

Extract from Table A2 WIS 4-08-02
 Processed granular bedding and sidefill material for flexible pipes

Pipe nominal bore (mm) see note (d)	Nominal maximum particle size (mm)	Material specified in British Standards see note (a)
100	10	10mm nominal single size
Over 100 to 150	14	10 or 14mm nominal single size or 14mm to 5mm graded
Over 150 to 300	20	10-14 or 20mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded
Over 300 to 500	20	14 or 20mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded
Over 550	40	14-20 or 40mm nominal single size or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded

- Notes:
- (a) Proposed granular material to include aggregates to BS 882, air-cooled blast furnace slag to BS1047 and lightweight aggregates BS3797
 - (c) For the purpose of this table, PE pipe of 630mm O.D. can be regarded as having a nominal bore of over 550mm irrespective of wall thickness
 - (d) Nominal bore is used in preference to DN because of the different nominal size classifications for flexible pipes

Minimum recommended trench widths for structural wall pipes in poor ground conditions

Native Soil Modulus between 3 and 4 Mpa
 Typical Soil Classifications: Very loose gravel, loose sand, medium dense clayey silty sand, firm clay

Nominal Pipe Diameter (mm)	150	225	300	375	450	525	600	750	900
Minimum Trench Width (mm)*	450	525	600	750	900	1050	1200	1500	1800

* A vertical trench face has been assumed to allow a modulus of 7 Mpa to be achieved for the pipe bedding and sidefill material

Other Assumed Values: Depth of cover = 6.00 meter max.
 Traffic Loading = Main Road
 Pipe Stiffness = SNB

Note: Where the native soil modulus is below 3Mpa or the depth of cover exceeds 6.0m guidance should be sought from the pipe manufacturer regarding structural design and installation details

Nominal Bore of Pipe (mm)	Alternative Aggregate Sizes Single Sized	(mm) Graded (Where directed)
100 - 125	10	-
150 - 200	10 or 14	14 - 5
225 - 300	10, 14 or 20	14-5 or 20-5
375 - 500	14 or 20	14-5 or 20-5
Exceed 500	14, 20 or 40	14-5 or 20-5 or 40-5

SEWERS TO BE LAID IN CLASS 'S' BRITISH 150mm GRANULAR BED AND SURROUND

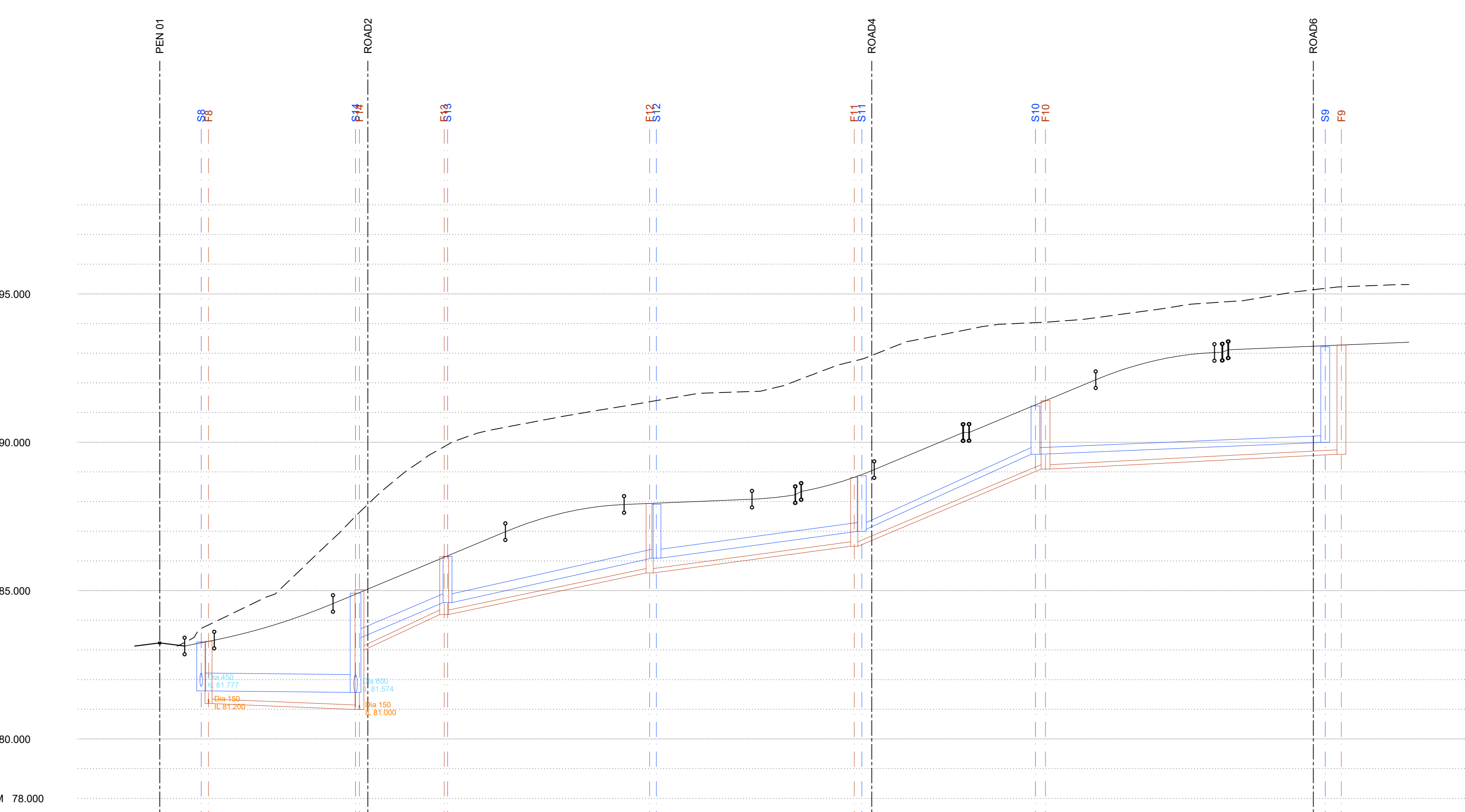
THE CLEARANCE OF THE CROSSOVER POINTS (MIN 300MM) BETWEEN THE SURFACE WATER, FOUL SEWERS, RISING MAIN AND OTHER SERVICES SHOULD BE SUFFICIENT CLEARANCE TO PROVIDE 150MM GRANULAR BED AND SURROUND AROUND BOTH PIPES

