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LINK LOGISTICS PARK
ELLESMERE PORT, CHESHIRE

FLOOD RISK ASSESSMENT
& DRAINAGE STATEMENT

[redacted]

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Flood Risk Assessment & Drainage Statement

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SECTION 1 SITE INVESTIGATION

INTRODUCTION

1.1. Shepherd Gilmour Infrastructure Ltd (SGi) has been engaged by Ma6nitude Land LLP to prepare a Flood Risk Assessment and Drainage Statement in support of a planning application for a site known as Link Logistics Park in Ellesmere Port.

1.2. The Flood Risk Assessment has been prepared in accordance with the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and the National Planning Policy Framework (NPPF). It contains information from sources such as the Environment Agency (EA), Local Sewerage Undertaker, District Council and Site Owner.

1.3. The Drainage Statement has been prepared in line with the Non-Statutory Technical Standards for Sustainable Drainage (NSTSSD) and CIRIA Report C753. It also defines the outline proposal for the disposal of surface runoff and foul effluent from the site.

EXISTING SITE DESCRIPTION

1.4. The proposed development site (PDS) is centred on National Grid reference SJ 338914, 378594 and spans approximate area of 17.35 hectares. The PDS is located 2km to the north west of Ellesmere Port town centre between the M53 and the Manchester Ship Canal with the Mersey Estuary beyond.

1.5. Access to the site [redacted] 53 via Netherpool Road and North Road which [redacted] ite. North Road also provides access to the industrial premises to the south east.

1.6. The site was formerly occupied by the Bridgewater Mill which closed in February 2012 with the buildings having since been demolished. The only remaining structures on site are the former office building, built in the mid 1990's, and the mill water tower located adjacent to North Road.

1.7. The site has been levelled and remains covered in hardstanding and crushed concrete with occasional scrubby vegetation over much of the area. Ground conditions become overgrown towards the north west boundary and extend into the Rivacre Brook valley.

1.8. A copy of the latest topographical survey has been included within **Appendix A**.

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Figure 1.1 Site Location (Google Maps)

PROPOSED SITE LAYOUT

1.9. The client's proposals are for three new industrial units which vary in size. Each of the units will also have their own associated service yards, car parking and landscaping.

1.10. A copy of the architect's current masterplan has been included within **Appendix B**.

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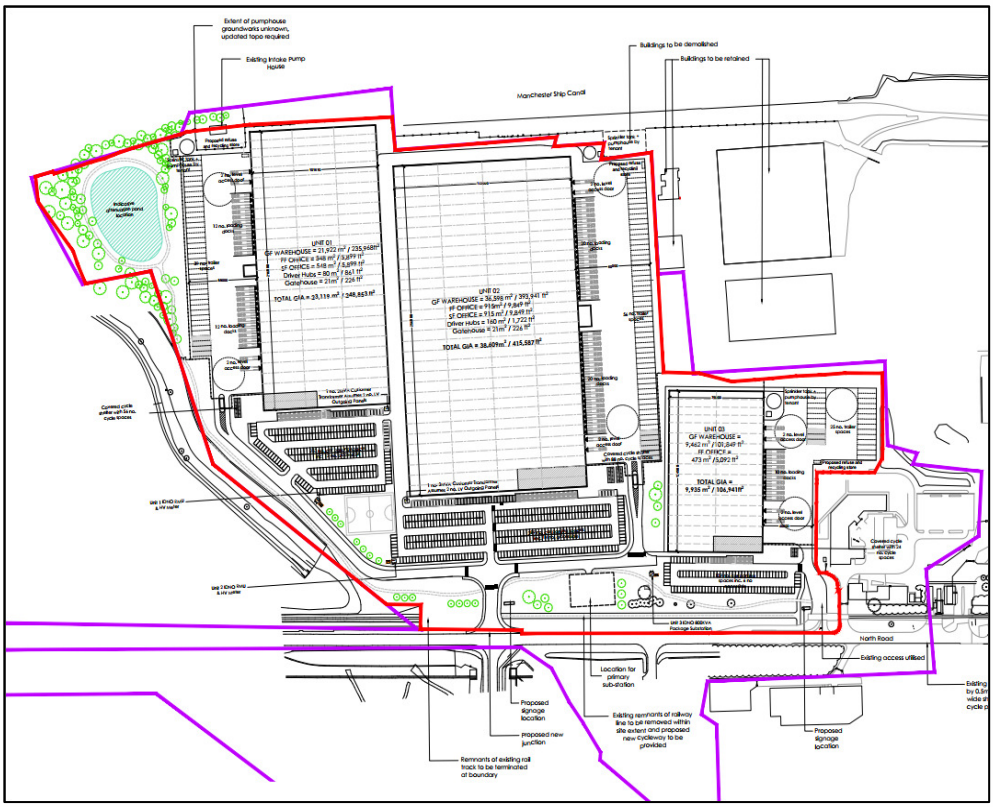

Figure 1.2 Illustrative Masterplan (AEW Architects)

[redacted]

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SECTION 2 POTENTIAL SOURCES OF FLOODING

2.1. There are several sources of flooding which could impact a site. The risk of flooding from these potential sources onto the Proposed Development Site (PDS) has been explored in this section;

- *Fluvial/Tidal,*
- *Ground Water,*
- *Artificial Waterbodies (canals, reservoirs etc) and,*
- *Pluvial.*

2.2. The sources of flooding which could potentially impact the PDS are discussed in detail within **Section 3 & 4** along with their associated mitigation measures.

FLUVIAL/TIDAL FLOOD RISK

Gov.UK Website

2.3. The Gov.UK website provides a flood risk service which allows for a PDS to be quickly checked against an online fluvial/tidal flood map. This map indicates that the site is at low risk and an abstract has been shown below in **Figure 2.1.**

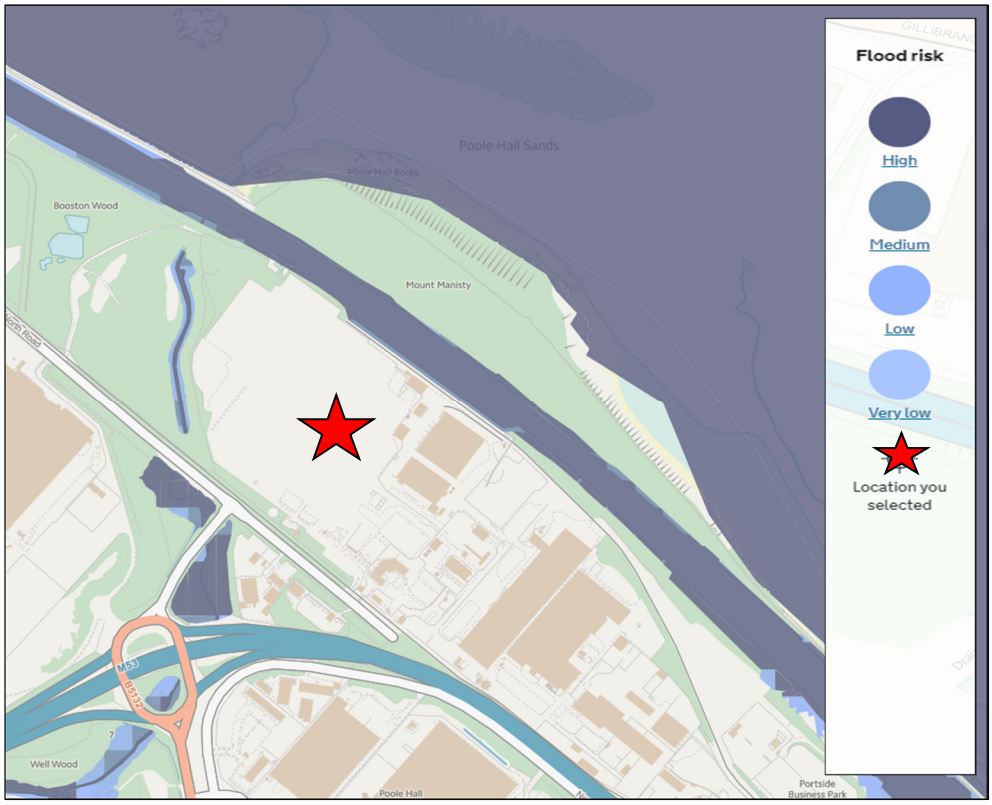

Figure 2.1 Flood Map for Planning (Gov.UK)

Strategic Flood Risk Assessment

2.4. The NPPF requires Local Planning Authorities to produce Strategic Flood Risk Assessments in support of their Local Plan. These form the basis for preparing appropriate policies for flood risk management within the area and provide the framework for assessing areas of developable land.

2.5. The PDS is within the SFRA for Ellesmere Port and Neston and was produced by Faber Maunsell in June 2008. The SFRA maps indicates that the PDS is in Flood Zone 1.

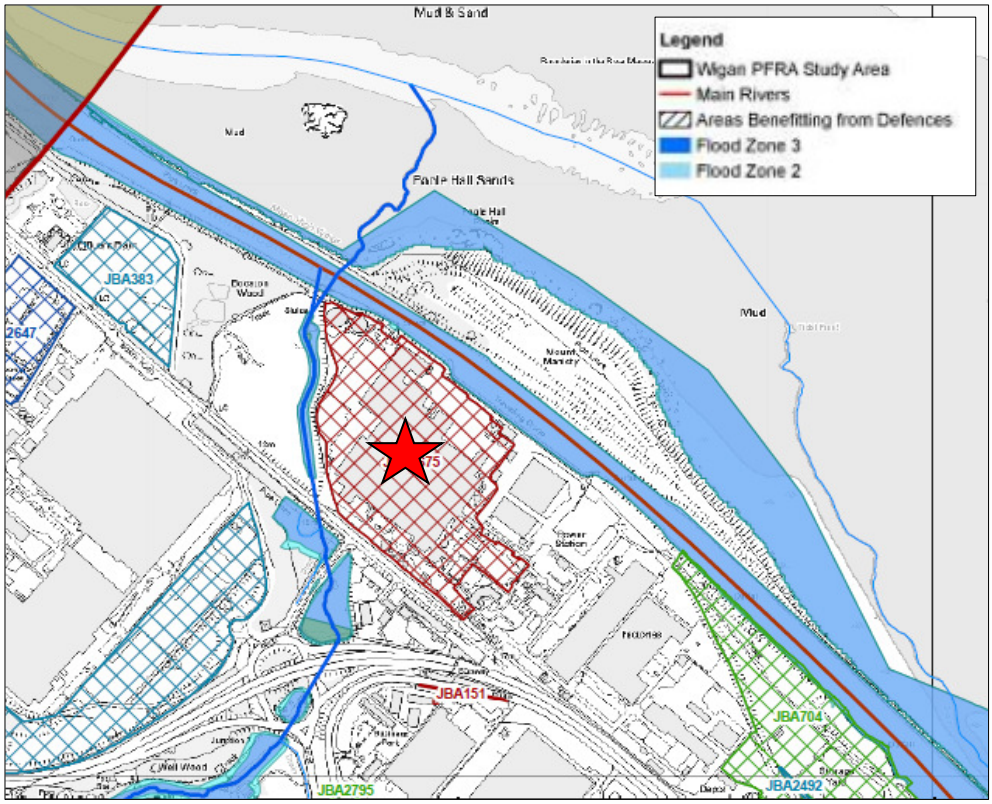

Figure 2.2 SFRA Fluvial/Tidal Flood Map (SFRA)

Environment Agency

2.6. According to the Environment Agency (EA) flood search the PDS is located within Flood Zones 1. An abstract of this EA Flood Map has been shown below in **Figure 2.3**.

- *Flood Zone 1 – Low Probability*

  Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)

- *Flood Zone 2 – Medium Probability*

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Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)

- *Flood Zone 3 – High Probability*

  Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

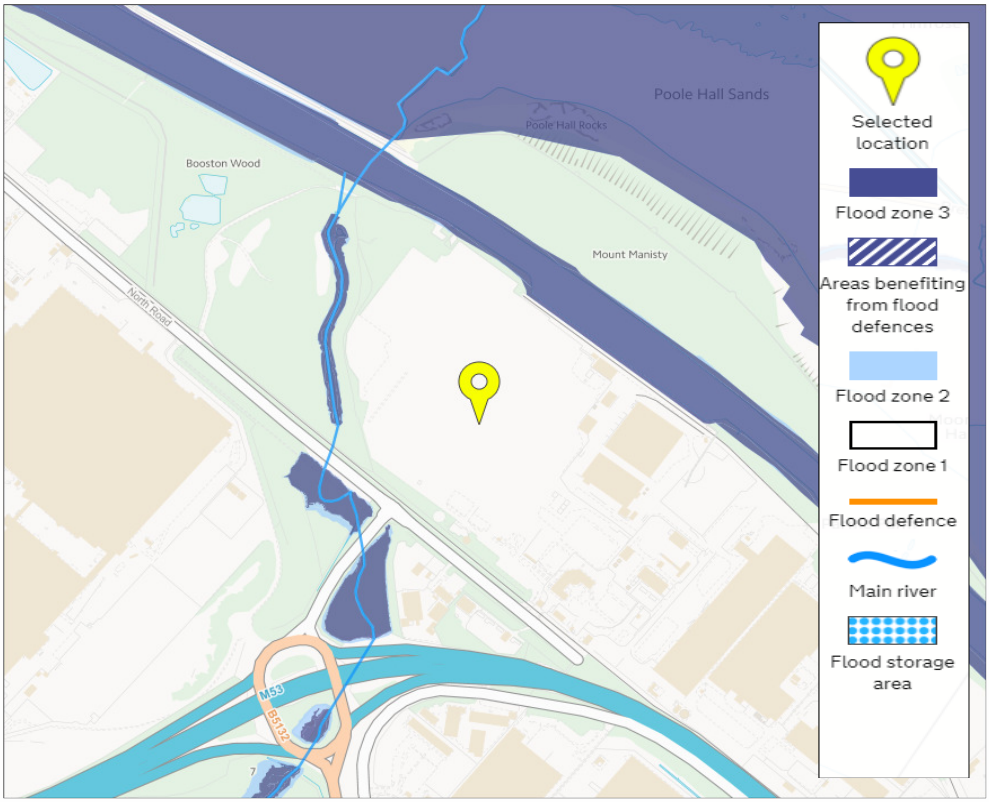

Figure 2.3 Flood Map (Environment Agency)

Ordinary Watercourse

2.7. Ordinary watercourses do not form part of a 'main river' and can consist of rivers, ditches, swales, drains etc. These watercourses are the responsibility of the riparian owner who must ensure that:

- *Flows can pass freely without obstruction, pollution or diversion (affecting the rights of others).*
- *The banks and bed of the watercourse are maintained (including vegetation).*
- *Any approved onsite watercourse structures are maintained.*

2.8. There is no data available (historic/present) to suggest that there are any ordinary watercourses onsite.

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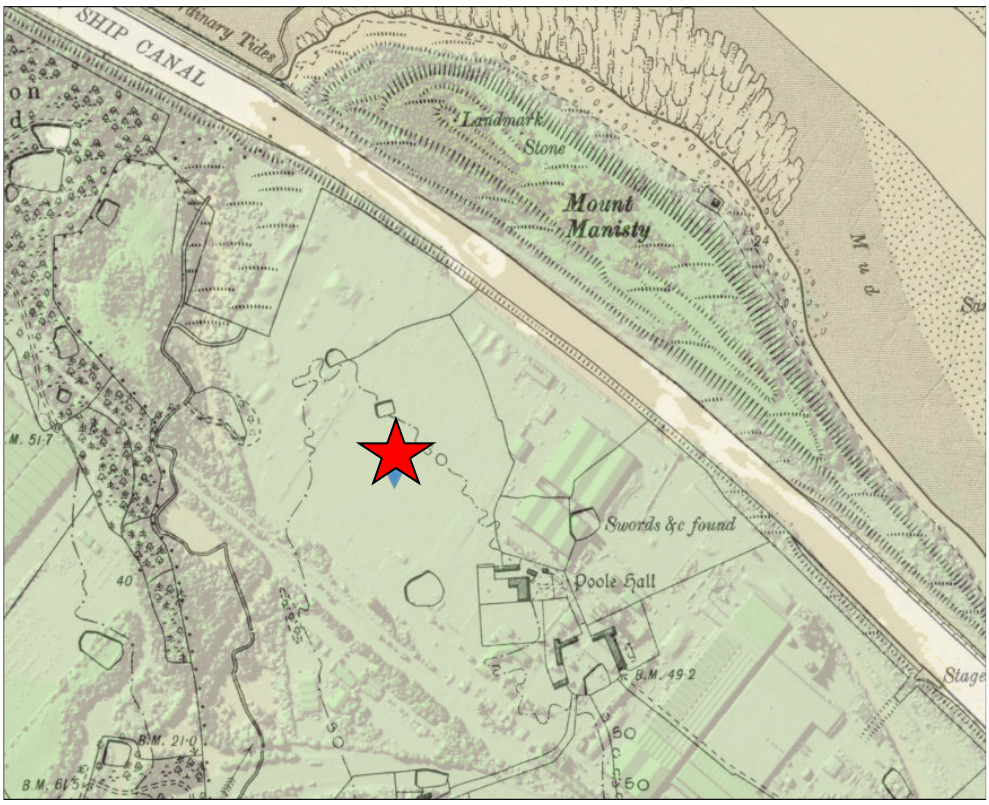

Figure 2.4 OS Map Overlay (National Library of Scotland)

CANAL FLOOD RISK

2.9. Most of the canals in England and Wales are owned, maintained, and operated by the Canal & River [redacted] within the canal is usually maintained/regulate[redacted] a breach or overtopping is unlikely, the poten[redacted]

2.10. The closest canal to the PDS is the Manchester Ship Canal (MSC). This canal forms the north eastern boundary of the site and is owned/maintained by Peel Ports. The topographical survey indicates that the canal on average is around 6.0m AOD which is 8m lower than the PDS.

2.11. The risk to the PDS from a potential breach therefore would be considered very low.

GROUNDWATER FLOOD RISK

2.12. Unlike flooding from rivers and the sea, groundwater does not pose a significant risk to life. It is more associated with damage to the building, due to the flooding persisting over several weeks.

