

- Key**
- Borehole
  - ◆ CT
  - ⊗ Dynamic Probe
  - Trial Pit
  - Hand Pit
  - Dynamic Sample Borehole

Hole ID	Easting (m)	Northing (mN)	Level (mOD)
BH101	389243.299	390265.094	45.218
BH102	389276.731	390293.978	43.345
BH103	389206.655	390246.422	42.422
BH104	389178.078	390228.877	42.473
BH105	389234.786	390221.942	42.624
BH106	389248.707	390249.657	42.445
BH107	389206.789	390252.392	42.265
BH108	389157.818	390267.979	42.717
BH109	389164.440	390216.960	42.260
BH111	389253.456	390080.226	50.919
BH112	389295.702	390239.877	43.703
CT1	389146.670	390309.530	42.240
CT1A	389139.000	390309.600	42.150
CT3	389139.940	390305.200	42.110
CT4	389146.580	390314.810	42.070
CT5	389154.697	390268.627	42.732
CT6	389161.890	390271.340	42.660
CT6A	389162.230	390271.690	42.590
CT8	389163.474	390271.412	42.662
CT7	389163.186	390263.329	42.754
CT8	389163.796	390266.428	42.721
DP1	389135.620	390312.530	42.300
DP2	389141.140	390303.370	42.130
DP3	389138.080	390305.540	42.130
DP4	389142.570	390304.560	42.070
DP5	389149.490	390299.830	42.730
DP6	389156.840	390270.940	42.620
DP7	389161.680	390271.310	42.590
DP8	389152.880	390259.980	42.850
DP9	389159.150	390263.750	42.710
DP10	389162.140	390266.860	42.650
HP101	389288.636	390260.602	48.577
HP102	389310.624	390281.273	52.835
TP1	389129.760	390307.010	42.250
TP2	389138.240	390302.500	42.090
TP3	389145.520	390305.290	42.070
TP4	389151.170	390306.650	42.120
TP5	389148.570	390312.490	42.160
TP6A/TP6B	389154.835	390259.244	42.863
TP7A/TP7B	389151.875	390270.319	42.705
TP8	389165.304	390276.628	42.802
TP9	389152.081	390266.391	42.789
WS201	389210.666	390145.901	45.614
WS203	389159.132	390201.040	43.011
WS204	389161.807	390212.600	42.851
WS205	389162.101	390221.783	42.291
WS206	389278.750	390194.812	48.125
WS208	389241.331	390271.366	42.350
WS209	389242.280	390284.319	42.673
WS210	389315.993	390273.770	44.431
WS211	389322.987	390302.677	44.884
WS212	389284.728	390377.074	45.736
WS214	389280.915	390351.942	46.345
WS217	389229.781	390254.966	42.295
WS218	389254.700	390238.100	42.750
WS218A	389253.900	390239.000	42.710
WS219	389259.609	390275.323	45.127
WS220	389143.232	390224.649	44.686
WS221	389275.017	390086.165	51.031
WS223	389237.657	390204.856	43.392
WS224	389229.683	390286.414	53.306



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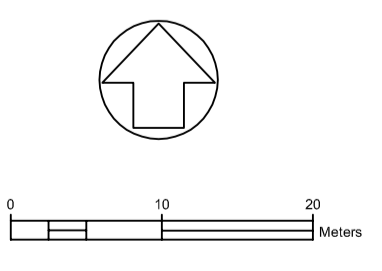
**Project:**  
 Stockport Bus Station