ALL ADAPTABLE SEWER WORK AND MATERIAL TO BE IN ACCORDANCE WITH SEWER FOR ADOPTION 6TH EDITION, THE RELEVANT BRITISH / EUROPEAN AND YORKSHIRE WATER STANDARD / REQUIREMENTS / ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED

Pipe Diameter (mm)	Minimum Crushing Strength Clay Pipes
150	40KN/m
225	45KN/m
300	72KN/m
375 Concrete	45KN/m
1200 Concrete	144KN/m
1500 Concrete	180KN/m

Concrete minimum crushing strength should conform to class 100 EN1916/BS5911-1:2002

- NOTES:
- All statutory undertakers equipment in footway and carriageway to be located and diverted before work commences
 - A pedestrian route through the works shall be maintained at all times and clearly defined by suitable barriers and lights where necessary
 - The contractor is obliged to obtain necessary road opening and/or sewer connection licence prior to commencement of the work
 - One vertical joint per course of brick work shall be left open to allow drainage during construction
 - All statutory undertakers covers and frames to be adjusted to suit new carriageway levels prior to surfacing
 - All existing gullies and drain runs to be cleared of debris and high pressure water jetted prior to commencement of works
 - The existing sewers and culverts shown on this drawing are taken from various authorities, drainage plans and street records. Some of the information is contradictory and the locations shown are interpreted using existing features and manhole locations shown on the survey. The exact depth and location should be verified on-site prior to commencing construction
 - All adaptable sewer works and material to be in accordance with Sewer Sector Guidance (SSG) / DCS, and the Water Authorities requirements and Kitemarked
 - All drainage works that shall be adopted by the Water Authority to be subject to their approval prior to commencement on site
 - All hard standing and impervious areas outside the adopted highway boundary to be drained and collected in private drainage systems and discharged into the surface water sewer before water encroaches onto the public highway
 - Gullies should not be located in the area of dropped crossings
 - The chamber size of manholes with more than one connection in them may need to be increased and movement to accommodate the connection and tanks
 - Sewers to be laid in Class 'S' bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in Highways and verges or less than 600mm in non-vehicular access areas then a concrete slab should be provided above granular bed and surround. Refer to Sewer Sector Guidance (SSG) / DCS for protection measures
 - Granular bedding for pipes shall consist of aggregates from natural sources complying with the relevant provisions of BS 882 stated in accordance with the table above
 - All pipes with a diameter larger or equal to 375mm shall be concrete. Pipes with a diameter less than 375mm shall be clay or ductile iron
 - Varied clay pipes and fittings for sewers shall have flexible mechanical joints. Pipes for foul sewers and surface water sewers shall comply with relevant requirements of BS EN202 and BS 65 (surface water pipes only)
 - Multiple covers shall meet face a clear opening of 600mm and shall be Class D40 to BS EN 124 with 100mm deep frames in Highways
 - Filled ground must be filled and consolidated under the supervision and to the satisfaction of the Water Authority before any sewer works are carried out
 - The Water Authority is not obliged to accept filter drain/drainage runoff into the public sewer network or adaptable drainage system (directly or indirectly). An alternative method of disposal of the roof drainage runoff will therefore be required and will have to be agreed with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/drainage runoff
 - Cover slabs must carry the BS Kitemark or will be replaced by the Water Authority Inspector. (Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the Water Authority specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), Technical Bulletin issued Autumn 2004 for Kitemarked cover slab opening sizes
 - Sulphate Resistant cement (C20-CC2) and precast concrete products must be used or a laboratory report provided proving that such products are not necessary
 - The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins
 - Sewers must have 5.0m clearance from trees and hedges, (refer to Sewer Sector Guidance (SSG) / DCS for restrictions on tree planting adjacent to sewers)
 - All private work to be in accordance with current building regulations
 - Drains passing through buildings to be protected with metal cover
 - No building to take place within 3.0m of an adoptable sewer
 - Where adoptable pipes have 150mm concrete bed and surround protection, all joints to be provided with 15mm thick flexible filer
 - No services to be steeled over or within 1.0m of an adoptable sewer
 - Private drainage connections not direct to manholes are to be made via a 45 degree junction and not saddles
 - Bedding and backfill material to conform to the requirement of Water Utility Specification 4-08-02 (Table A2)
 - Any proposed sewers located within 5 meters of the public sewer shall be ductile iron pipe work