2.13. The Department for Environment, Food, and rural Affairs MAGIC map (**Figure 2.5)**. Indicates that the PDS is at medium to low risk of groundwater flooding.

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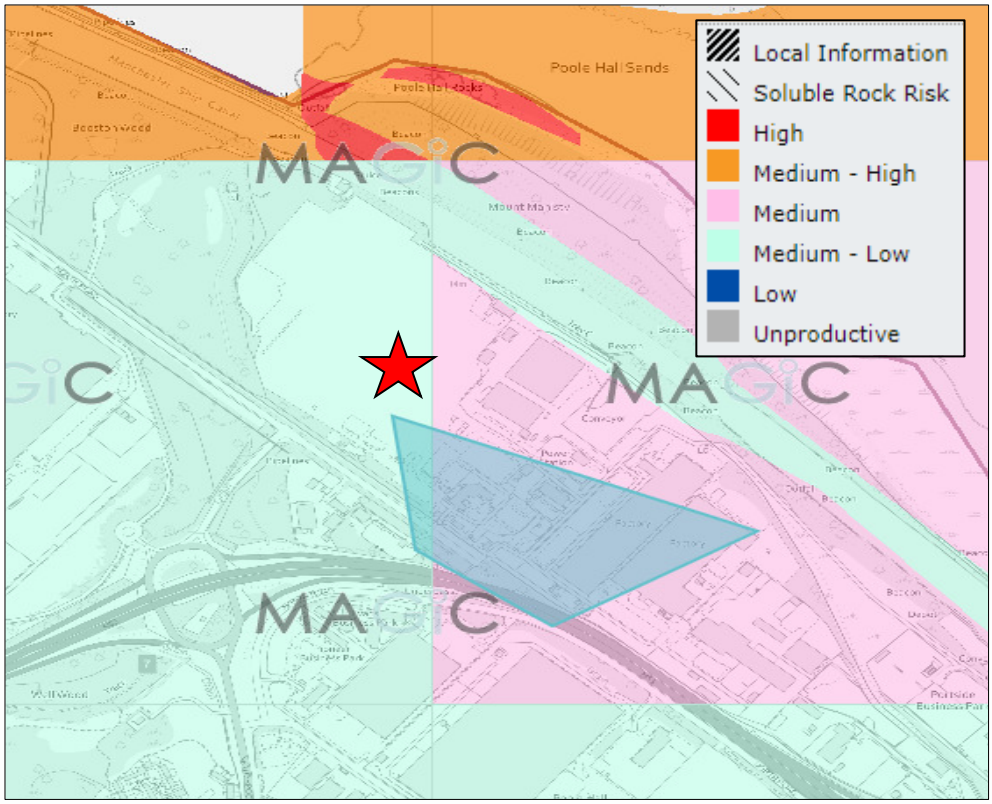

Figure 2.5 Groundwater Flood Map (MAGIC)

ARTIFICIAL WATERBODIES

2.14. The reservoirs in the area are owned and operated by Yorkshire Water and are covered by the Reservoirs [redacted] f a catastrophic dam failure occurring is relativ [redacted] vent are severe.

2.15. Reservoir flood plans are still required and are prepared by their owners. These documents are considered sensitive due to national security and only indicative plans are made available by the Environment Agency/Gov.UK.

2.16. The indicative reservoir flood plan (**Figure 2.6**) indicates that the PDS is outside of associated flood risk during a possible breach.

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Figure 2.6 Reservoir Flood Risk Map (Gov.UK)

PLUVIAL RUNOFF

2.17. Pluvial flooding is defined as 'flooding from rainfall generated overland flow before the runoff enters any [redacted] associated with high-intensity rainfall events but [redacted] events when the ground is saturated/frozen o[redacted]

2.18. The maps provided within the SFRA and Gov.UK (**Figure 2.7**) indicates that most of the site is at very low risk. But there are some small, isolated areas of medium-high risk onsite.

CRITICAL DRAINAGE AREA

2.19. Critical Drainage Areas (CDA) are areas that are particularly sensitive to an increase in surface water runoff, either as direct overland flow or from the existing sewer network.

2.20. There is no information available to confirm if the PDS lies within a CDA.

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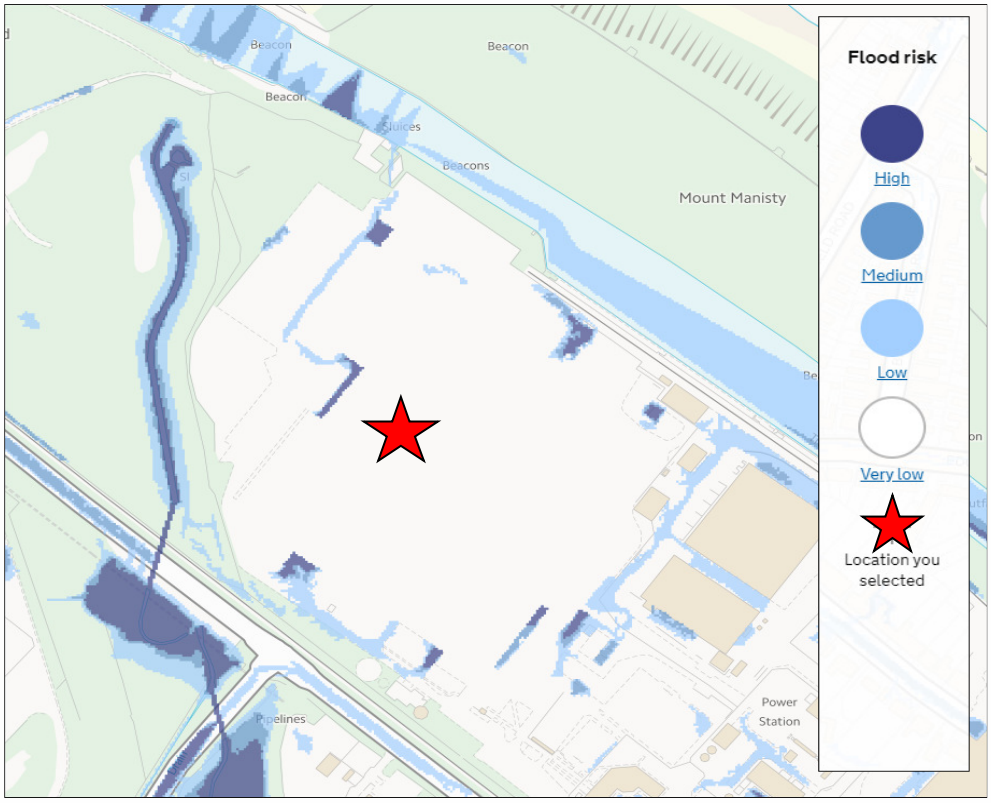

Figure 2.7 Pluvial Flood Risk Map (Gov UK)

FLOOD RISK OVERVIEW

2.21. The potential sources of flooding which could be experienced have been summarised in **Table 2.1**. Those [redacted] site have been investigated further in **Section** [redacted] measures.

Source of Flooding	Potential Flood Risk					Site Description
	High	Medium	Low	Very Low or Negligible	Information Not Available	
Fluvial/Tidal			X	X		The Environment Agency maps indicate that the onsite risk varies between Zone 1.
Canal				X		A potential breach would be unlikely to affect the PDS due to the topography.
Ground Water		X	X			The SFRA considers the area to be low to medium risk.

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Artificial Waterbodies				X		In the event of a breach, the PDS is located outside of any flood risk area.
Pluvial Runoff	X	X	X			The Gov.UK Maps identifies that the site is at low to high risk of surface flooding.
Critical Drainage Areas					X	No information available.

Table 2.1 Potential Sources of Flooding Overview

[redacted]

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SECTION 3 FLOOD RISK ANALYSIS

GROUNDWATER FLOODING

3.1. The Defra MAGIC maps in **Section 2** indicated that the PDS was at low to medium risk of ground water flooding. These maps provide a good insight into what could be encountered but are not detailed enough to form any conclusions.

3.2. The risk of groundwater flooding to the PDS is expected to be low after the site has been reprofiled (externals fall away from the buildings etc). The risk, however, will be confirmed once the intrusive site investigation has been carried out.

Groundwater Flood Risk = To be confirmed

PLUVIAL FLOODING

3.3. The Gov.UK Maps in **Section 2** indicates that the PDS was at risk of pluvial flooding. These maps, however, are based solely on LIDAR data and purely highlight low spots and/or depressions where runoff may gather.

3.4. A review of the topographical survey confirms that the areas identified at risk are low spots/holding tanks and will be removed by the development proposals.

Mitigation Measures 1

3.5. The proposed Fini[redacted]ed by a minimum of 150mm above the surrou[redacted]tion. If raising the FFL is not possible, then the f[redacted] at the detailed design stage.

- *External levels plan to indicate how surface water runoff is directed away from sensitive areas or intercepted by runoff-capturing devices.*
- *A detailed surface water drainage design that shows all necessary storm periods can be adequately catered for below ground.*

Mitigation Measures 2

3.6. The surface water drainage for the PDS must be designed to cater for all storm events up to and including the 100-year plus climate change event. This will reduce the risk of pluvial flooding onsite/offsite.

Pluvial Flood Risk = Low risk after redevelopment

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SECTION 4 FLOOD ZONE REQUIREMENTS

4.1. Based on the information currently available the PDS is in Flood Zone 1.

- *Flood Zone 1 Low Probability - Land having a less than 1 in 1,000 annual probability of river or sea flooding.*

Proposed Development Type

4.2. In accordance with the National Planning Policy Framework Practice Guidance on flooding, less vulnerable types of development are permitted within Flood Zones 1.

Flood Zone	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	✓	✓	✓	✓	✓
2	✓	Exception Test Required	✓	✓	✓
3a	Exception Test Required	x	Exception Test Required	✓	✓
3b	Exception Test Required	x	x	x	✓

Key: ✓ Development is appropriate x Development should not be permitted

Table 4.1 Flood Risk Classification (NPPF)

Sequential Test

4.3. Not applicable in F[redacted]

Exception Test

4.4. Not applicable in F[redacted]

Local Authority Policy Aims

4.5. In this zone developers and Local Authorities should still seek opportunities to reduce the overall level of flood risk in the area through the layout design and form of development and the appropriate application of sustainable drainage techniques.

4.6. The proposed sustainable drainage techniques along with an outline drainage strategy are discussed in detail in **Section 6 & 7**.

Finished Floor Level Restrictions

4.7. Not applicable in Flood Zone 1.

Flood Compensation

4.8. Not applicable in Flood Zone 1.

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Flood Resilient Construction

4.9. Not applicable in Flood Zone 1.

Safe Access and Egress

4.10. Not applicable in Flood Zone 1.

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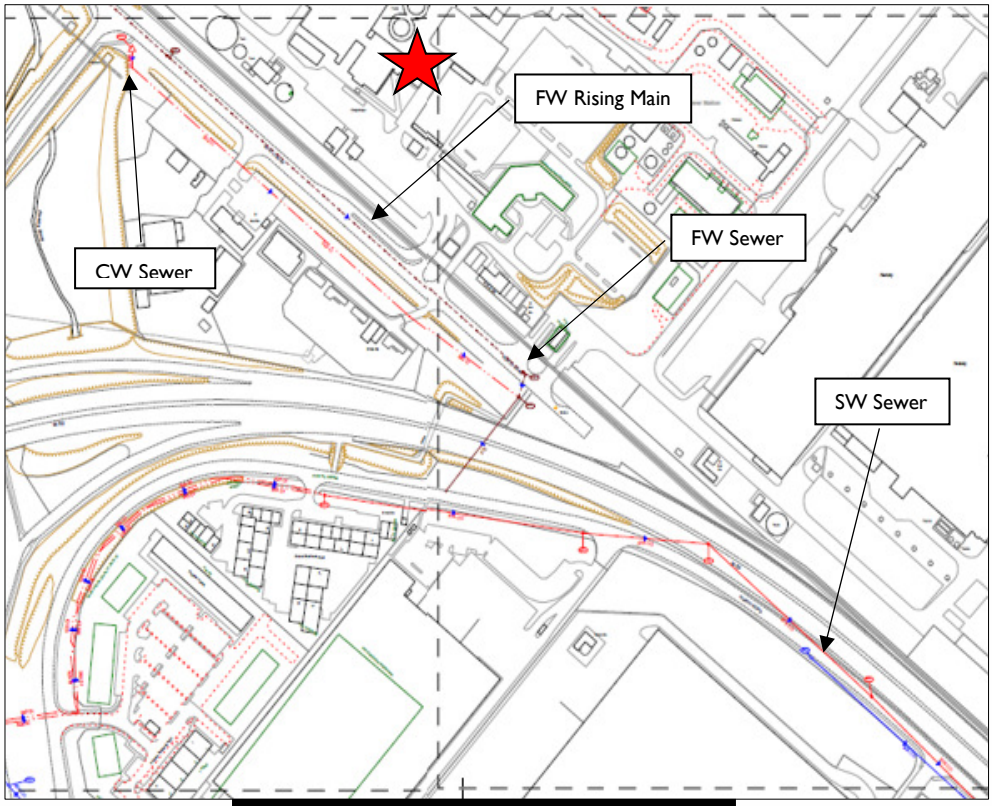
SECTION 5 EXISTING DRAINAGE INFORMATION

PUBLIC SEWERS

5.1. The public sewers in the area are owned and maintained by United Utilities (UU). A copy of their sewer records has been included within **Appendix C.**



[redacted]es)

Surface Water Sewers

5.2. The nearest surface water sewer to the PDS is 300m to the southeast.

Foul Water Sewers

5.3. The nearest foul water sewer to the PDS is 150m to the southeast. There is also a rising main within North road, but this is a sealed system and not accessible.

Combined Water Sewers

5.4. The nearest combined water sewer is 60m to the southeast and connections to a pumping station.

Sewer Diversions

5.5. None required. There are no public sewers identified on the site.

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PRIVATE DRAINAGE

As Built Plans

5.6. The previous owner of the site has provided as built drainage plans for the Bridgewater Mill. These plans showed that the existing site was served by three surface water outfalls and one foul water outfall.

5.7. The as built records also confirmed that 6.5ha of the site discharged to the MSC (approx 43%) where as 8.5ha discharged to Rivacre Brook (57%). The condition of the existing drainage outfalls post demolition is unknown and will require further investigation during the detailed design stage.

5.8. A copy of the as built records has been included within **Appendix D**.

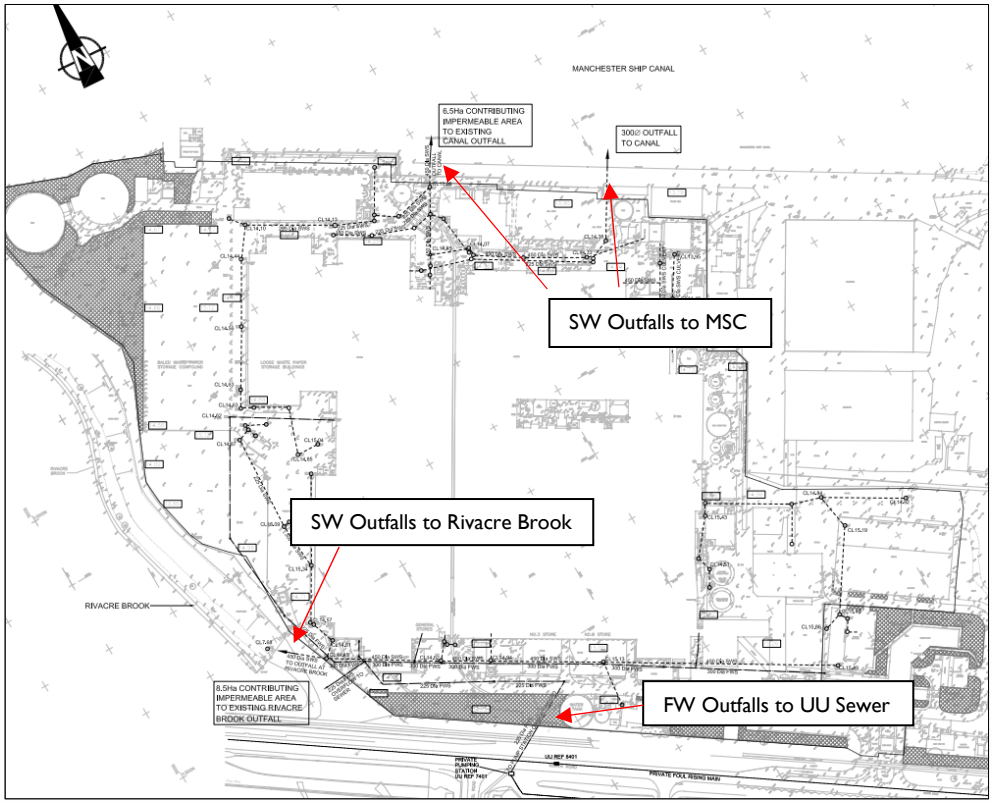

Figure 5.1 As Built Drainage Records (Lees Roxburgh)

PREDEVELOPMENT ENQUIRY

5.9. A predevelopment enquiry has been submitted to UU and a copy of their response is included within **Appendix C**. The response in summary confirms;

- *The foul water effluent can connect to the UU's pump station via the existing 225mm stub,*
- *The surface water runoff cannot discharge to UU's network,*
- *The surface water runoff must utilise either infiltration and/or discharge to a waterbody.*

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SECTION 6 SUSTAINABLE DRAINAGE STRATEGY

6.1. The general requirement set out by the NSSDS 2011 and NSTSSD 2015 technical documents is that 'the development must not increase the risk of flooding elsewhere.' In practical terms this means that the proposed runoff must provide an overall betterment or be equal to the calculated greenfield rate.