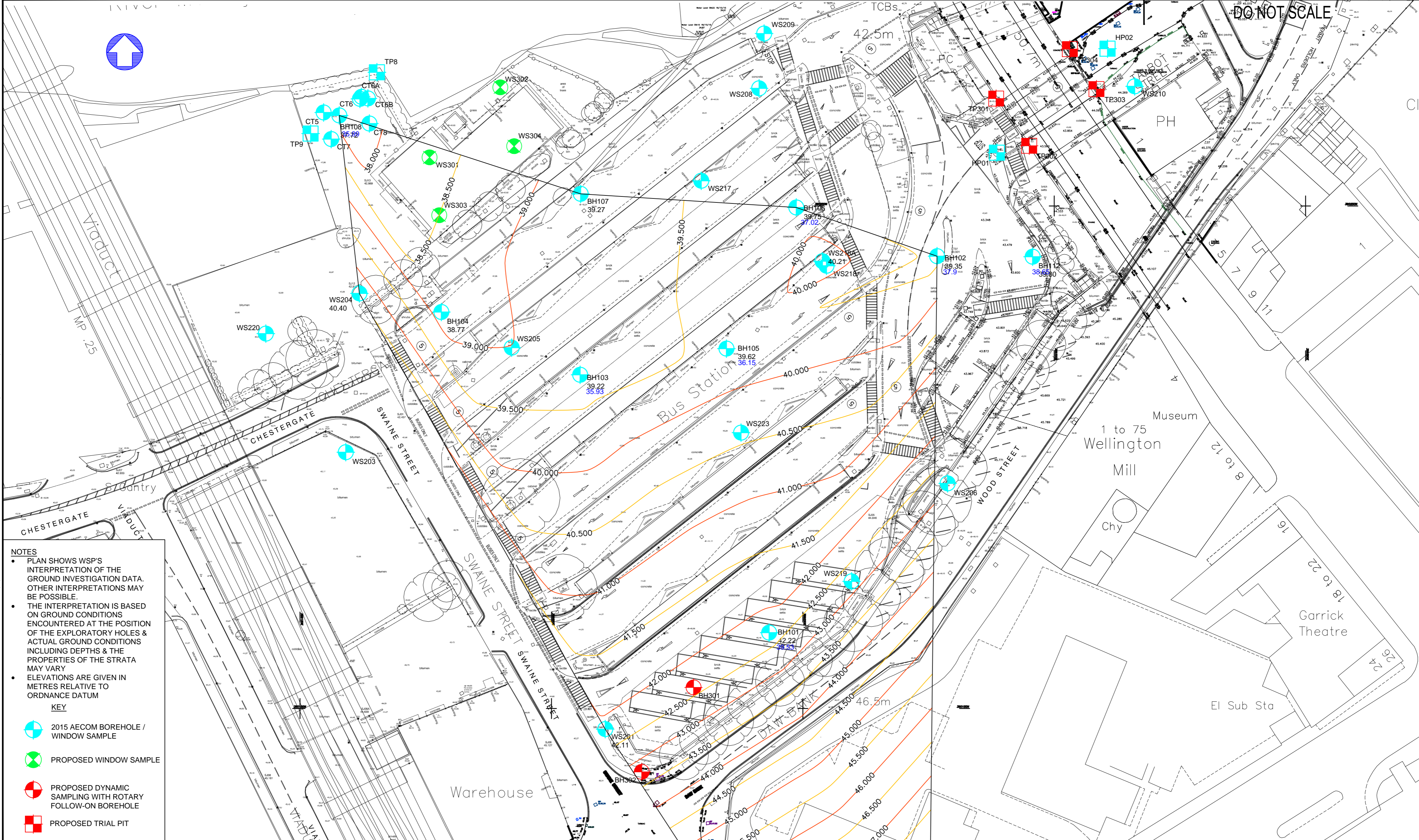
**Drawing Title:**  
 Exploratory Hole Location Plan

Drawing 2 of 2

**Scale:** 1:500@A1  
**Date:** February 2016

**Project No:** PN153428  
**File Name:** Geo-PN153428-001(2)





**NOTES**

- PLAN SHOWS WSP'S INTERPRETATION OF THE GROUND INVESTIGATION DATA. OTHER INTERPRETATIONS MAY BE POSSIBLE.
- THE INTERPRETATION IS BASED ON GROUND CONDITIONS ENCOUNTERED AT THE POSITION OF THE EXPLORATORY HOLES & ACTUAL GROUND CONDITIONS INCLUDING DEPTHS & THE PROPERTIES OF THE STRATA MAY VARY
- ELEVATIONS ARE GIVEN IN METRES RELATIVE TO ORDNANCE DATUM

- KEY**
- 2015 AECOM BOREHOLE / WINDOW SAMPLE
  - PROPOSED WINDOW SAMPLE
  - PROPOSED DYNAMIC SAMPLING WITH ROTARY FOLLOW-ON BOREHOLE
  - PROPOSED TRIAL PIT

P01	6/7/18	RH	FIRST ISSUE	MN	MN
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ARCHITECT:

**BDP**

PROJECT:

**STOCKPORT INTERCHANGE**

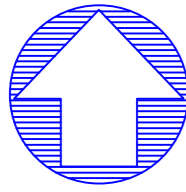
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**ROCKHEAD ELEVATION CONTOUR PLAN**

SCALE @ A2:	1:500	CHECKED:	MN	APPROVED:	MN
PROJECT No:	70031899	DESIGNED:	RH	DRAWN:	RH
DRAWING No:	70031899_CP_001			DATE:	July 18
REV:					P01
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DO NOT SCALE