CHAINAGE	0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400	1+500	1+600	1+700	1+800	1+900	2+000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
EXISTING GROUND LEVEL	84.020	84.096	84.166	84.230	84.289	84.343	84.392	84.436	84.475	84.509	84.538	84.562	84.581	84.595	84.604	84.608	84.608	84.604	84.595	84.581	84.562	84.538	84.509	84.475	84.436	84.392	84.343	84.289	84.230	84.166	84.096	84.020																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
ALIGNMENT LEVEL	83.136	83.306	83.456	83.586	83.696	83.786	83.856	83.906	83.945	83.974	83.993	84.002	84.011	84.020	84.029	84.038	84.047	84.056	84.065	84.074	84.083	84.092	84.101	84.110	84.119	84.128	84.137	84.146	84.155	84.164	84.173	84.182	84.191	84.200	84.209	84.218	84.227	84.236	84.245	84.254	84.263	84.272	84.281	84.290	84.299	84.308	84.317	84.326	84.335	84.344	84.353	84.362	84.371	84.380	84.389	84.398	84.407	84.416	84.425	84.434	84.443	84.452	84.461	84.470	84.479	84.488	84.497	84.506	84.515	84.524	84.533	84.542	84.551	84.560	84.569	84.578	84.587	84.596	84.605	84.614	84.623	84.632	84.641	84.650	84.659	84.668	84.677	84.686	84.695	84.704	84.713	84.722	84.731	84.740	84.749	84.758	84.767	84.776	84.785	84.794	84.803	84.812	84.821	84.830	84.839	84.848	84.857	84.866	84.875	84.884	84.893	84.902	84.911	84.920	84.929	84.938	84.947	84.956	84.965	84.974	84.983	84.992	85.001	85.010	85.019	85.028	85.037	85.046	85.055	85.064	85.073	85.082	85.091	85.100	85.109	85.118	85.127	85.136	85.145	85.154	85.163	85.172	85.181	85.190	85.199	85.208	85.217	85.226	85.235	85.244	85.253	85.262	85.271	85.280	85.289	85.298	85.307	85.316	85.325	85.334	85.343	85.352	85.361	85.370	85.379	85.388	85.397	85.406	85.415	85.424	85.433	85.442	85.451	85.460	85.469	85.478	85.487	85.496	85.505	85.514	85.523	85.532	85.541	85.550	85.559	85.568	85.577	85.586	85.595	85.604	85.613	85.622	85.631	85.640	85.649	85.658	85.667	85.676	85.685	85.694	85.703	85.712	85.721	85.730	85.739	85.748	85.757	85.766	85.775	85.784	85.793	85.802	85.811	85.820	85.829	85.838	85.847	85.856	85.865	85.874	85.883	85.892	85.901	85.910	85.919	85.928	85.937	85.946	85.955	85.964	85.973	85.982	85.991	86.000	86.009	86.018	86.027	86.036	86.045	86.054	86.063	86.072	86.081	86.090	86.099	86.108	86.117	86.126	86.135	86.144	86.153	86.162	86.171	86.180	86.189	86.198	86.207	86.216	86.225	86.234	86.243	86.252	86.261	86.270	86.279	86.288	86.297	86.306	86.315	86.324	86.333	86.342	86.351	86.360	86.369	86.378	86.387	86.396	86.405	86.414	86.423	86.432	86.441	86.450	86.459	86.468	86.477	86.486	86.495	86.504	86.513	86.522	86.531	86.540	86.549	86.558	