MINIMUM THRUST AREA FOR BLOCKS IN SQUARE METRES (m^2)
DESIGN PRESSURE 1000 kPa (NOM. 100 m HEAD)

NOMINAL DIAMETER OF FITTING (DN)	90° & 60° HORIZONTAL BENDS			45° & 30° HORIZONTAL BENDS			22.5° HORIZONTAL BENDS			11.25° HORIZONTAL BENDS			TEES AND DEAD ENDS		
SOIL CLASSIFICATION AND ALLOWABLE HORIZONTAL BEARING PRESSURE OF GROUND. (SEE NOTE 3) FOR HORIZONTAL THRUST ON TRENCH WALLS WHERE THE COVER OVER PIPES IS 450 OR GREATER	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY DENSE SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM-DENSE CLEAN SAND	VERY STIFF CLAY DENSE SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM-DENSE CLEAN SAND	VERY STIFF CLAY DENSE SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM-DENSE CLEAN SAND	VERY STIFF CLAY DENSE SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM-DENSE CLEAN SAND	VERY STIFF CLAY DENSE SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK
PBH kPa	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
100	0.34	0.17	N	0.18	N	N	0.10	N	N	N	N	N	0.24	0.12	N
150	0.70	0.35	0.18	0.38	0.19	0.10	0.20	0.10	N	0.10	N	N	0.50	0.25	0.13
200	1.20	0.60	0.30	0.65	0.33	0.17	0.33	0.17	N	0.17	N	N	0.85	0.43	0.22
225	1.49	0.75	0.38	0.81	0.41	0.21	0.42	0.21	0.11	0.21	0.11	N	1.06	0.53	0.27
250	1.82	0.91	0.46	0.99	0.50	0.25	0.51	0.26	0.13	0.26	0.13	N	1.29	0.65	0.33
300	2.65	1.33	0.67	1.43	0.72	0.36	0.73	0.37	0.19	0.37	0.19	0.10	1.87	0.94	0.47
375	4.03	2.02	1.01	2.18	1.09	0.55	1.12	0.56	0.28	0.56	0.28	0.14	2.85	1.43	0.72
450	5.71	2.86	1.43	3.09	1.55	0.78	1.58	0.79	0.40	0.80	0.40	0.20	4.04	2.02	1.01
500	6.96	3.48	1.74	3.77	1.89	0.95	1.93	0.97	0.49	0.97	0.49	0.25	4.93	2.47	1.24
600	9.88	4.94	2.47	5.35	2.68	1.34	2.73	1.37	0.69	1.37	0.69	0.35	6.99	3.50	1.75
750	15.15	7.58	3.79	8.20	4.10	2.05	4.18	2.09	1.05	2.10	1.05	0.53	10.71	5.36	2.68

'N' DENOTES NOMINAL THRUST AREA – (SEE NOTES 4&5)
PBH – ALLOWABLE HORIZONTAL BEARING PRESSURE

NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. CAST THE THRUST AREA OF ALL THRUST BLOCKS AGAINST A CLEAN FACE OF UNDISTURBED NATURAL SOIL. THRUST BLOCKS NOT TO INTERFERE WITH OTHER SERVICES.
3. SOIL CLASSIFICATIONS USED ON THIS DRAWING ARE EXPLAINED IN WAT–1200.
4. DO NOT USE STANDARD THRUST BLOCKS AS SPECIFIED IN THIS DRAWING IN:
   – VERY SOFT, SOFT OR FIRM CLAY.
   – LOOSE CLEAN SAND.
   – UNCOMPACTED FILL OR REFUSE.
   A GEOTECHNICAL ASSESSMENT AND INDIVIDUAL DESIGN IS REQUIRED FOR THESE SOILS.
5. THE NOMINAL THRUST AREA 'N' TO BE ACHIEVED BY POURING CONCRETE THE FULL LENGTH OF THE FITTING AND EXTENDING FROM THE FLOOR OF THE TRENCH TO ABOVE THE FITTING (SEE ALSO NOTE 7).
6. DESIGN PRESSURES OTHER THAN 1000 kPa REDUCE OR INCREASE THE MINIMUM THRUST AREA BY THE RATIO OF THE DESIGN PRESSURES EXCEPT WHERE:
   – MIN THRUST AREA IS <0.1 m^2, AND
   – 'N' APPEARS IN THE TABLE AND DESIGN PRESSURE IS ABOVE 1000 kPa CALCULATE THE AREA.
7. FINISH THRUST BLOCKS APPROXIMATELY 100 ABOVE THE TOP OF THE FITTING OR BEARING PAD AND EXTEND TO THE FLOOR OF THE TRENCH OR DEEPER IF NECESSARY TO ACHIEVE THE REQUIRED THRUST AREA. MAXIMUM ENCASEMENT TO BE 180°.
8. THE MINIMUM THRUST AREA FOR TAPER THRUST BLOCKS TO BE EQUAL TO THE DIFFERENCE BETWEEN THE THRUST AREAS FOR DEAD ENDS OF EQUIVALENT DIAMETER TO THOSE EACH SIDE OF TAPER.
9. FOR DOWNWARD VERTICAL THRUST, THE ALLOWABLE BEARING PRESSURES FOR VARIOUS SOILS MAY BE TAKEN AS TWICE THAT FOR HORIZONTAL THRUST SHOWN.
10. WHEN POURING CONCRETE AGAINST FITTINGS PLACE A MEMBRANE OF POLYETHYLENE, PVC OR FELT BETWEEN THE FITTING AND CONCRETE TO PREVENT DAMAGE TO THE FITTING. JOINTS TO BE CLEAR OF CONCRETE.
11. CONCRETE THRUST BLOCKS AND ANCHORS FOR VALVES TO BE AS DETAILED IN WAT–1207.

Invercargill CITY COUNCIL	**TYPICAL DETAILS THRUST BLOCK INSTALLATION** **TEES, BENDS AND TAPERS - TABLE**	Fig. W8A Rev. 3 Date 7/19