Existing Brownfield Runoff Rate

6.2. The Modified Rational Method has been used to calculate the existing runoff rate from the previous development. This method requires the existing impermeable area, an approximate time of concentration and the variables from the Wallingford Procedure.

	m^2	ha
Current Red Line Boundary	173500	17.350
Previous Development Size	15 ha	
Impermeable Ratio	90%	
Impermeable Area	135000	13.5

Table 6.1 Existing Site Analysis

Volume Wallingford Variables	Value
M5-60 minute rainfall depth	[redacted]00mm
Ratio of M5-60 to M5-2 day rainfalls	[redacted].38
Average Annual Rainfall (SAAR)	[redacted]2mm
Winter Rain Acceptance Potential (SOIL)	Soil Type 4 (0.45)
Urban Catchment Wetness Index (UCWI)	80
Time of Concentration	5

Table 6.2 Wallingford Procedure Volume 3 Variables

Return Period (Years)	1	2	5	30	100
Rainfall Intensity (l/s)	46.87	59.72	77.11	109.47	135.32

Table 6.3 Return Period Rainfall Intensity

6.3. The peak flow rate as calculated by the Modified Rational Method is as follows:

Q Brownfield (l/s) = *2.78 x Cv x Cr x Ri x Area*

Where; *PIMP* = *Percentage of impermeable area* = *90 %*

Pr = *0.829 PIMP + 25 SOIL + 0.078 UCWI – 20.7* = *71.4*

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Cv	*= Volumetric runoff coefficient =* $\frac{Pr}{PIMP}$	*= 0.793*
Cr	*= Routing coefficient (Urban Areas)*	*= 1.3*
Ri	*= Rainfall Intensity 1 Year*	*= 46.87*
Area	*= Impermeable Area*	*= 13.50*
Q Brownfield (l/S)	*= 2.78 x 0.793 x 1.3 x 46.87 x 13.50*	*= 19.00*

Return Period (Years)	1	2	5	30	100
Peak Runoff Rate (l/s)	1813	2310	2983	4235	5235

Table 6.4 Existing Peak Runoff Rates

Proposed Runoff Rate

6.4. Redevelopments should aim for a 50% reduction (minimum) in surface water runoff for Brownfield sites. This reduction has therefore been applied to the existing peak runoff rate (**Table 6.5**) to confirm the permissible discharge rates for the PDS.

Return Period (Years)	1	2	5	30	100
Peak Runoff Rate (l/s)	1813	2310	2983	4235	5235
Proposed Betterment	-50%				
Permissible Peak Runoff Rate (l/s)	906.5	1155	1491.5	2117.5	2617.5

[redacted]

PROPOSED RUNOFF DESTINATION

Surface Water Hierarchy

6.5. Paragraph 080 of the Flood Risk and Coastal Change Guidance within the Planning Practice Guidance sets out the following hierarchy of surface water runoff destinations:

i. Discharge into the ground (infiltration),

ii. Discharge to a surface waterbody,

iii. Discharge to a surface water sewer,

iv. Discharge to a combined sewer.

Discharge into the ground

6.6. There are five bands of soil classes in England which roughly describe the infiltration potential of an area. It is derived from factors such as, soil permeability, topography, and the likelihood of impermeable layers.

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6.7. The soil classification for the PDS is Type 4. This implies that the use of infiltration techniques to dispose of surface runoff is unlikely to be practical.

Soil	WRAP	Runoff	Soil Value	Soil Characteristics
1	Very High	Very Low	0.15	Sandy, well drained
2	High	Low	0.30	Intermediate soils (sandy)
3	Moderate	Moderate	0.40	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very Low	Very High	0.50	Steep, rocky areas

Table 6.6 Soil Classification

6.8. The use of infiltration onsite will also be prohibited by the previous site uses and the likelihood of contamination. This surface water destination has therefore been discounted.

Discharge to a surface water body

6.9. The surface water runoff from the previous site discharged to both the MSC and Riveacre Brook. These waterbodies then connected to the adjacent River Mersey estuary which is immediately downstream.

6.10. The PDS should co[redacted]stinations but must be limited to the rates shown[redacted]

Discharge to a surface water sewer

6.11. Not applicable for this site.

Discharge to a combined sewer

6.12. Not applicable for this site.

SUSTAINABLE DRAINAGE TECHNIQUES

6.13. There are several SuDS techniques that are suitable for high and low-density developments. One or more of the techniques shown in **Table 6.6** could be included at the detailed design stage to provide the required reduction/betterment in flow rates.

6.14. Some of these techniques also provide some or all the required water quality treatment by removing, capturing or breaking down containments such as hydrocarbons, sediment and heavy metals

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SuDS Technique		Proposed Development Suitability
Porous pavements	Description	Pavements constructed with porous paving can provide runoff storage within the sub-base and runoff treatment.
	Suitability	Potentially suitable for car parking areas with light-duty traffic. Suitability is subject to detailed drainage design, topography and infiltration rates.
Filter drains	Description	Granular filled linear trenches with a perforated pipe installed at the base.
	Suitability	Filter drains can be used along embankments/boundaries to prevent overland runoff from leaving the site.
Swales	Description	Relatively shallow naturally landscaped channels that convey and/or infiltrate the surface water runoff.
	Suitability	Could be used within the perimeter landscaped area. Suitability is subject to detailed design, topography and infiltration rates (if permitted).
Retention Ponds	Description	Partially filled permanent water bodies that have been designed to provide temporary surface water storage during critical events.
	Suitability	Suitable. But subject to detailed design.
Detention Basin	Description	Naturally vegetated depression. Designed to store surface water runoff on a temporary basis during critical events.
	Suitability	Suitable. But subject to detailed design.
Soakaways	Description	Drainage structures designed to store and infiltrate runoff into the [redacted]
	Suitability	[redacted] this development.
Green Roofs	Description	[redacted]unoff and increase times of concentration.
	Suitability	Not suitable for this type of development
Underground Storage	Description	Attenuation structures installed below ground to provide surface water storage.
	Suitability	Can be located under the car park/service yard areas. The type of structure would be confirmed during detailed design stage.

Table 6.6 SuDS Techniques

CLIMATE CHANGE ALLOWANCE

6.15. An allowance for climate change should be included at the detailed design stage to help minimize vulnerability and provide resilience to flooding. According to the Flood Risk Assessments: Climate Change Allowances **both** the 'Upper End' and 'Central' allowances should be assessed.

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6.16. The 'Central' allowance should be applied to the underground surface water drainage network/design to assess its ability to contain critical events. Whilst the 'Upper End' allowance should be applied to evaluate the potential implications and to ensure that the flooding is wholly contained onsite.

6.17. The following climate change allowances should be applied to the proposed rainfall intensities during the detailed design stage.

- *Less Vulnerable Commercial Development +20% to +40% Allowance.*

Applies across all of England	Potential Change anticipated for the 2020's	Potential Change anticipated for the 2050's	Potential Change anticipated for the 2080's
Upper End	+10%	+20%	+40%
Central	+5%	+10%	+20%

Table 6.7 Recommend Climate Change Guidance (EA)

[redacted]

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SECTION 7 SURFACE WATER TREATMENT

CIRIA REPORT C753

7.1. CIRIA Report C753 (The SuDS Manual) outlines the simple index approach which is a best practice design standard for managing the water quality of runoff. The pollution hazard index for different land uses/sources and has been reproduced below.

No.	Proposed Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro carbons
1	Residential roofs	Very Low	0.2	0.2	0.05
2	Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 – 0.8	0.05
3	Individual property driveways, residential car parks, low traffic roads (e.g. cul de sac, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. <300 traffic movements per day	Low	0.5	0.4	0.4
4	Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7

Ta[redacted]C753)

7.2. Based on the devel[redacted] applicable. The surface water runoff will therefore require at least one SuDS components, to sufficiently treat the runoff before it can be discharged offsite.

7.3. Where more than one SuDS component/technique is implemented there will be a reduced "performance factor" and the following formula must be applied.

Total SuDS mitigation index = Mitigation component index + 0.5 x Mitigation index of second component

PRELIMINARY RUNOFF TREATMENT

7.4. The required runoff treatment will be confirmed during the detailed design stage. But based on the current masterplan there are four distinct runoff areas.

- *Industrial Roof*
- *Service Yard*
- *Car Park*

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- *Access Road*

Industrial Roofs

7.5. We would suggest that runoff from the buildings is directed to a filter drain before discharging to the wider drainage network.

	TSS	Metals	Hydrocarbons
Pollution Hazard: No.2 Industrial Roof (See Table 7.1)	-0.3	-0.4*	-0.05
Proposed Mitigation 1: Filter Drain	+0.4	+0.4	+0.4
Total Pollution Mitigation	+0.1 **(Adequate)**	+0.0 **(Adequate)**	+0.35 **(Adequate)**

Table 7.2 Proposed Mitigation Index: Industrial Roofs (CIRIA C753)

**Assumed Figure - The potential for metal to leach from the roof should be assessed at the detailed design stage.*

Service Yard & Access Roads

7.6. We would suggest that the runoff from the service yard areas is directed to a filter drain or treatment channels such as Hydro Filter Drain. The runoff can then discharge to the wider drainage net[redacted]

	TSS	Metals	Hydrocarbons
Pollution Hazard: No.4 Service Yard (See Table 7.1)	-0.7	-0.6	-0.7
Proposed Mitigation 1: Filter Drain	+0.4	+0.4	+0.4
Total Pollution Mitigation 1	-0.3 **(Inadequate)**	-0.2 **(Inadequate)**	-0.3 **(Inadequate)**
Proposed Mitigation 2: Hydro Internal Downstream Defender	(+0.5) +0.25	(+0.4) +0.2	(+0.8) +0.4
Total Pollution Mitigation 1	-0.05 **(Adequate)**	+0.0 **(Adequate)**	+0.1 **(Adequate)**

Table 7.3 Proposed Mitigation Index: Service Yard/Roads (CIRIA C753)

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7.7. Where possible the main access roads should aim to discharge to a swale rather than a filter drain. This will provide a betterment/further cleansing of the runoff before discharging to the watercourse (TSS 0.5, Metals 0.6, Hydrocarbons 0.6).

Car Parks

7.8. We would suggest that all the light duty car parks are formed with a permeable surface. The overall construction would need to be a Type-C System due to the ground conditions (non-infiltrating) and the runoff from the sub-base would discharge to drains.

	TSS	Metals	Hydrocarbons
Pollution Hazard: No.3 Non-Residential Car Parking (See Table 7.1)	-0.7	-0.6	-0.7
Proposed Mitigation 1: Permeable Pavement	+0.7	+0.6	+0.7
Total Pollution Mitigation 1	+0.0 **(Adequate)**	+0.0 **(Adequate)**	+0.0 **(Adequate)**

Table 7.4 Proposed Mitigation Index: Car Parks (CIRIA C753)

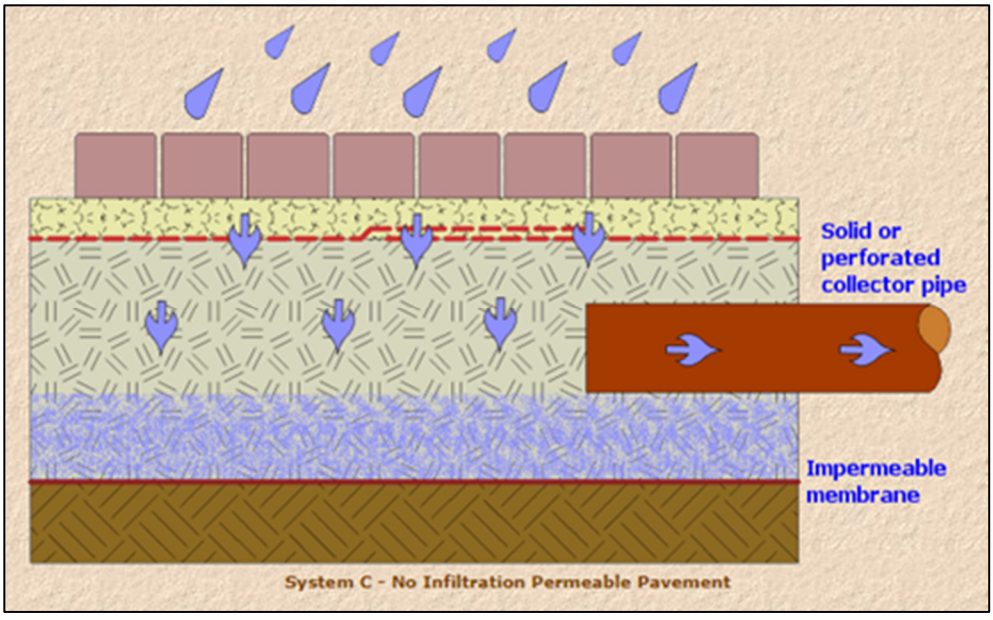

Figure 7.1 Type C Non Infiltration Pavement Construction

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SECTION 8 PRELIMINARY DRAINAGE STRATEGY

8.1. A preliminary drainage strategy has been produced to identify any major issues that may affect the foul and surface water drainage for the proposed development. All recommendations are preliminary at this stage and should be developed/investigated further during the detailed design stage.

8.2. A preliminary drainage layout demonstrating the below strategy, utilising SuDS where possible, is included in **Appendix E.**

SURFACE WATER STRATEGY

8.3. A new underground drainage network will collect and convey the proposed development runoff towards the new/existing outfalls. Only clean/treated runoff will be permitted to discharge into the adjacent waterbodies, so an effective SuDS treatment is required (**Section 7**).

8.4. The discharge rate from the new PDS will be restricted to the rates shown in **Table 6.5** and will require excess runoff to be attenuated. The attenuation will likely be in the form of a new attenuation basin/pond in the northwest corner.

8.5. Based on the development proposal, we estimate that between 4000m^3 and 6500m^3 of storage will be req[redacted]nate change event.

Outfall Velocity

8.6. The surface water [redacted] must be controlled to prevent downstream scouring or damage. The maximum velocity will be confirmed/approved by both the LLFA (Riveacre Brook) and Peel Ports (MSC) during the detailed design stage.

Submerged Outfall

8.7. During an extreme storm, the surface water outfalls could become submerged and cause flooding onsite. The following EA data provides estimated flood levels in which the proposed drainage network can be tested against.

8.8. The EA Data has been included within **Appendix F**.

Node/Event	Node 1	Node 2	Node 3
Undefended 100 Year	6.63	5.70	5.28
Undefended 1000 Year	7.46	5.96	5.35

Table 8.1 EA Rivacre Brook 2007 data (Environment Agency)

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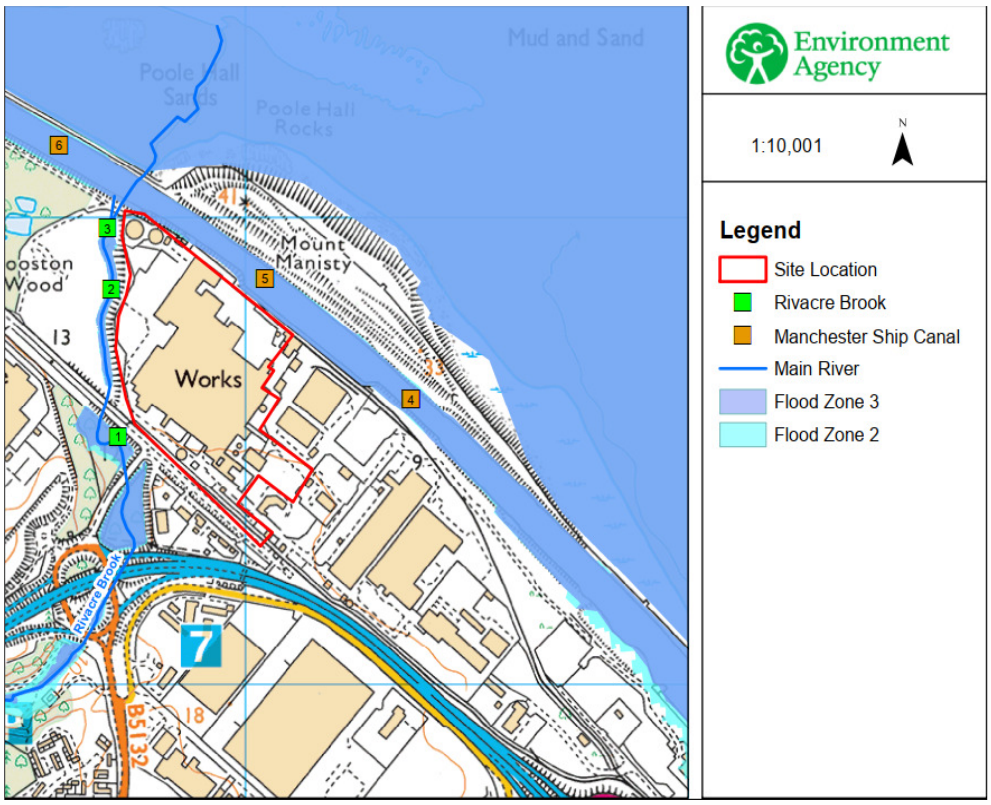

Figure 8.1 Environment Agency Node Points

Node/Event	Node 4	Node 5	Node 6
Defended 100 Year	4.62	4.63	4.61
Defended 1000 Year	[redacted]		6.79

Tabl[redacted]gency)

FOUL WATER STRATEGY

Foul Water Drainage

8.9. A new underground drainage network(s) will collect and convey the foul effluent from the proposed units to the existing 225mm stub on North Road.

8.10. Depending upon the existing foul water invert level. There could be a need for a new onsite pumping station.

Foul Water Flows

8.11. Sewers for Adoption 7th Edition recommends that drainage designs for Commercial developments should be based on 0.6 litres per second per hectare of developable land.

Q Foul Water (litres) *= 0.6 litres per second per hectare*

Redline Boundary *= 17.4 ha*

Q Foul Water (l/s) *= 17.4 x 0.6 = 10.44 l/s*

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8.12. The proposed flow rate and any connection point must be agreed with United Utilities during the detailed design stage. Any proposed drainage should also be designed in accordance with Building Regulations Document H1 and Sewers for Adoption 7th Edition.