86.567	86.576	86.585	86.594	86.603	86.612	86.621	86.630	86.639	86.648	86.657	86.666	86.675	86.684	86.693	86.702	86.711	86.720	86.729	86.738	86.747	86.756	86.765	86.774	86.783	86.792	86.801	86.810	86.819	86.828	86.837	86.846	86.855	86.864	86.873	86.882	86.891	86.900	86.909	86.918	86.927	86.936	86.945	86.954	86.963	86.972	86.981	86.990	86.999	87.008	87.017	87.026	87.035	87.044	87.053	87.062	87.071	87.080	87.089	87.098	87.107	87.116	87.125	87.134	87.143	87.152	87.161	87.170	87.179	87.188	87.197	87.206	87.215	87.224	87.233	87.242	87.251	87.260	87.269	87.278	87.287	87.296	87.305	87.314	87.323	87.332	87.341	87.350	87.359	87.368	87.377	87.386	87.395	87.404	87.413	87.422	87.431	87.440	87.449	87.458	87.467	87.476	87.485	87.494	87.503	87.512	87.521	87.530	87.539	87.548	87.557	87.566	87.575	87.584	87.593	87.602	87.611	87.620	87.629	87.638	87.647	87.656	87.665	87.674	87.683	87.692	87.701	87.710	87.719	87.728	87.737	87.746	87.755	87.764	87.773	87.782	87.791	87.800	87.809	87.818	87.827	87.836	87.845	87.854	87.863	87.872	87.881	87.890	87.899	87.908	87.917	87.926	87.935	87.944	87.953	87.962	87.971	87.980	87.989	87.998	88.007	88.016	88.025	88.034	88.043	88.052	88.061	88.070	88.079	88.088	88.097	88.106	88.115	88.124	88.133	88.142	88.151	88.160	88.169	88.178	88.187	88.196	88.205	88.214	88.223	88.232	88.241	88.250	88.259	88.268	88.277	88.286	88.295	88.304	88.313	88.322	88.331	88.340	88.349	88.358	88.367	88.376	88.385	88.394	88.403	88.412	88.421	88.430	88.439	88.448	88.457	88.466	88.475	88.484	88.493	88.502	88.511	88.520	88.529	88.538	88.547	88.556	88.565	88.574	88.583	88.592	88.601	88.610	88.619	88.628	88.637	88.646	88.655	88.664	88.673	88.682	88.691	88.700	88.709	88.718	88.727	88.736	88.745	88.754	88.763	88.772	88.781	88.790	88.799	88.808	88.817	88.826	88.835	88.844	88.853	88.862	88.871	88.880	88.889	88.898	88.907	88.916	88.925	88.934	88.943	88.952	88.961	88.970	88.979	88.988	88.997	89.006	89.015	89.024	89.033	89.042	89.051	89.060	89.069	89.078	89.087	89.096	89.105	89.114	89.123	89.132	89.141	89.150	89.159	89.168	89.177	89.186	89.195	89.204	89.213	89.222	89.231	89.240	89.249	89.258	89.267	89.276	89.285	89.294	89.303	89.312	89.321	89.330	89.339	89.348	89.357	89.366	89.375	89.384	89.393	89.402	89.411	89.420	89.429	89.438	89.447	89.456	89.465	89.474	89.483	89.492	89.501	89.510	89.519	89.528	89.537	89.546	89.555	89.564	89.573	89.582	89.591	89.600	89.609	89.618	89.627	89.636	89.645	89.654	89.663	89.672	89.681	89.690	89.699	89.708	89.717	89.726	89.735	89.744	89.753	89.762	89.771	89.780	89.789	89.798	89.807	89.816	89.825	89.834	89.843	89.852