydrant seat) and the hydrant box or box supports shall be 25mm.

6.12 GATE VALVES

Gate valves are to be resilient seated, coated, o-ring stem seal, anticlockwise closing Class 16 OBE's Elypso or Tubemakers Tubeline Series 500 or prior approved equivalent. Alternative types may be permitted,, but only with the prior approval of Council.

6.13 FITTINGS & VALVES

In general, fittings shall be socketed, except for scour valves, where single flanged tees and flanged valves are required. Coatings for valves shall be Rislon Nylon 11 or fusion bonded epoxy. If the above coating is not available, then other approved fittings shall be cement lined with bituminous coating wrapped with poly sleeving to Tubemakers Australia Ltd specifications. As an alternative to poly sleeving iron fittings, fittings may be fibreglass Class 18 or Blue Brute fittings Class 16.

6.14 TYPICAL CONSTRUCTION DRAWINGS FOR APPROVAL

Refer to Council's Standard Drawings for a copy of a typical construction drawing submitted for approval. The following notes should be added to standard Consultant's notes:-

(i) UPVC PIPES - AS2977 - Ductile Compatible O.D. "Blue Brute" or Vinyl Iron" Class 12; Polyethylene Pipes - AS 1159-1979

(ii) HD Polypipe - AS 1159-1979

(iii) DICL PIPE - AS2280 Class K9 polywrapped to Tubemakers specification;

(iv) HYDRANTS - Hydrant valves NSWGWSS Pattern 1384 coated installation per Council's Standard Drawings;

(v) VALVES - Rislon Nylon 11 coated, Resilient seated OBE "Elypso" or Tubeline "Series 500";

(vi) WATER ALIGNMENT is 2.5m. Class 12.

6.15 JOINT TRENCHING

Joint trenching of other services (eg. Electricity, Telephone) with the watermain is generally not permitted.

6.16 MARKER STAKES

Marker stakes shall be provided at all hydrants, sluice valves, air valves and scour valves. Marker stakes and plates and their positioning shall be in accordance with the Standard Drawing.

6.17 FOOTPATH BOXES AND SURROUNDS

Footpath boxes shall be an approved cast iron box with an approved concrete surround. The surrounds are to be finished at approximately 50mm above the finished soil ground level.

6.18 TESTING

All pipes, fittings and service connections shall be tested to a minimum test pressure of the rated class of the pipe at the lowest point.