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SECTION 9 FUTURE DRAINAGE MAINTENANCE

General Drainage Maintenance

9.1. The end-users will be provided with as-built plans to ensure that the private development drainage within their responsibility undergoes a regular maintenance regime (either as required or every 2-5 years). This includes, jetting, vacuumation and a visual/CCTV survey to check the structural condition of pipes and manholes.

SuDS Maintenance

9.2. The maintenance for the onsite SuDS elements will be split into the following sections and will be undertaken by an appointed Maintenance Company once the scheme/plot has been completed.

- *Regular (weeding/inspections/sweeping/litter removal/grass cutting),*
- *Occasional (sediment removal/vacuum brushing) and*
- *Remedial maintenance (repair and replacement).*

9.3. The Maintenance Company will be employed by the end user of the site and will be provided an Operation and Maintenance manual. This manual will outline the location(s) of any drainage infrastructure and detail the maintenance that is required. It will also include the associa[redacted]hould be carried out.

9.4. Records must be [redacted] and the end user for any maintenance works undertaken and must be available for inspection when requested.

Site Specific SuDS elements

9.5. The design of the onsite surface water drainage networks will be carried out during the detailed design stage. But we envisage that the design will include the following SuDS elements.

- *Ponds / Detention Basins,*
- *Filter Drains,*
- *Cellular Storage,*
- *Porous Paving,*
- *Swales and*
- *Proprietary System; Petrol Interceptors, Downstream Defenders*

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9.6. The maintenance required for each of the SuDS elements is shown below in **Table 9.1**

Operation and Maintenance Activity	Suds Component												
	Pond	Wetland	Detention Basin	Infiltration Basin	Soakaway	Infiltration Trench	Filter Drain	Cellular Storage	Permeable Pavement	Swales	Filter Strip	Green Roof	Proprietary Systems
Regular Maintenance – Monthly Basis													
Inspection	●	●	●	●	●	●	●	●	●	●	●	●	●
Litter and debris removal	●	●	●	●	○	●	●	○	●	●	●		○
Grass cutting	●	●	●	●	○	●	●	○	○	●	●		
Weed and invasive plant control	○	○	○	○		○	○		○		○	●	
Shrub management	○	○	○	○					○	○	○		
Shoreline vegetation management	●	●	○										
Aquatic vegetation management	[redacted]												
Occasional Maintenance – Annually or as required													
Sediment management	●	●	●	●	●	●	●	●	●	●	●		●
Vegetation replacement	○	○	○	○						○	○	●	
Vacuum sweeping and brushing									●				
Remedial Maintenance – As required													
Structure rehabilitation/repair	○	○	○	○	○	○	○	○	○	○	○	○	
Infiltration surface reconditioning				○	○	○	○		○	○	○		

● *Will be required* ○ *May be required*

Table 9.1 SuDS Maintenance Management

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SECTION 10 CONCLUSION

10.1. A Flood Risk Assessment is required to satisfy all requirements of the National Planning Policy Framework (NPPF) and the Flood Risk and Coastal Change Planning Practice Guidance (PPG).

10.2. This FRA as far as reasonably practical; determines the potential flood risk associated with the site and has concluded the following:

a) The proposed development site is located within Flood Zone 1 (low risk)

b) The line and level of the existing drainage connection/outfalls (surface & foul) should be confirmed during the detailed design stage via a CCTV survey and/or topographical survey.

c) The peak surface water runoff from the proposed developments must be restricted to the rates shown in **Section 6.** The proposed network should also be modelled against a surcharged outfall to ensure that the PDS is protected (**Section 8**).

d) Only clean/treated surface water runoff will be allowed to discharge to the adjacent waterbodies. Surface water runoff must be treated in accordance with CIRIA C753 (**Section 7)**.

e) The maximum [redacted](s) must be confirmed by the LLFA and Peel

f) Surface water storage will be needed onsite to store excess flows during extreme events. The estimated attenuation is noted within **Section 8** and the exact type/volume will be confirmed during the detailed design stage.

g) The allowable foul water discharge rate must be approved by United Utilities via a S106 & S104 application.

h) The proposed onsite drainage system must not contribute to any offsite flood risk or overland flow risk. Any residual risk must be effectively managed onsite with the use of appropriate drainage and/or topographical level consideration.

i) The proposed development of the site should not commence until a detailed scheme for surface and foul water drainage has been submitted to and approved by the Local Planning Authority.

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j) The proposed surface water network for the proposed developments must include the "Central" climate change allowance of 20%. The proposed network must also be checked against the "Upper" climate change allowance of 40% to ensure any surface flooding remains wholly within the development.

10.3. SGi recommends that the Local Planning Authority accept this Flood Risk Assessment and Drainage Strategy in support of the Planning Application.

[redacted]

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Shepherd Gilmour
Consulting Engineers

APPENDIX A1

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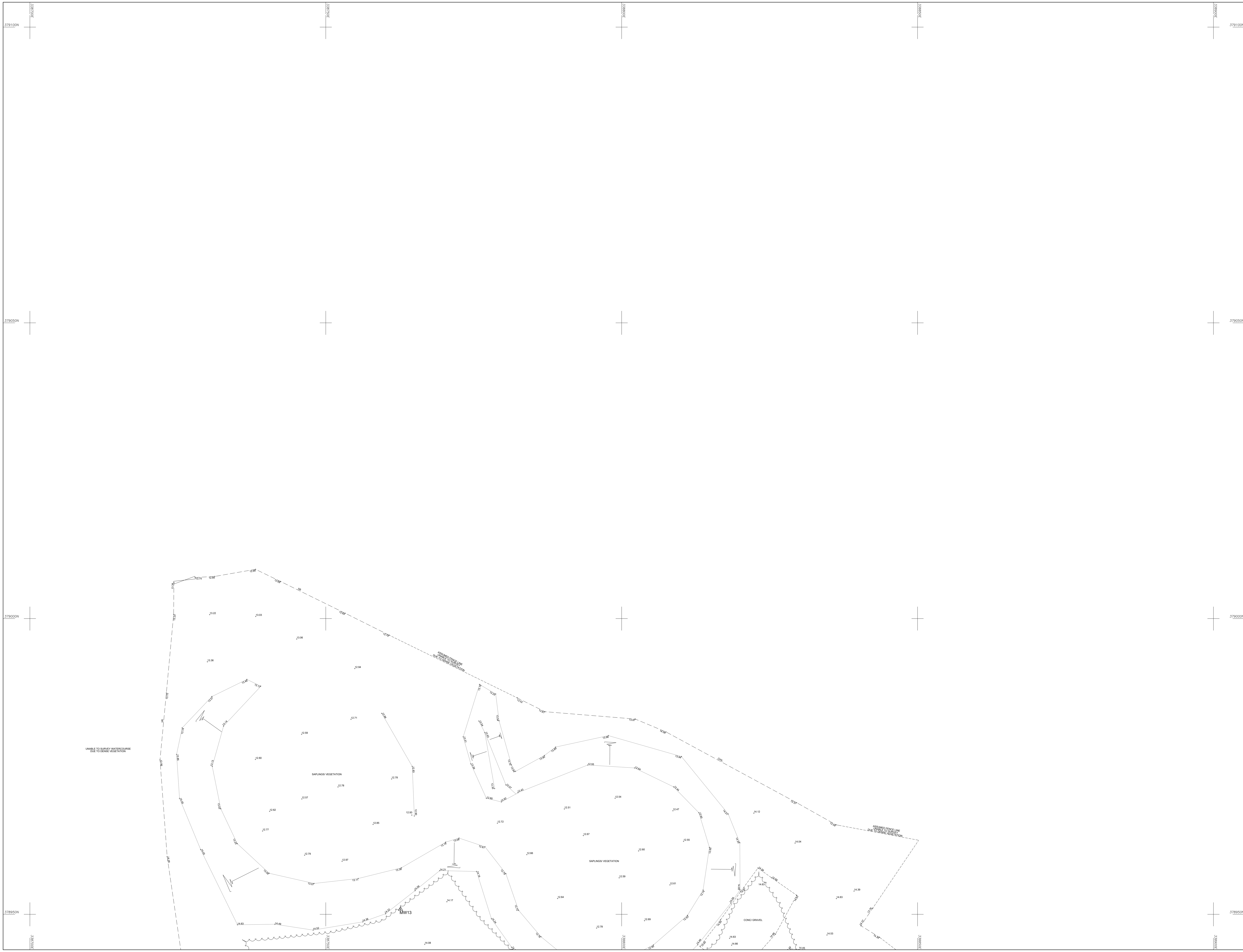

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Note:
The survey is plotted on a plane local Grid. Orientation to National Grid.
All levels relate to Ordnance Datum, achieved using the OS National GPS Network.
Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

SURVEY STATIONS

Name	Easting	Northing	Height
SO1	338646.19	378307.69	10.03
SO2	338699.61	378396.00	9.07
SO3	338777.50	378511.02	12.28
SO4	338864.18	378423.11	13.57
SO5	338980.58	378326.54	15.28
SO6	339011.23	378371.57	15.46
SO7	339041.52	378453.01	15.45
SO8	339065.04	378515.28	15.32
MW1	339022.06	378370.33	15.64
MW2	339050.47	378403.38	15.41
MW3	339100.17	378430.80	15.43
MW4	338999.97	378549.15	15.39
MW5	339014.00	378650.08	14.81
MW6	339052.05	378710.24	14.63
MW7	338995.18	378757.08	14.37
MW8	338934.61	378820.02	14.62
MW9	338904.58	378895.09	14.25
MW10	338834.63	378907.46	14.74
MW11	338839.29	378922.64	14.37
MW12	338812.62	378942.37	14.58
MW13	338762.63	378950.86	14.25
MW14	338742.25	378920.58	15.19
MW15	338731.83	378902.30	14.20
MW16	338740.31	378877.38	14.82

STANDARD REFERENCE & ABBREVIATIONS

(AR)........Assumed Route	IL.........Invert Level
AB.........Air Brick	IP.........Inlet Pipe
AV.........Air Valve	KO.........Kerb Outlet
B/W........Barbed Wire	LB.........Letter Box
BAR........Barrier	LP.........Lamp Post
BB.........Belisha Beacon	MG.........Multi-Girth
BH.........Borehole	MH.........Manhole
BL.........Bed Level	MKR........Marker
BOL........Bollard	MP.........Mooring Point
BS.........Bus Stop	NP.........Street Name Plate
BT Box......British Telecom Box	O/H........Overhead
BT.........British Telecom IC	O/P........Open Paling
BRTW.......Brick Retaining Wall	OE.........Overhead Electric Wire
BW.........Brick Wall	OP.........Outfall Pipe
C/B........Close Boarded	OSBM.......Ordnance Survey Bench Mark
C/I........Corrugated Iron	OT.........Overhead Telecom Wire
C/P........Chestnut Paling	P/C........Post & Chain
CB.........Control Box	P/R........Post & Rail
CBW........Concrete Block Wall	P/W........Post & Wire
CCTV.......Closed Circuit TV	PAV........Paving
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CEL........Cellar Light	PC.........Pedestrian Crossing
CH/L.......Chain Link	PP.........Petrol Pump
CHY........Chimney	PT.........Post or Pillar
CL.........Cover Level	RE.........Rodding Eye
CM.........Cable Marker	RS.........Road Sign
COL........Column	RTW........Retaining Wall
CONC.......Concrete	RWP........Rain Water Pipe
CP.........Catch Pit	SAP........Sapling
CRTW.......Concrete Retaining Wall	SL.........Sump Level
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DPC........Damp Proof Course	SV.........Stop Valve (unspecified)
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DSW........Dry Stone Wall	SW.........Stone Wall
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EJB........Electricity Junction Box	TCB........Telephone Call Box
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EP.........Electricity Pole	TLB........Traffic Light Control Box
ER.........Earth Rod	TM.........Ticket Machine
ETL........Electricity Transmission Line	TMC........Tarmac
FB.........Flower Bed	TP.........Telecommunications Pole
FH.........Fire Hydrant	TPIT.......Trial Pit
FL.........Floor Level	TS.........Trash Screen
FP.........Flagpole	U/C........Under Construction
G*.*.......Girth (of tree)	U/G........Underground
G..........Gulley	UTL........Unable to Lift (MH,IC etc)
GAB........Gabion	UTS........Unable to Survey
GIP........Gas Inlet Pipe	VDP........Vehicle Detector Pad
GMKR.......Gas Marker	VP.........Vent Pipe
GST........Gas Stop Tap (Domestic)	W/M........Wire Mesh
GSV........Gas Stop Valve (Mains)	WL.........Water Level
HSE........Housing	WM.........Water Meter
Ht.........Height	WO.........Wash Out
HV.........High Voltage	WP.........Waste Pipe
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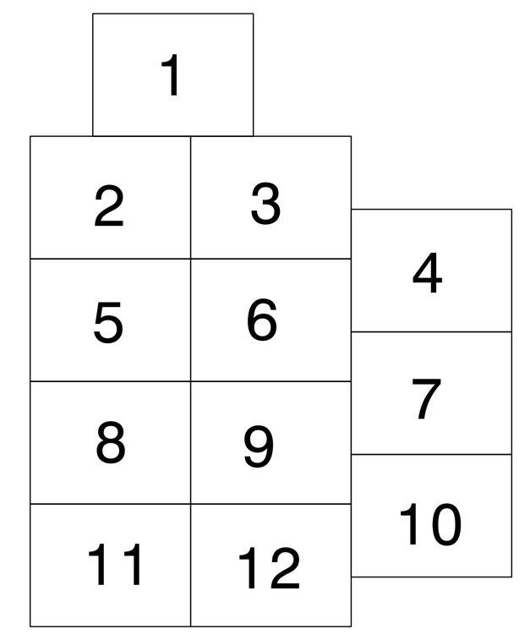

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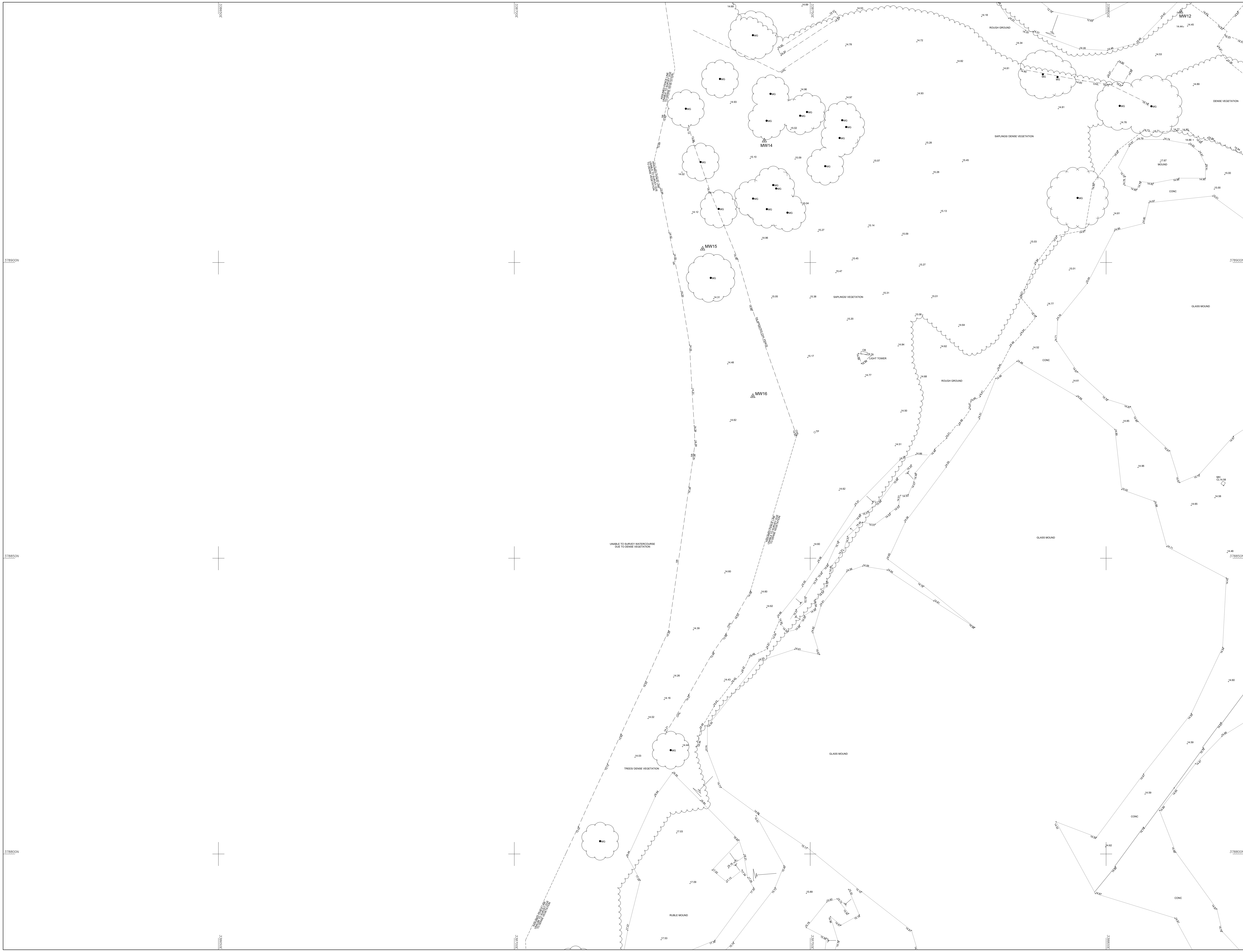
Shepherd Gilmour

Drawing Title
Topographical Survey of Land at:
Port Cheshire
Ellesmere Port
Sheet 1 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/001