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**KEY**

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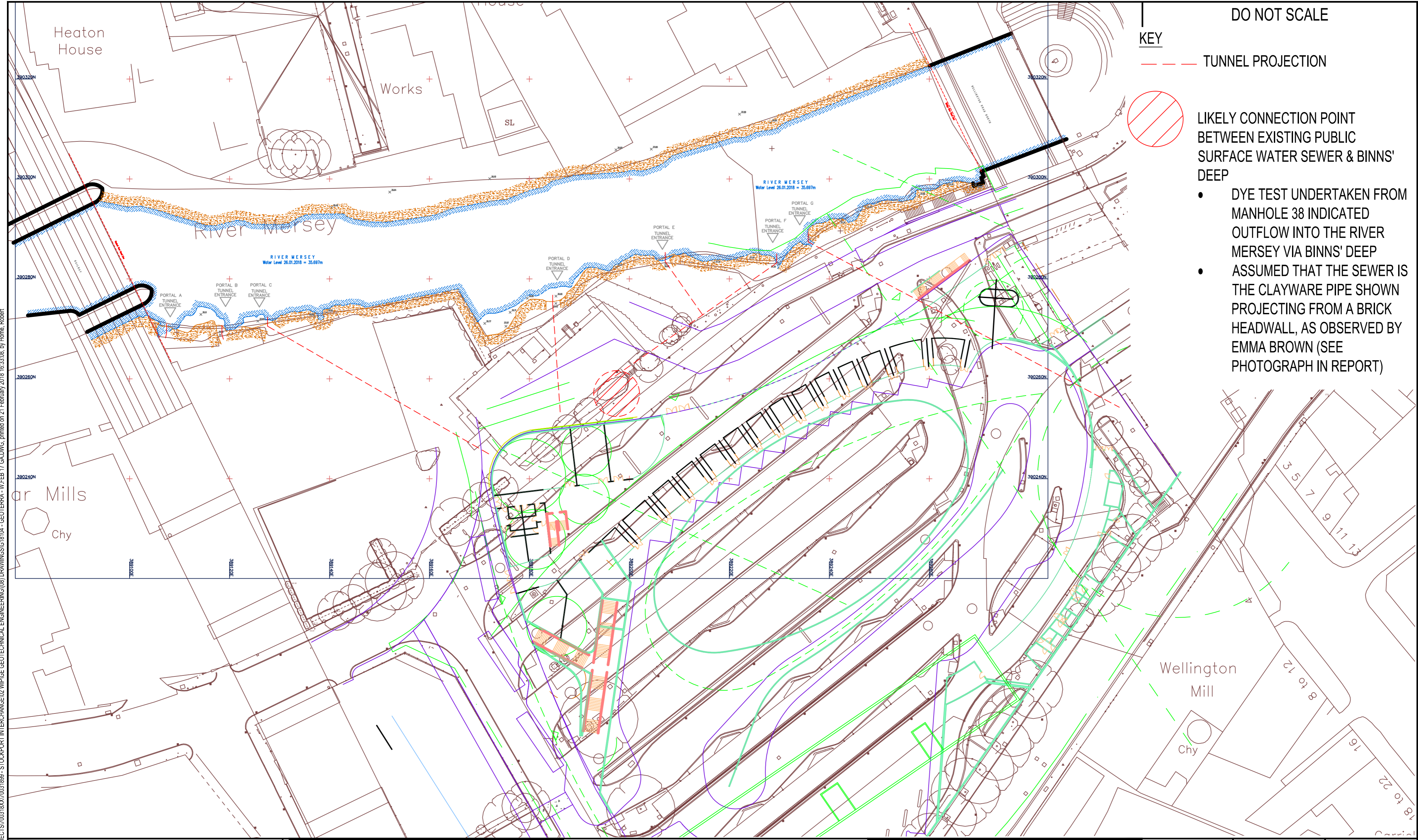
ARCHITECT: BDP

PROJECT: STOCKPORT INTERCHANGE

TITLE: GROUNDWATER ELEVATION CONTOUR PLAN

SCALE @ A2: 1:500	CHECKED: MN	APPROVED: MN
PROJECT No: 70031899	DESIGNED: RH	DRAWN: RH
DATE: July 18		REV: P01
DRAWING No: 70031899_CP_003		
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CLIENT:	TRANSPORT FOR GREATER MANCHESTER
ARCHITECT:	BDP