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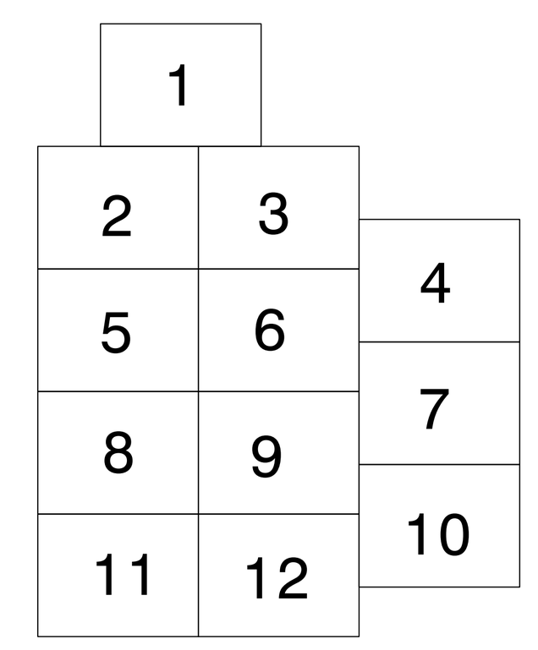

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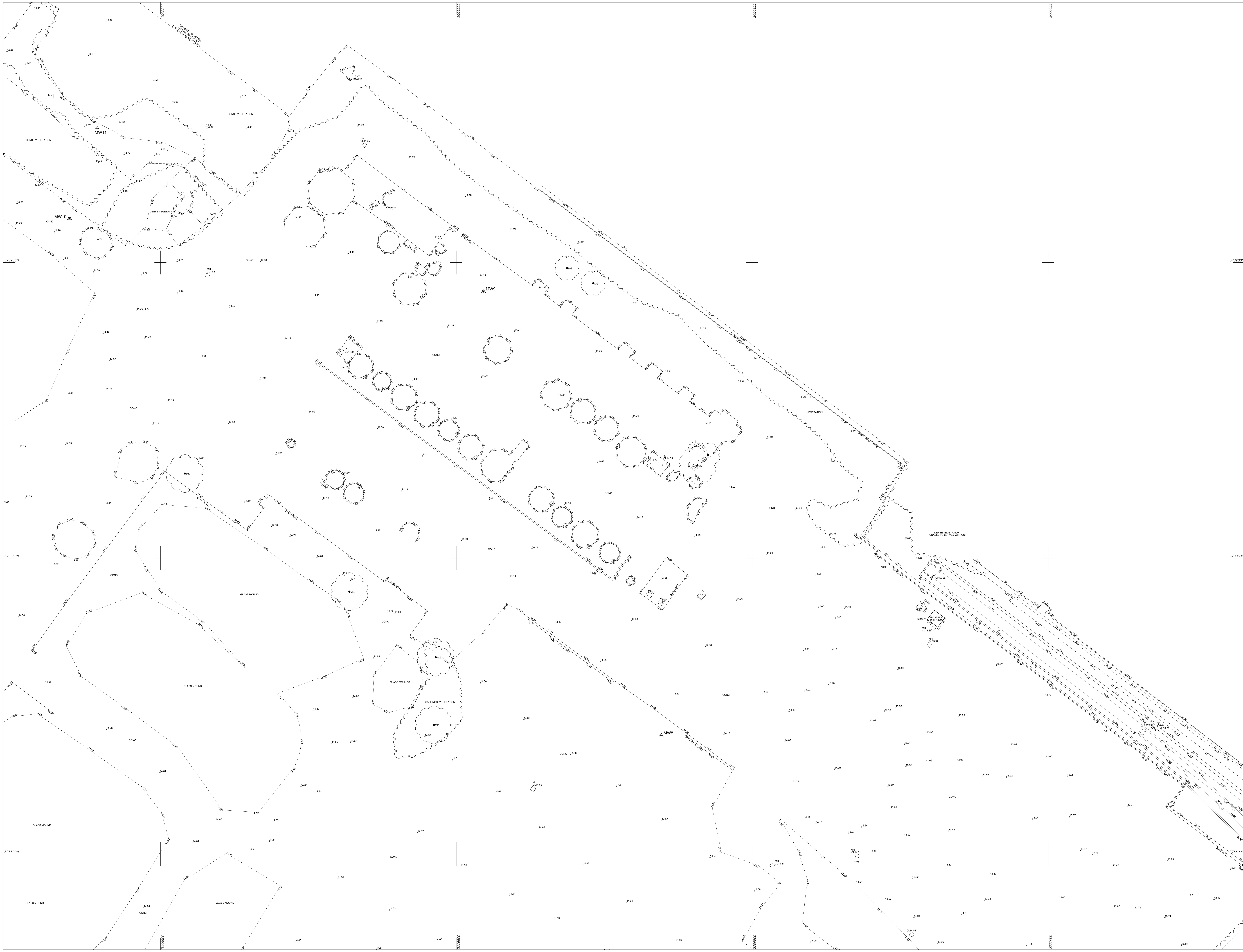
Client
Shepherd Gilmour

Drawing Title
Topographical Survey of Land at:
Port Cheshire
Ellesmere Port
Sheet 2 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/002



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Note:
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Name	Easting	Northing	Height
SO1	338646.19	378307.69	10.03
SO2	338699.61	378396.00	9.07
SO3	338777.50	378511.02	12.28
SO4	338864.18	378423.11	13.57
SO5	338980.58	378326.54	15.28
SO6	339011.23	378371.57	15.46
SO7	339041.52	378453.01	15.45
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MW11	338839.29	378922.64	14.37
MW12	338812.62	378942.37	14.58
MW13	338762.63	378950.86	14.25
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MW15	338731.83	378902.30	14.20
MW16	338740.31	378877.38	14.82

STANDARD REFERENCE & ABBREVIATIONS

(AR)........Assumed Route	IL..........Invert Level
AB..........Air Brick	IP..........Inlet Pipe
AV..........Air Valve	KO..........Kerb Outlet
B/W.........Barbed Wire	LB..........Letter Box
BAR.........Barrier	LP..........Lamp Post
BB..........Belisha Beacon	MG..........Multi-Girth
BH..........Borehole	MH..........Manhole
BL..........Bed Level	MKR.........Marker
BOL.........Bollard	MP..........Mooring Point
BS..........Bus Stop	NP..........Street Name Plate
BT Box......British Telecom Box	O/H.........Overhead
BT..........British Telecom IC	O/P.........Open Paling
BRTW........Brick Retaining Wall	OE..........Overhead Electric Wire
BW..........Brick Wall	OP..........Outfall Pipe
C/B.........Close Boarded	OSBM........Ordnance Survey Bench Mark
C/I.........Corrugated Iron	OT..........Overhead Telecom Wire
C/P.........Chestnut Paling	P/C.........Post & Chain
CB..........Control Box	P/R.........Post & Rail
CBW.........Concrete Block Wall	P/W.........Post & Wire
CCTV........Closed Circuit TV	PAV.........Paving
CD..........Cable Duct	PB..........Pillar Box
CEL.........Cellar Light	PC..........Pedestrian Crossing
CH/L........Chain Link	PP..........Petrol Pump
CHY.........Chimney	PT..........Post or Pillar
CL..........Cover Level	RE..........Rodding Eye
CM..........Cable Marker	RS..........Road Sign
COL.........Column	RTW.........Retaining Wall
CONC........Concrete	RWP.........Rain Water Pipe
CP..........Catch Pit	SAP.........Sapling
CRTW........Concrete Retaining Wall	SL..........Sump Level
CTV.........Cable Television	SoL.........Soffit Level
CUL.........Culvert	SP..........Sign Post
CW..........Concrete Block Wall	SPL.........Springing Level
DC..........Drainage Channel	SRTW........Stone Retaining Wall
DPC.........Damp Proof Course	SV..........Stop Valve (unspecified)
DR..........Drain	SVP.........Soil Vent Pipe
DSW.........Dry Stone Wall	SW..........Stone Wall
ECP.........Electricity Cable Pit	TAC.........Tactile Paving
EIC.........Electricity Inspection Cover	TB..........Traffic Bollard
EJ..........Expansion Joint	TBM.........Temporary Bench Mark
EJB.........Electricity Junction Box	TCB.........Telephone Call Box
EL SUB STN..Electricity Sub Station	TFR.........Taken From Records
EL..........Eaves Level	TIE.........Anchor Point (Masts/Poles)
ELB.........Electricity Box	TL..........Traffic Light
EP..........Electricity Pole	TLB.........Traffic Light Control Box
ER..........Earth Rod	TM..........Ticket Machine
ETL.........Electricity Transmission Line	TMC.........Tarmac
FB..........Flower Bed	TP..........Telecommunications Pole
FH..........Fire Hydrant	TPIT........Trial Pit
FL..........Floor Level	TS..........Trash Screen
FP..........Flagpole	U/C.........Under Construction
G*.*........Girth (of tree)	U/G.........Underground
G...........Gulley	UTL.........Unable to Lift (MH,IC etc)
GAB.........Gabion	UTS.........Unable to Survey
GIP.........Gas Inlet Pipe	VDP.........Vehicle Detector Pad
GMKR........Gas Marker	VP..........Vent Pipe
GST.........Gas Stop Tap (Domestic)	W/M.........Wire Mesh
GSV.........Gas Stop Valve (Mains)	WL..........Water Level
HSE.........Housing	WM..........Water Meter
Ht..........Height	WO..........Wash Out
HV..........High Voltage	WP..........Waste Pipe
I/R.........Iron Railing	WST.........Water Stop Tap (domestic)
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1
2 3 4
5 6 7
8 9 10
11 12

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Drawing Title
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Sheet 3 of 12

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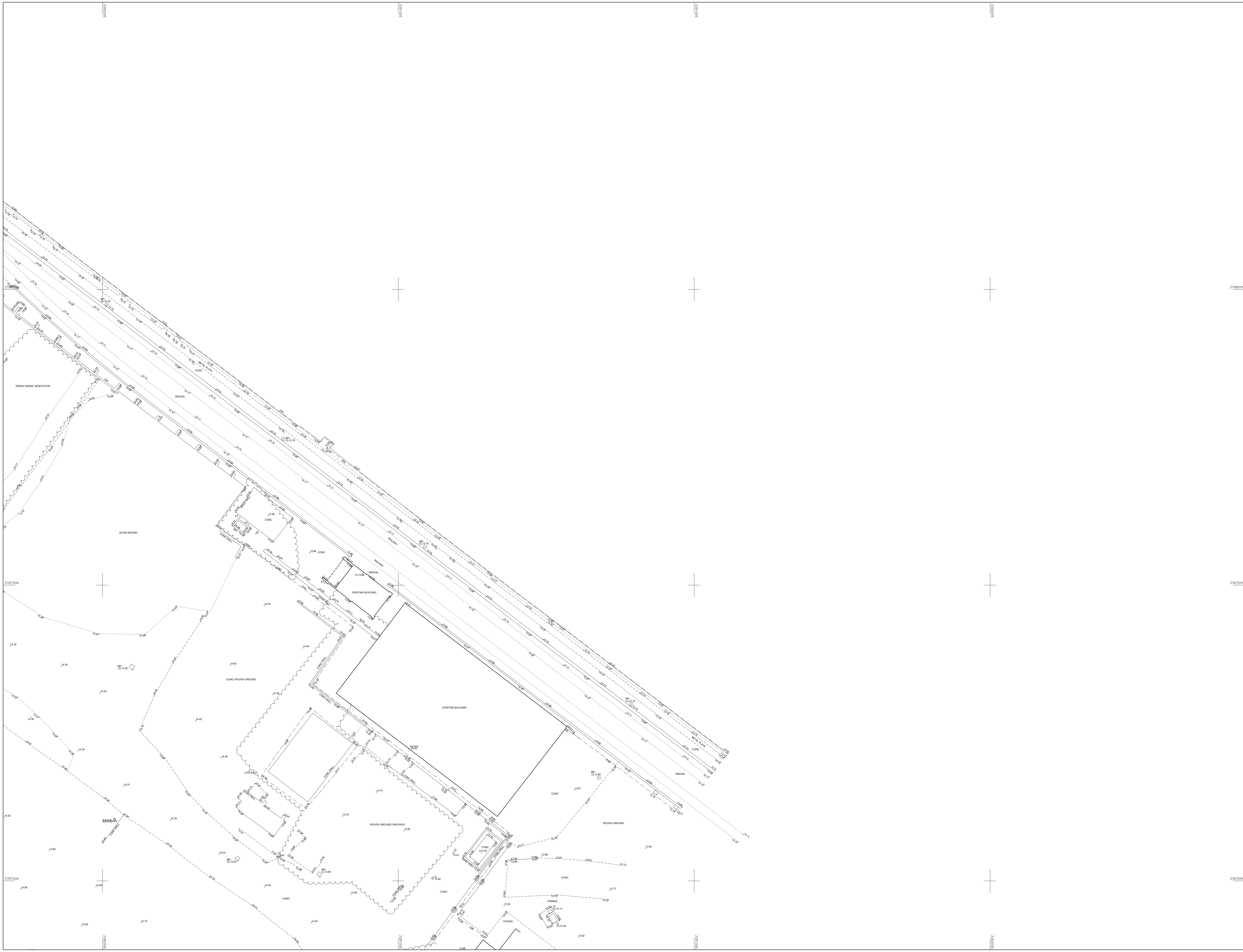
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/003



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BT Box......British Telecom Box
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BW..........Brick Wall
C/B.........Close Boarded
C/I.........Corrugated Iron
C/P.........Chestnut Paling
CB..........Control Box
CBW.........Concrete Block Wall
CCTV........Closed Circuit TV
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CEL.........Cellar Light
CH/L........Chain Link
CHY.........Chimney
CL..........Cover Level
CM..........Cable Marker
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CUL.........Culvert
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DPC.........Damp Proof Course
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EJ..........Expansion Joint
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EL SUB STN..Electricity Sub Station
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ETL.........Electricity Transmission Line
FB..........Flower Bed
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FL..........Floor Level
FP..........Flagpole
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G...........Gulley
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GMKR........Gas Marker
GST.........Gas Stop Tap (Domestic)
GSV.........Gas Stop Valve (Mains)
HSE.........Housing
Ht..........Height
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I/R.........Iron Railing
IC..........Inspection Cover
IL..........Invert Level
IP..........Inlet Pipe
KO..........Kerb Outlet
LB..........Letter Box
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MG..........Multi-Girth
MH..........Manhole
MKR.........Marker
MP..........Mooring Point
NP..........Street Name Plate
O/H.........Overhead
O/P.........Open Paling
OE..........Overhead Electric Wire
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OSBM........Ordnance Survey Bench Mark
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SRTW........Stone Retaining Wall
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SVP.........Soil Vent Pipe
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TBM.........Temporary Bench Mark
TCB.........Telephone Call Box
TFR.........Taken From Records
TIE.........Anchor Point (Masts/Poles)
TL..........Traffic Light
TLB.........Traffic Light Control Box
TM..........Ticket Machine
TMC.........Tarmac
TP..........Telecommunications Pole
TPIT........Trial Pit
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U/C.........Under Construction
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UTL.........Unable to Lift (MH,IC etc)
UTS.........Unable to Survey
VDP.........Vehicle Detector Pad
VP..........Vent Pipe
W/M.........Wire Mesh
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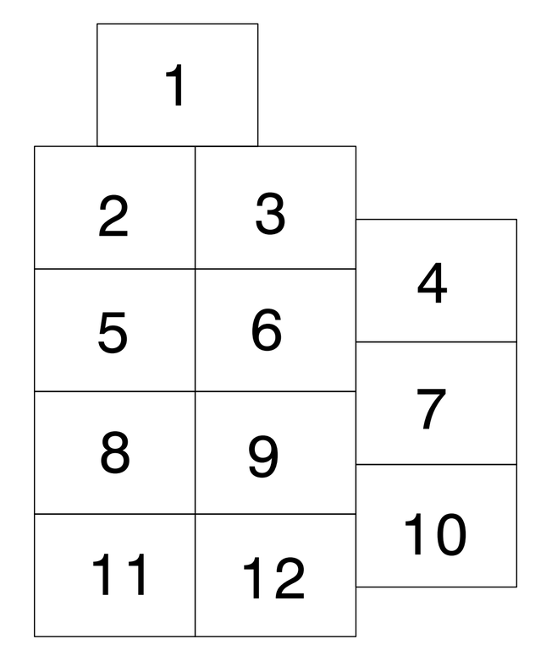

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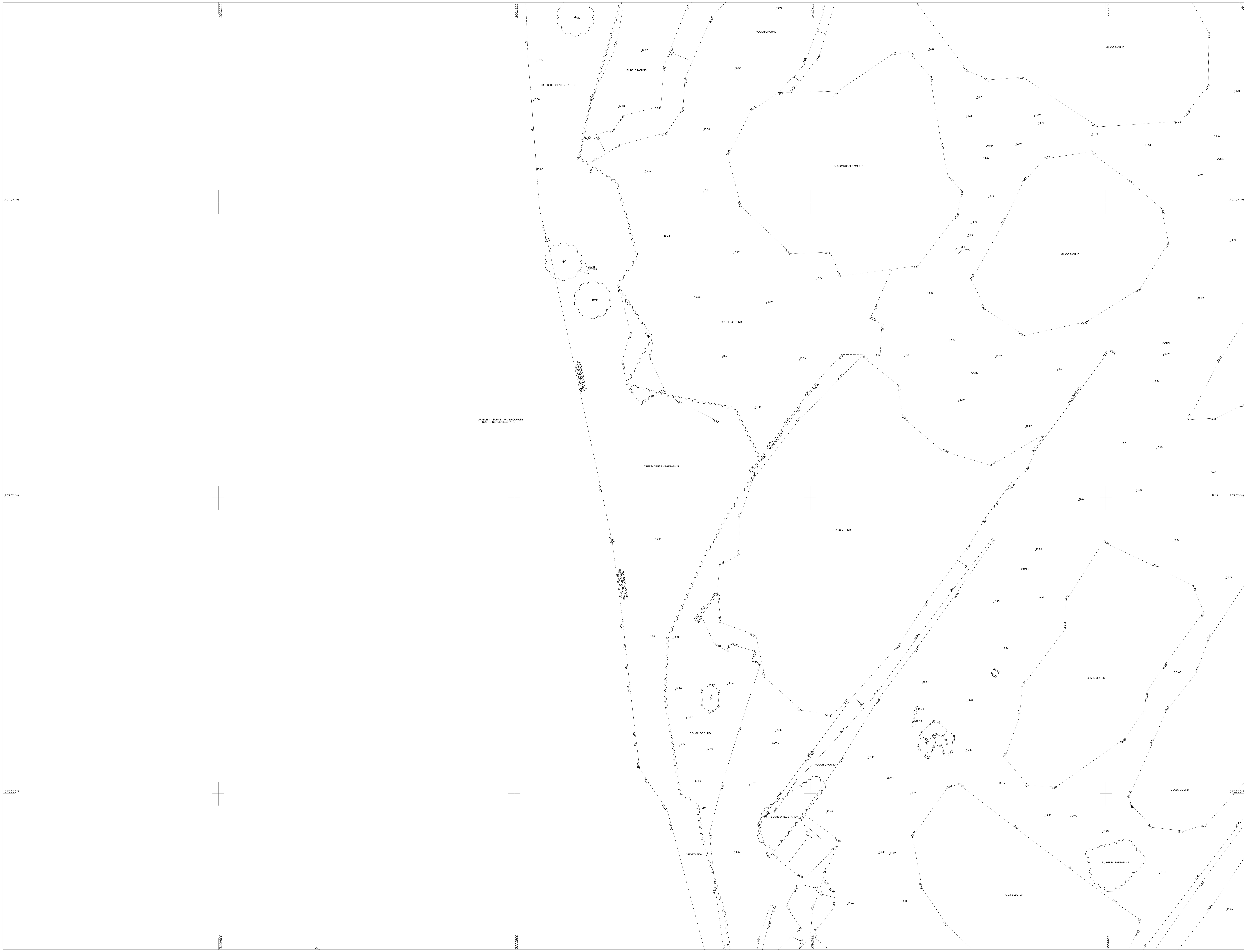
Client
Shepherd Gilmour

Drawing Title
Topographical Survey of Land at:
Port Cheshire
Ellesmere Port
Sheet 4 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/004



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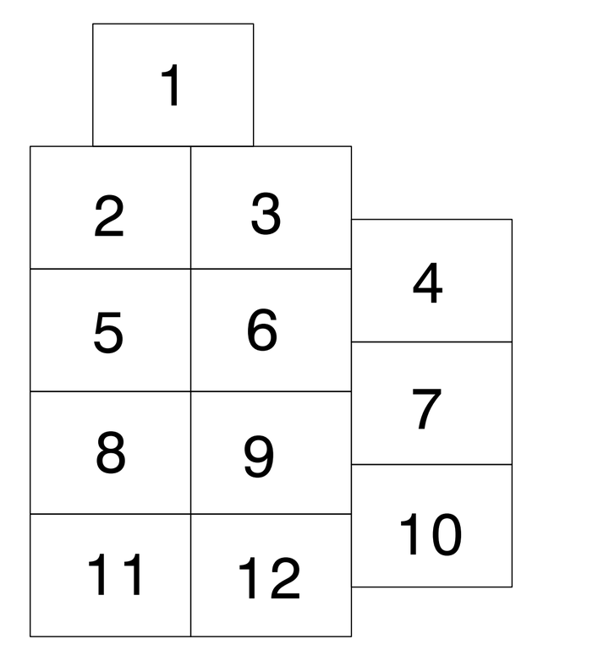

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Sheet 5 of 12

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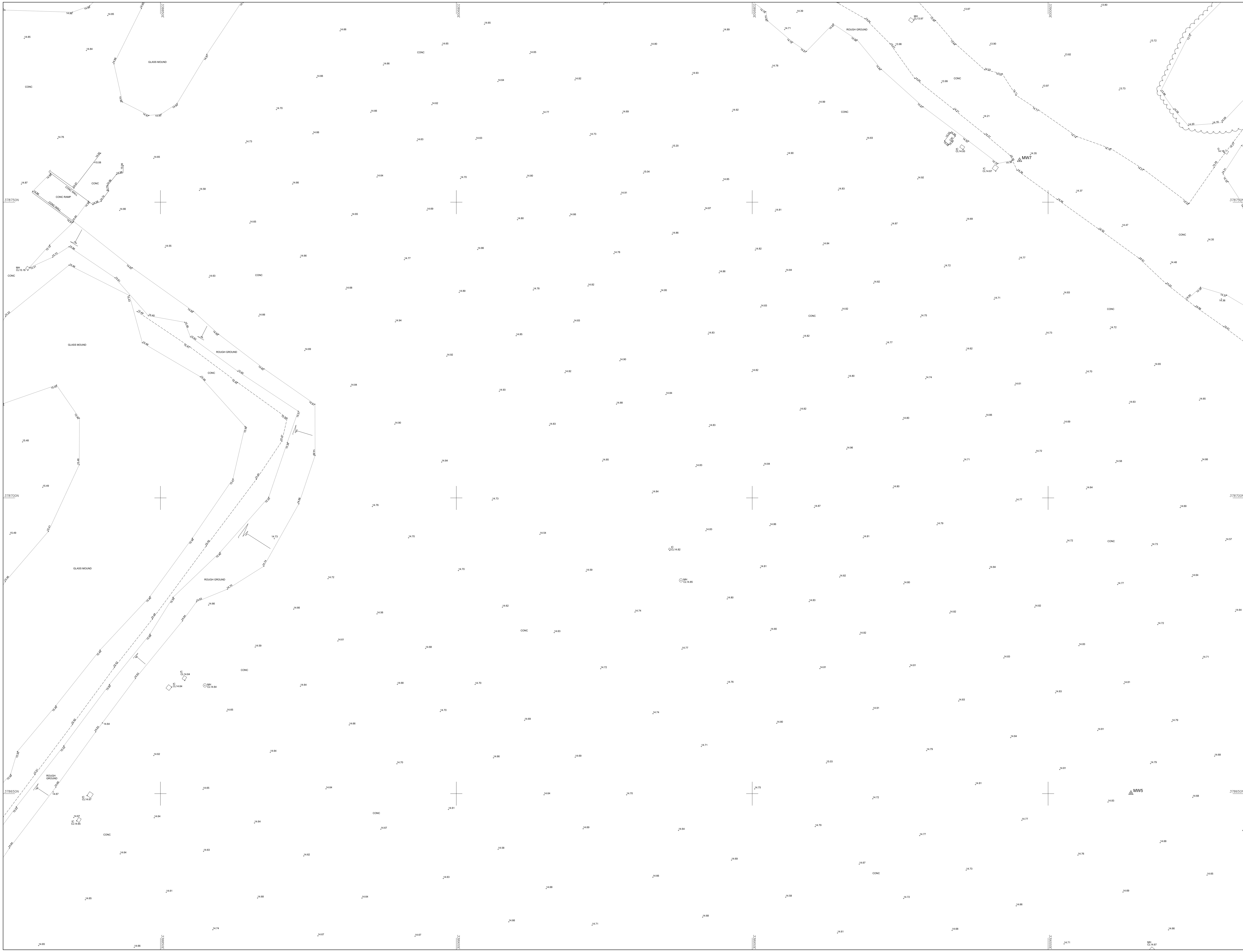
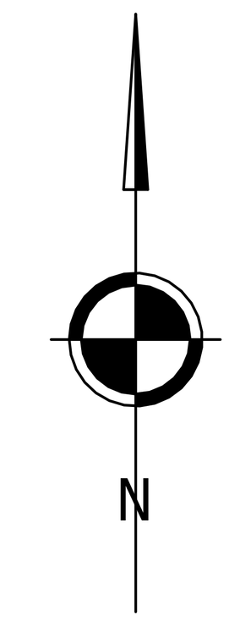
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/005





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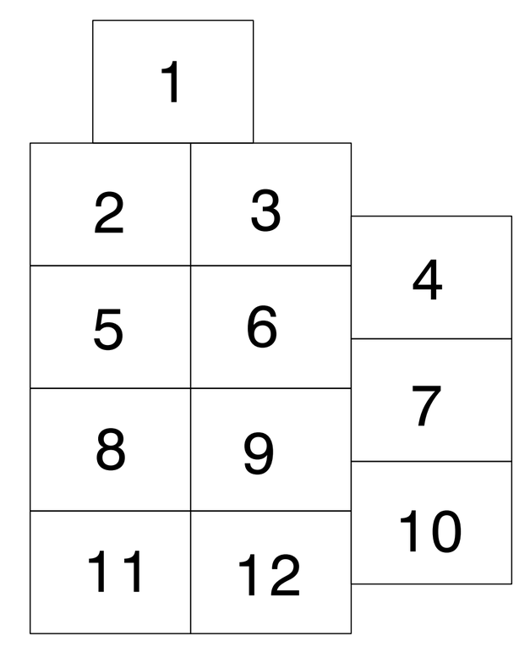
HV.........High Voltage	WP.........Waste Pipe
I/R........Iron Railing	WST........Water Stop Tap (domestic)
IC.........Inspection Cover	WSV........Water Stop Valve (mains)



Survey Operations

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Email: mail@survops.co.uk — www.survops.co.uk

Client

Shepherd Gilmour

Drawing Title

Topographical Survey of Land at:

Port Cheshire

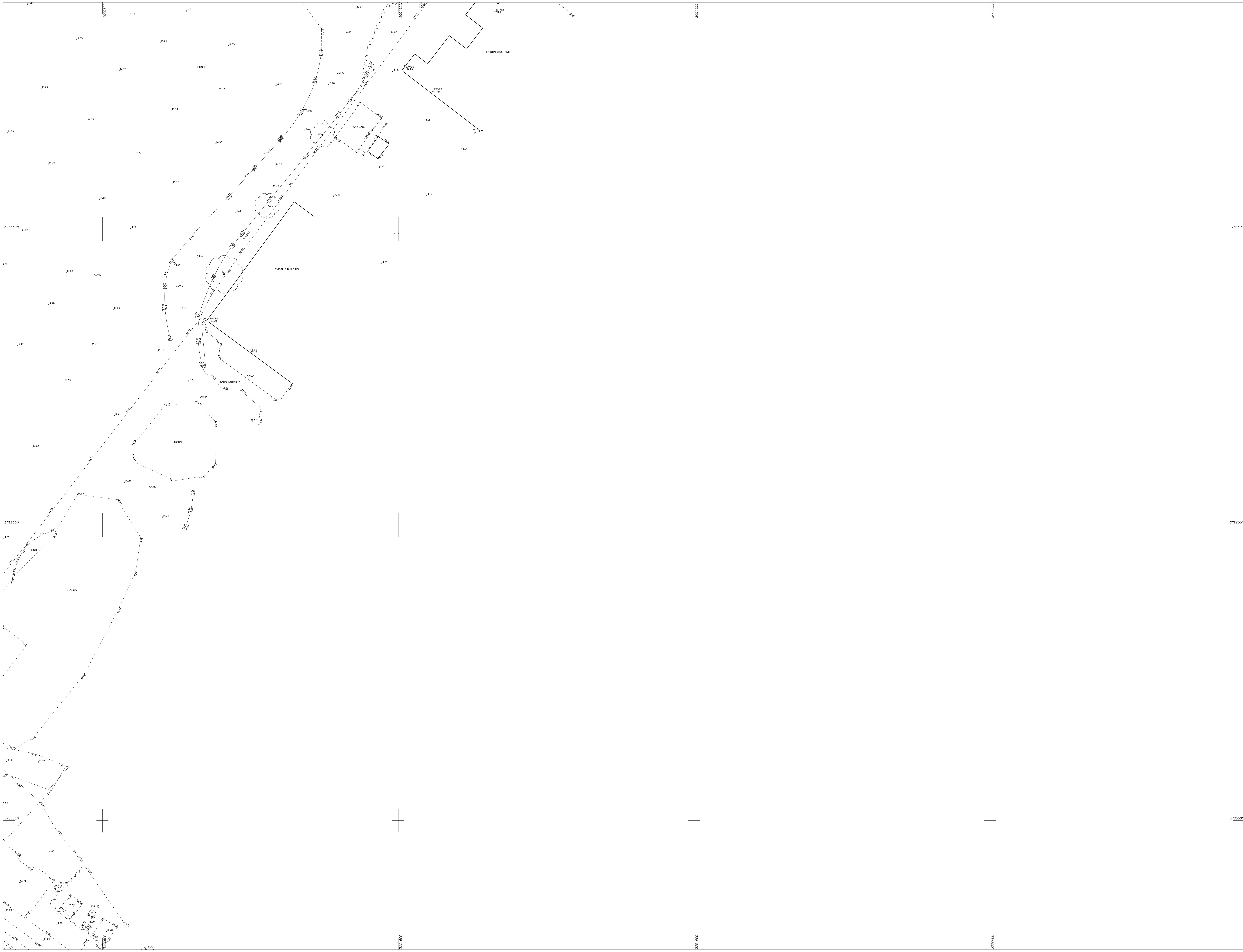
Ellesmere Port

Sheet 6 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision

A0 20K288/006



Note:
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SURVEY STATIONS			
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SO3	338777.50	378511.02	12.28
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MW14	338742.25	378920.58	15.19
MW15	338731.83	378902.30	14.20
MW16	338740.31	378877.38	14.82

STANDARD REFERENCE & ABBREVIATIONS

(AR)........Assumed Route
AB..........Air Brick
AV..........Air Valve
B/W.........Barbed Wire
BAR.........Barrier
BB..........Belisha Beacon
BH..........Borehole
BL..........Bed Level
BOL.........Bollard
BS..........Bus Stop
BT Box......British Telecom Box
BT..........British Telecom IC
BRTW........Brick Retaining Wall
BW..........Brick Wall
C/B.........Close Boarded
C/I.........Corrugated Iron
C/P.........Chestnut Paling
CB..........Control Box
CBW.........Concrete Block Wall
CCTV........Closed Circuit TV
CD..........Cable Duct
CEL.........Cellar Light
CH/L........Chain Link
CHY.........Chimney
CL..........Cover Level
CM..........Cable Marker
COL.........Column
CONC........Concrete
CP..........Catch Pit
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CTV.........Cable Television
CUL.........Culvert
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DPC.........Damp Proof Course
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EJ..........Expansion Joint
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EL SUB STN..Electricity Sub Station
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ELB.........Electricity Box
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FB..........Flower Bed
FH..........Fire Hydrant
FL..........Floor Level
FP..........Flagpole
G*.*........Girth (of tree)
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O/P.........Open Paling
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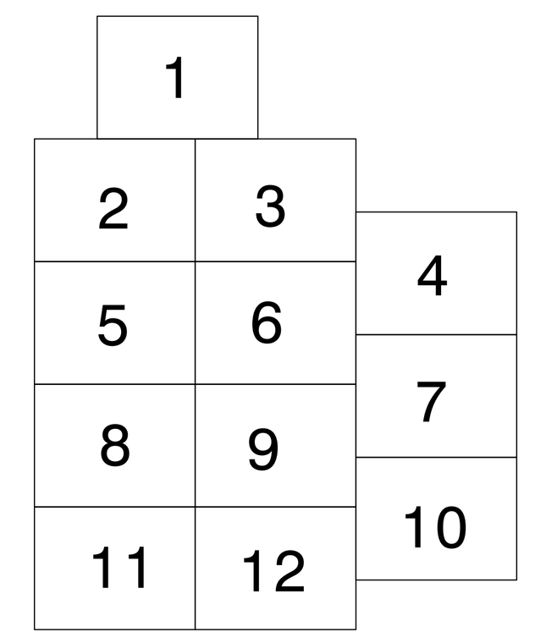

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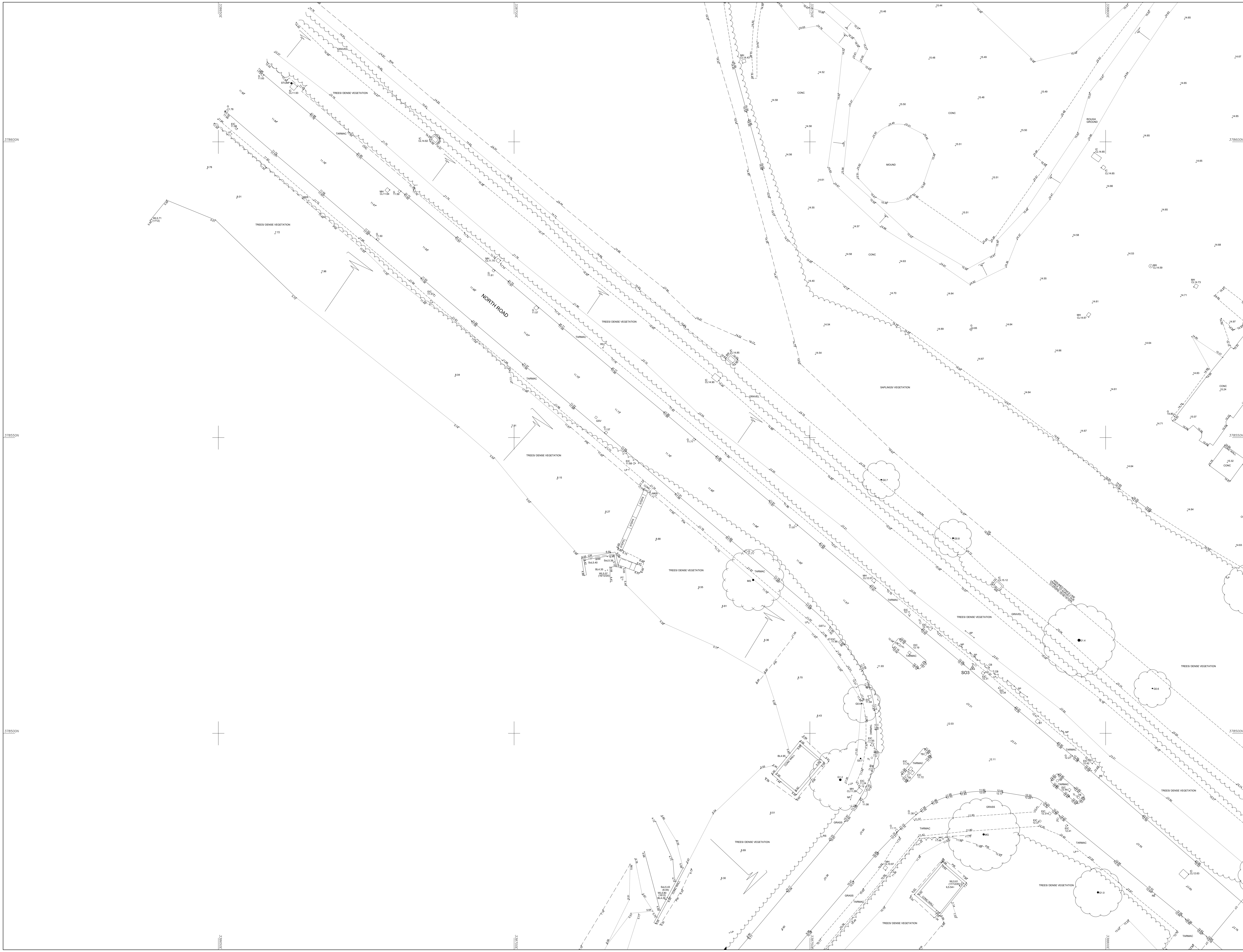
Client
Shepherd Gilmour