PROJECT:	STOCKPORT INTERCHANGE
TITLE:	PRELIMINARY TUNNEL LOCATION PLAN

SCALE @ A2:	1:500	CHECKED:	MN	APPROVED:	MN
PROJECT No:	70031899	DESIGNED:	RH	DRAWN:	RH
				DATE:	February 18
DRAWING No:	70031899-PTLP-001			REV:	P01
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# Appendix D

GEOTECHNICAL RISK REGISTER



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Hazard	Cause	Consequence	Perceived Level of Risk Without Control	Control Adopted	Risk Ownership
Unforeseen ground conditions	Ground conditions differ from those assumed within the design	Delays on site Possible re-design of foundations, retaining structures etc. Financial implications	High	Desk based study and intrusive investigation undertaken to inform the ground model and facilitate design.  Additional ground investigation proposed in order to provide sufficient testing data for design.  Note: ground investigation only samples a limited amount of the ground and conditions may exist between exploratory holes that are not identified by the ground investigation and cannot be anticipated from interpretation of the available data. As such, the risk of unforeseen ground conditions cannot be entirely mitigated	Client
Instability of Wellington Road viaduct	Lowering of ground levels around the viaduct	Delays on site Financial implications Reputational damage	Moderate	Foundation inspection pits to be undertaken to investigate the construction of the viaduct foundations  Careful control of any excavation works	Client & Contractor
Excessive pile settlement, possible pile failure	Variations in rock head level	Additional piles may be required Financial implications Delays on site	Moderate	Risk to be considered by piling contractor.  Appropriate monitoring of piling operations to confirm rock head level and ensure that adequate length rock sockets are formed.  Should rock head levels vary from those assumed the contractor shall cease work and investigate appropriately.	Piling Contractor
Bearing piles fail to provide adequate capacity	Inappropriate assessment of ground investigation data	Additional piles may be required Financial implications Delays on site	Low / moderate	Pile design to be undertaken by a competent contractor based on their own conservative assessment of the ground investigation data.  Pile testing to be incorporated at an early stage.	Piling Contractor



Hazard	Cause	Consequence	Perceived Level of Risk Without Control	Control Adopted	Risk Ownership
Piles fail to reach design depth	Obstructions Rock strength greater than anticipated Use of inappropriate rig	Additional piles may be required Financial implications Delays on site	High	Appropriate measures to be out in place to mitigate the risk as much as practicable prior to construction. Piling contractor to be aware of the risk of obstructions within the Glacial Sand and Gravel. Pile design to be undertaken by a competent contractor based on their own conservative assessment of the ground investigation data. Use of an appropriate piling rig	Piling Contractor & Contractor
Pile failure	Piles intersect historic tunnels below the site	Delays to programme Financial implications Re-design of foundations	High	Desk study research and preliminary investigations undertaken to assess potential presence of tunnels. Investigation to be undertaken to assess the extent and condition of tunnels and allow the design of appropriate remedial works	Client
Ground collapse	Collapse of historic tunnels below the site	Health & Safety implications Financial implications Delays on site	Moderate	Desk study research and preliminary investigations undertaken to assess potential presence of tunnels. Investigation to be undertaken to assess the extent and condition of tunnels and allow the design of appropriate remedial works	Client
Collapse of excavations Damage to adjacent structures and infrastructure	Insufficient ground support, poor design of batters/ground support	Health & Safety implications Financial implications Delays on site	High	Temporary works to be appropriately designed to take into account ground stability, groundwater level, loading and proximity and nature of site boundaries. Stability to be ensured by competent design and use of ground support, appropriate safe batters, or underpinning.	Contractor
Difficult excavation	Obstructions in Made Ground	Financial implications Delays on site	High	A detailed strategy for obstruction removal should be implemented to ensure that abnormal costs are appropriately managed	Contractor
Excessive groundwater ingress into excavations	Groundwater levels higher than currently anticipated.	Health & Safety implications Delays to programme	Low	Allowance to be made for dewatering during excavations. Dewatering works to be assessed and designed by a competent specialist contractor.	Contractor / Designer



Hazard	Cause	Consequence	Perceived Level of Risk Without Control	Control Adopted	Risk Ownership
Toppling of piling rig	Failure of working platform	Health and safety implications	High	Platform to be designed and maintained in accordance with current good practice	Piling Contractor & Contractor
Degradation of below ground concrete	Inappropriate concrete assessment	Remedial works required Financial implications	Moderate	Undertake sufficient number of sulphate and pH tests Appropriate assessment of groundwater activity	Designer
Damage to services	Inappropriate buried services assessment	Delays Health and safety issues Financial / legal implications	High	Undertake appropriate services search and undertake diversion/disconnection where necessary. Site wide GPR survey to be undertaken	Contractor





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