Drawing Title
Topographical Survey of Land at:
Port Cheshire
Ellesmere Port
Sheet 7 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/007



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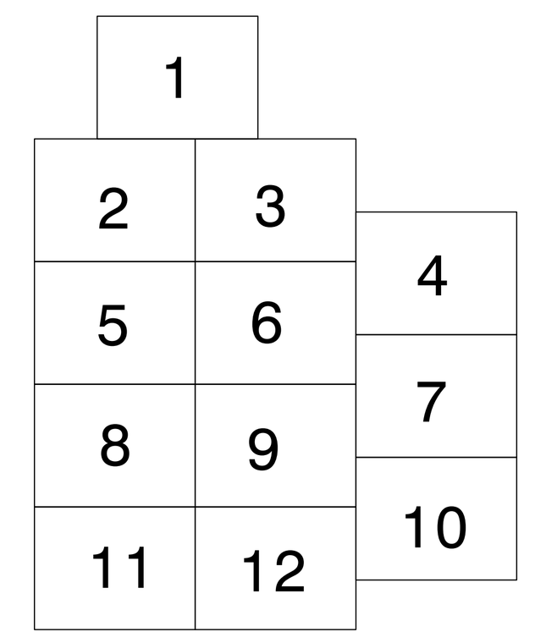

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Client
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Drawing Title
Topographical Survey of Land at:
Port Cheshire
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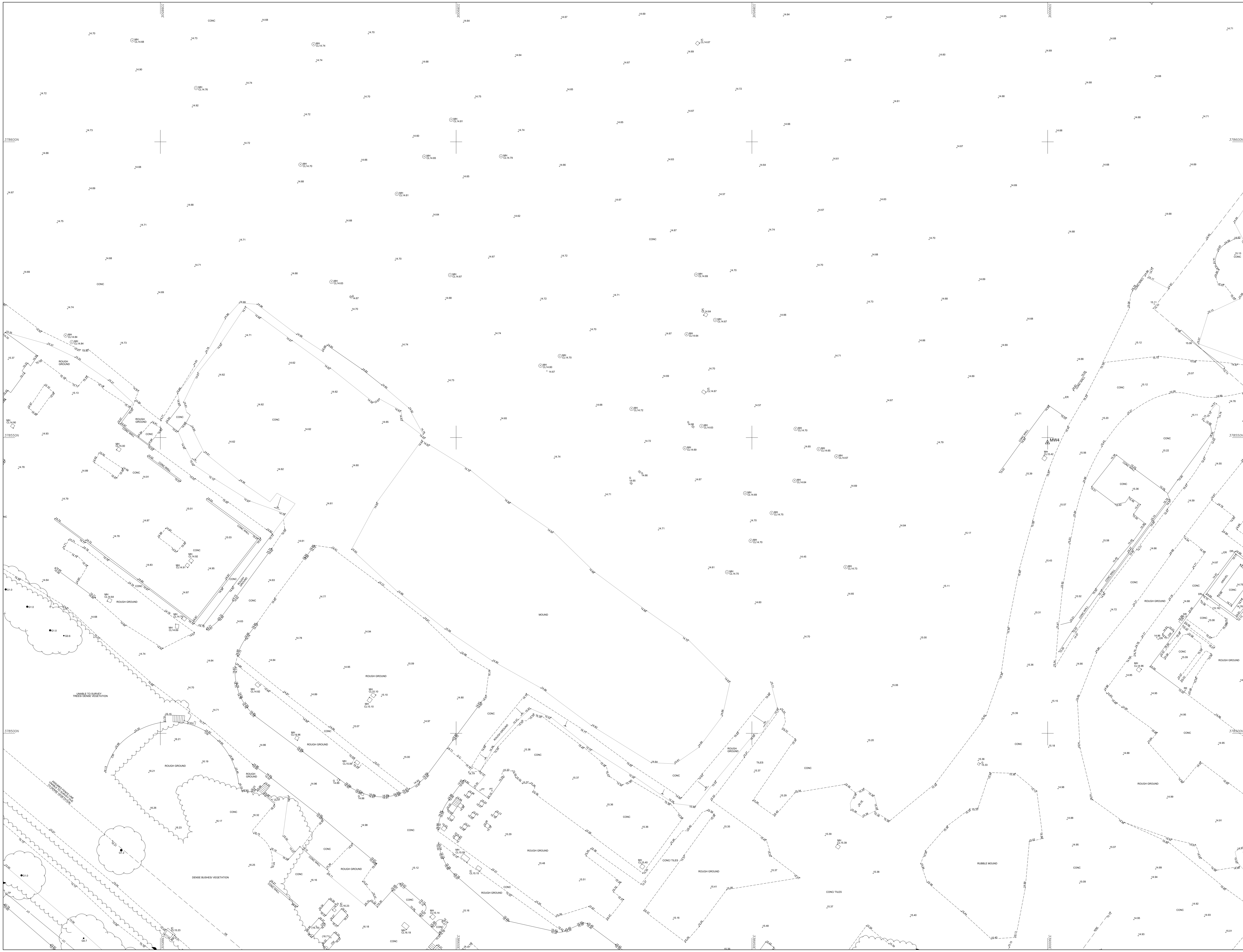
Sheet 8 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/008



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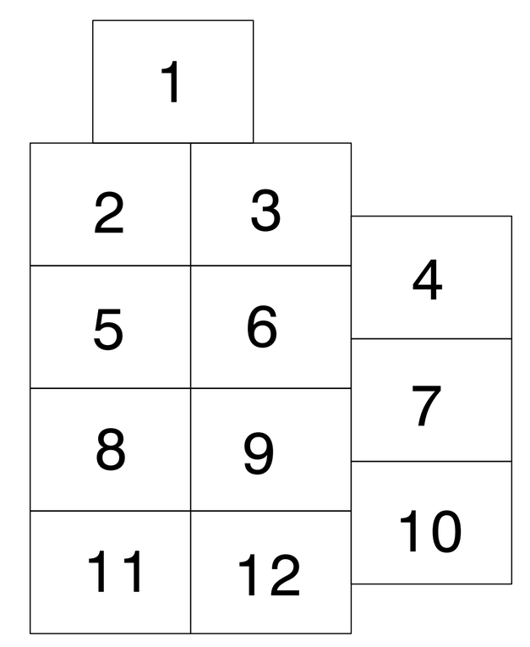

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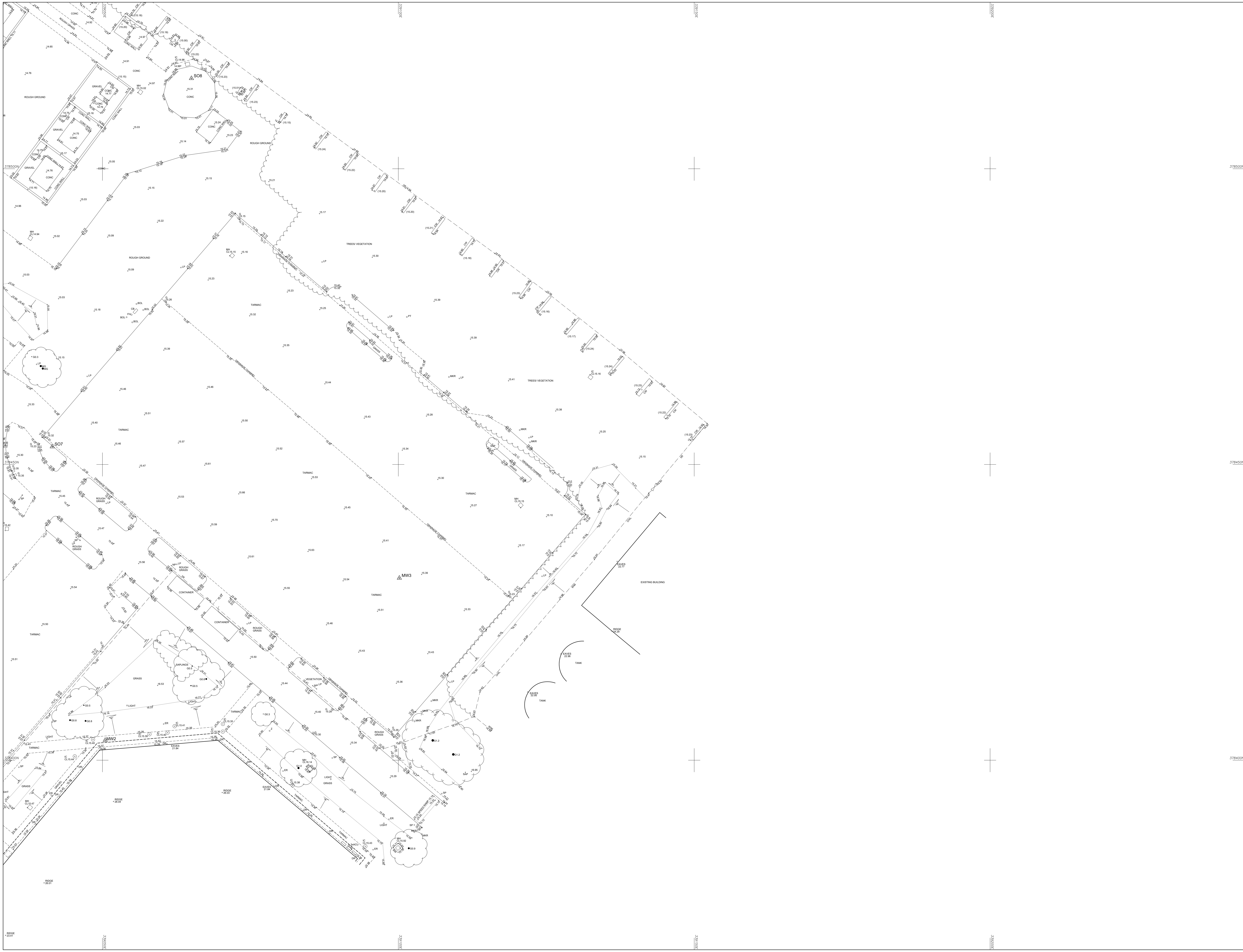
Sheet Size & Drg Number & Revision
A0 20K288/009



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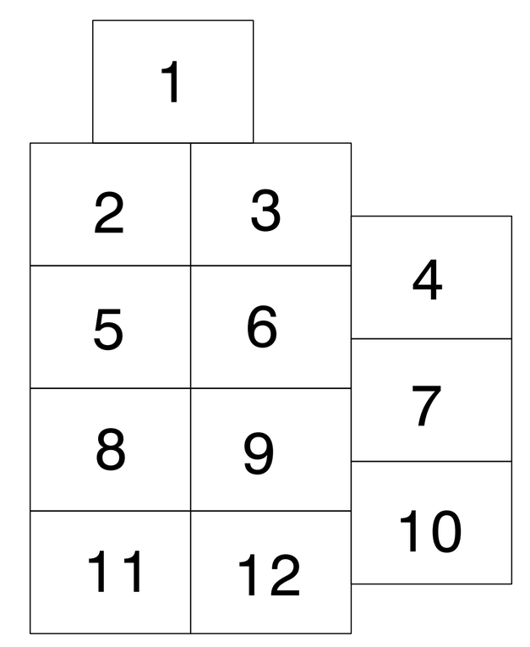
TBM.........Temporary Bench Mark
TCB.........Telephone Call Box
TFR.........Taken From Records
TIE.........Anchor Point (Masts/Poles)
TL..........Traffic Light
TLB.........Traffic Light Control Box
TM..........Ticket Machine
TMC.........Tarmac
TP..........Telecommunications Pole
TPIT........Trial Pit
TS..........Trash Screen
U/C.........Under Construction
U/G.........Underground
UTL.........Unable to Lift (MH,IC etc)
UTS.........Unable to Survey
VDP.........Vehicle Detector Pad
VP..........Vent Pipe
W/M.........Wire Mesh
WL..........Water Level
WM..........Water Meter
WO..........Wash Out
WP..........Waste Pipe
WST.........Water Stop Tap (domestic)
WSV.........Water Stop Valve (mains)



SurveY OPERATIONS
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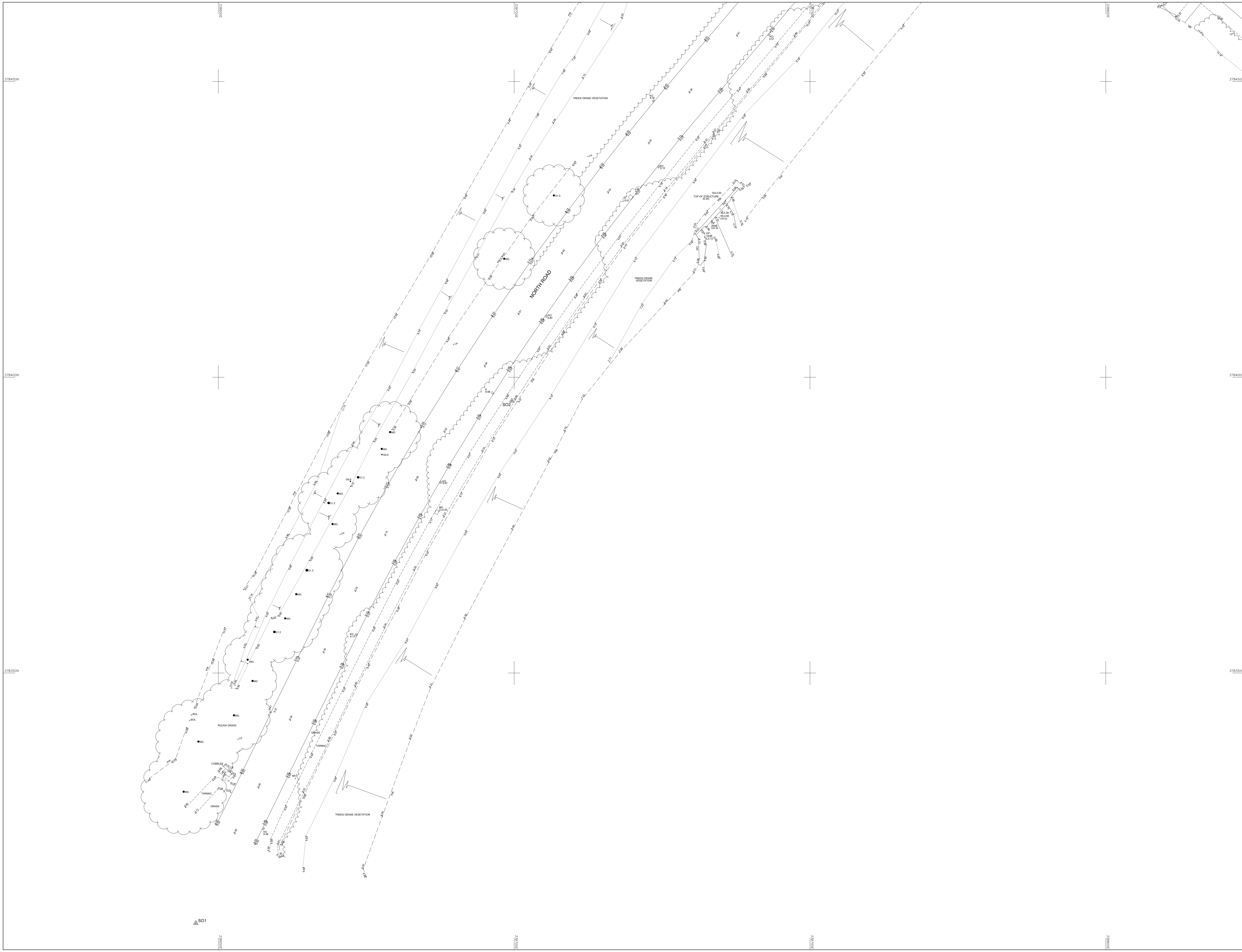
Email: mail@survops.co.uk — www.survops.co.uk

Client
Shepherd Gilmour

Drawing Title
Topographical Survey of Land at:
Port Cheshire
Ellesmere Port
Sheet 10 of 12

Scale(s) 1:200	Surveyor CA/MW
Date Jan 21	Drawn DIF
Job Number 20K288	Checked SO

Sheet Size & Drg Number & Revision
A0 20K288/010



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Note:
The survey is plotted on a plane local Grid. Orientation to National Grid.
All levels relate to Ordnance Datum, achieved using the OS National GPS Network.
Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

SURVEY STATIONS

Name	Easting	Northing	Height
SO1	338646.19	378307.69	10.03
SO2	338699.61	378396.00	9.07
SO3	338777.50	378511.02	12.28
SO4	338864.18	378423.11	13.57
SO5	338980.58	378326.54	15.28
SO6	339011.23	378371.57	15.46
SO7	339041.52	378453.01	15.45
SO8	339065.04	378515.28	15.32
MW1	339022.06	378370.33	15.64
MW2	339050.47	378403.38	15.41
MW3	339100.17	378430.80	15.43
MW4	338999.97	378549.15	15.39
MW5	339014.00	378650.08	14.81
MW6	339052.05	378710.24	14.63
MW7	338995.18	378757.08	14.37
MW8	338934.61	378820.02	14.62
MW9	338904.58	378895.09	14.25
MW10	338834.63	378907.46	14.74
MW11	338839.29	378922.64	14.37
MW12	338812.62	378942.37	14.58
MW13	338762.63	378950.86	14.25
MW14	338742.25	378920.58	15.19
MW15	338731.83	378902.30	14.20
MW16	338740.31	378877.38	14.82

STANDARD REFERENCE & ABBREVIATIONS

(AR)........Assumed Route
AB..........Air Brick
AV..........Air Valve
B/W.........Barbed Wire
BAR.........Barrier
BB..........Belisha Beacon
BH..........Borehole
BL..........Bed Level
BOL.........Bollard
BS..........Bus Stop
BT Box......British Telecom Box
BT..........British Telecom IC
BRTW........Brick Retaining Wall
BW..........Brick Wall
C/B.........Close Boarded
C/I.........Corrugated Iron
C/P.........Chestnut Paling
CB..........Control Box
CBW.........Concrete Block Wall
CCTV........Closed Circuit TV
CD..........Cable Duct
CEL.........Cellar Light
CH/L........Chain Link
CHY.........Chimney
CL..........Cover Level
CM..........Cable Marker
COL.........Column
CONC........Concrete
CP..........Catch Pit
CRTW........Concrete Retaining Wall
CTV.........Cable Television
CUL.........Culvert
CW..........Concrete Block Wall
DC..........Drainage Channel
DPC.........Damp Proof Course
DR..........Drain
DSW.........Dry Stone Wall
ECP.........Electricity Cable Pit
EIC.........Electricity Inspection Cover
EJ..........Expansion Joint
EJB.........Electricity Junction Box
EL SUB STN..Electricity Sub Station
EL..........Eaves Level
ELB.........Electricity Box
EP..........Electricity Pole
ER..........Earth Rod
ETL.........Electricity Transmission Line
FB..........Flower Bed
FH..........Fire Hydrant
FL..........Floor Level
FP..........Flagpole
G*.*........Girth (of tree)
G...........Gulley
GAB.........Gabion
GIP.........Gas Inlet Pipe
GMKR........Gas Marker
GST.........Gas Stop Tap (Domestic)
GSV.........Gas Stop Valve (Mains)
HSE.........Housing
Ht..........Height
HV..........High Voltage
I/R.........Iron Railing
IC..........Inspection Cover
IL..........Invert Level
IP..........Inlet Pipe
KO..........Kerb Outlet
LB..........Letter Box
LP..........Lamp Post
MG..........Multi-Girth
MH..........Manhole
MKR.........Marker
MP..........Mooring Point
NP..........Street Name Plate
O/H.........Overhead
O/P.........Open Paling
OE..........Overhead Electric Wire
OP..........Outfall Pipe
OSBM........Ordnance Survey Bench Mark
OT..........Overhead Telecom Wire
P/C.........Post & Chain
P/R.........Post & Rail
P/W.........Post & Wire
PAV.........Paving
PB..........Pillar Box
PC..........Pedestrian Crossing
PP..........Petrol Pump
PT..........Post or Pillar
RE..........Rodding Eye
RS..........Road Sign
RTW.........Retaining Wall
RWP.........Rain Water Pipe
SAP.........Sapling
SL..........Sump Level
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1
2 3 4
5 6 7
8 9 10
11 12

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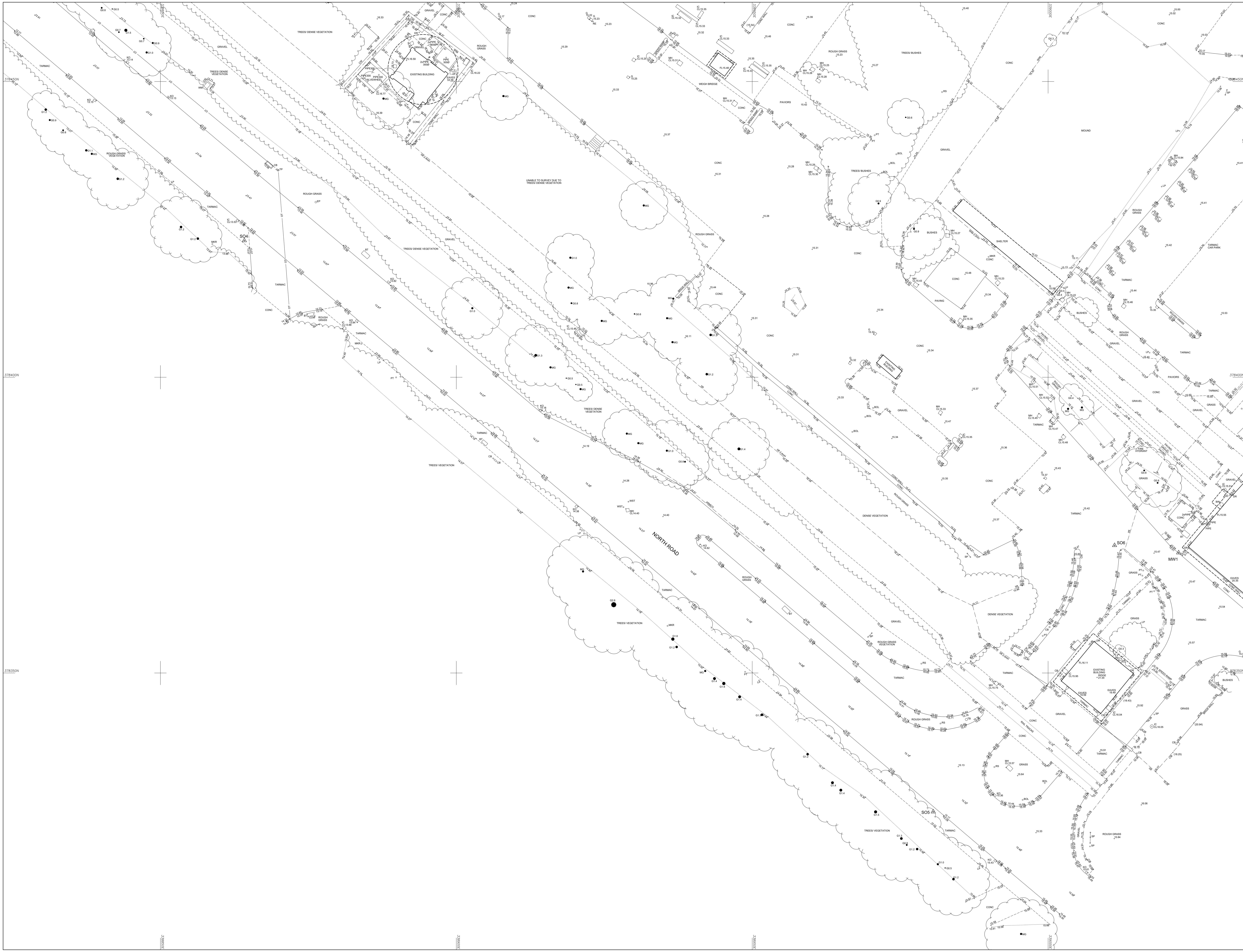
Sheet 11 of 12

Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/011



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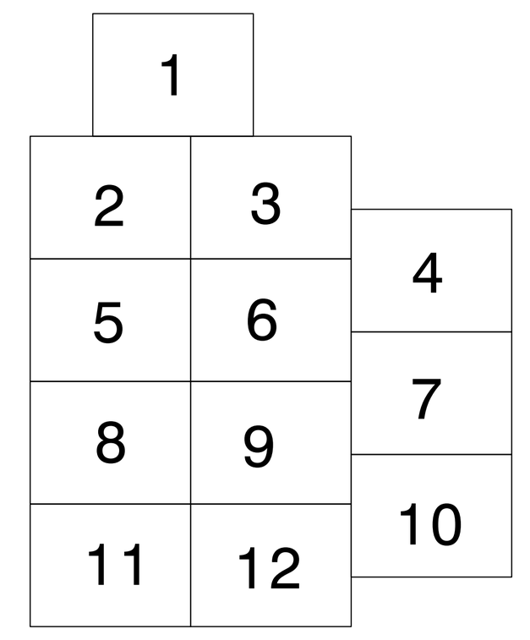

Survey Operations
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Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk — www.survops.co.uk

Client: Shepherd Gilmour

Drawing Title: Topographical Survey of Land at:
Port Cheshire
Ellesmere Port
Sheet 12 of 12

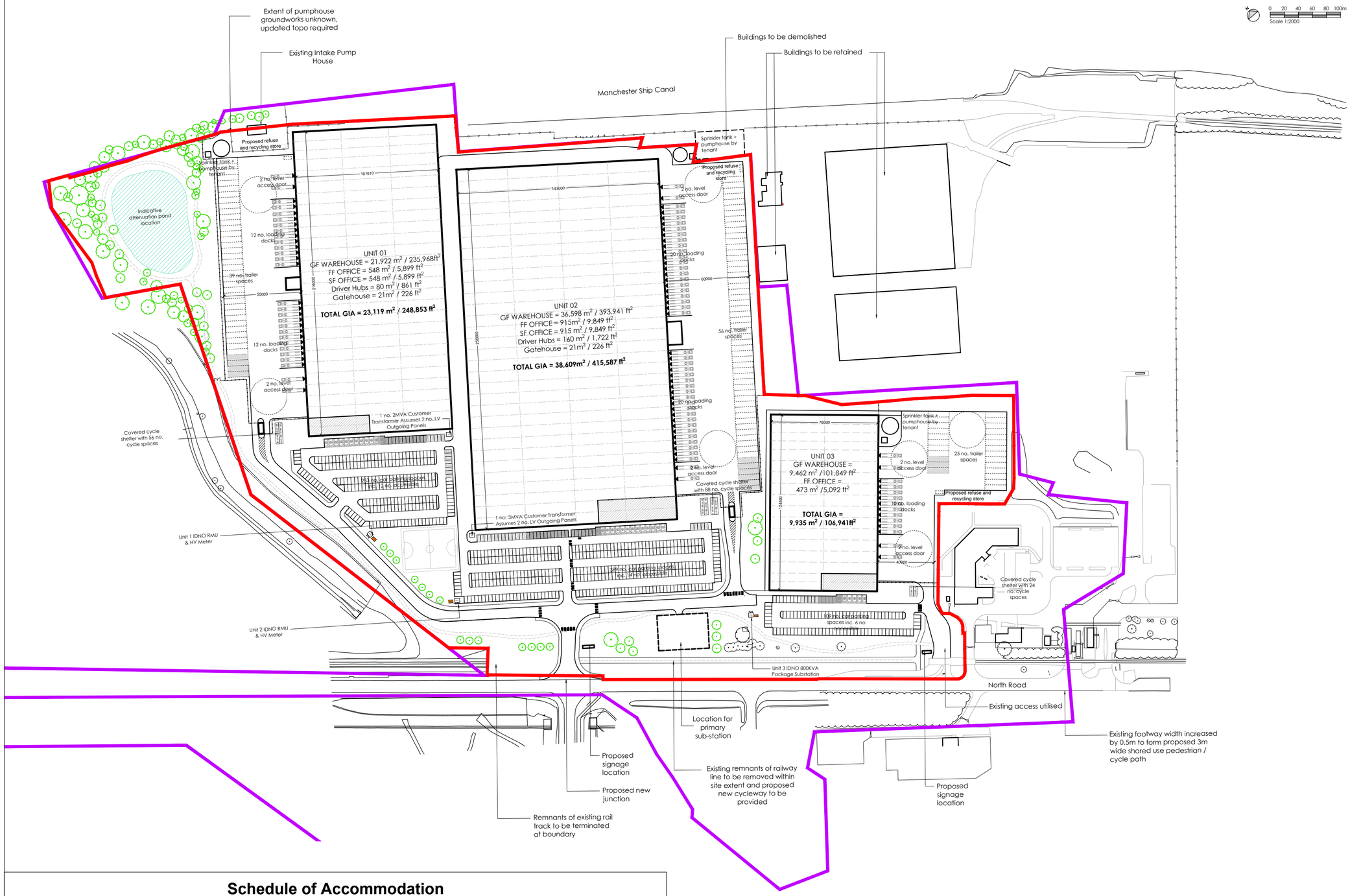
Scale(s)	1:200	Surveyor	CA/MW
Date	Jan 21	Drawn	DIF
Job Number	20K288	Checked	SO

Sheet Size & Drg Number & Revision
A0 20K288/012

Shepherd Gilmour
Consulting Engineers

APPENDIX B1

Colchester House, 40 Peter Street, Manchester M2 5GP
(44)0161 837 1500
www.shepherd-gilmour.co.uk



Schedule of Accommodation

Unit	Ground Floor GIA	Office GIA	Gatehouse	Driver Hubs	TOTAL UNIT GIA	Car Parking (Accessible)	Parking Ratio (/m²)	EV Charging Spaces (Hatched Dark Grey)	Future EV Charging Spaces (Hatched Light Grey)	Ducting for HGV EV Charging (Hatched Light Grey)
Unit 1	21,922m² / 235,968ft²	1,096m² / 11,798ft²	21m² / 226ft²	80m² / 861ft²	**23,119m² / 248,853ft²**	253 (12)	1:91	13	13	4
Unit 2	36,598m² / 393,941ft²	1,830m² / 19,698ft²	21m² / 226ft²	160m² / 1,722ft²	**38,609m² / 402,779t²**	389 (14)	1:99	20	20	6
Unit 3	9,462m² / 101,849ft²	473m² / 5,092ft²	-	-	**9,935m² / 106,941ft²**	109 (6)	1:92	6	6	3
TOTAL SITE GIA					**71,663m² / 771,381ft²**	751 (32)		39	39	12

NOTES

AEWTP027C

- All dimensions and levels are to be checked on site.
- Any discrepancies are to be reported to the architect before any work commences
- This drawing shall not be scaled to ascertain any dimensions. Work to figured dimensions only.
- This drawing shall not be reproduced without express written permission from AEW.
- Title overlay drawings and ownership boundaries are produced using all reasonable endeavors. AEW cannot be responsible for the accuracy or scale discrepancy of base plans supplied to them.
- All works are to be undertaken in accordance with Building Regulations and the latest British Standards.
- All proprietary materials and products are to be used strictly in accordance with the manufacturers recommendations.

CDM 2015

Client notified of duties:

Principal Designer:

Unless noted below, all known hazards have been highlighted on the drawing:

Note

- Exact boundaries to be confirmed with reference to land registry plans and topographical survey.
- HGV circulation subject to tracking analysis.

Planning Application Boundary 43.01 acres / 17.40 ha

LDO Boundary taken from Cheshire West and Chester Drawing: North Road Industrial Area - LDO Area (DWG required for accuracy)

GAS MP Gas Kiosk

Rev	Date	Drawn	Checked
P6	03/03/21	KS	AS
Carriageway width on the bend of the internal road leading to Unit 1 amended.			
P5	02/03/21	KS	AS
Cycle path amended to proposed site access			
P4	25/02/21	KS	AS
Title block updated. Red line boundary updated to the existing site entrance.			
P3	18/02/21	KS	AS
Unit 1 and 2 shared fire track increased to 12.3m and site layout amended to suit. Primary sub-station footprint updated. Proposed site access updated and cycleway added.			
P2	15/02/21	KS	AS
Unit 1 footprint amended to suit updated topo survey. Unit 3 footprint increased to ensure site total GIA remains the same. Parking amended to suit proposed landscape plan			
P1	20/01/21	KS	AS
Initial Issue			

REV Date Drawn by: - Checked by: -

Status: S2 — Purpose of Issue: For Comment

drawing stage: **Planning**

client: **Firethorn Developments Ltd**

project: **Link Logistics Park Ellesmere Port**

drawing title: **Proposed Site Plan**

date: Nov 2020 drawn: DJS

scale@A2: 1:2000 checked: AS

Rev P6

Job No. 11915-AEW-XX-XX-DR-A-0501

aew architects
0161 214 4370
www.aewarchitects.com

Shepherd Gilmour
Consulting Engineers

APPENDIX C1

Colchester House, 40 Peter Street, Manchester M2 5GP
(44)0161 837 1500
www.shepherd-gilmour.co.uk

OS Sheet No: SJ3978SW

Scale 1:1250 Date: 25-Jul-2012

Printed by: Liz Bywater

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
0101		C	M		975		C	CO		86.28
0102		F	G							
0201		F	M		375		C			78.87
0202		F	H		300					15.64
1101		C	M		975		C	CO		149.48
2001		C	M		975		C	CO		126.62
2002		S	M		600		C	CO		170.27

WASTE WATER SYMBOLOGY

FOUL, SURFACE, COMBINED, DUAL — MANHOLE
SIDE ENTRY MANHOLE
PRIVATE SEWER
ABANDONED SEWER
SITE TERMINATION
T-JUNCTION (SADDLE)
AIRVALVE
LAMP HOLE
CASCADE
OIL INTERCEPTOR
CONTROL KIOSK
PENSTOCK
CONTROL VALVE
RODDING EYE
GULLEY
SOAKAWAY
HATCHBOX
TUMBLING BAY
HEADWALL
UNSPECIFIED
HYDROBRAKE
VALVE
INLET
WASHOUT
GHOST NODE (inc. GN - Rising Main & GN - Dual Function)
EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)
CATCHPIT
SIDE ENTRY CATCHPIT
CHAMBER
SIDE ENTRY CHAMBER
DROPSHAFT
SIDE ENTRY DROPSHAFT
SHEET EDGE
VENT COLUMN
SEWER OVERFLOW
DISCHARGE POINT (OUTFALL)
TANK
WASTE WATER TREATMENT WORKS
PUMPING STATION
EJECTOR STATION
SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

- F Foul
- S Surface
- C Combined
- T Transition
- O Overflow
- U Unspecified

MANHOLE / NODE TYPE

- M Manhole
- J Junction
- L Lamphole
- H Hatchbox
- R Rodding Eye
- F Outfall
- V Combined Sewer Overflow
- P Pumping Station
- S Soakaway
- D Dual Function Manhole
- W Treatment Works
- Z Ghost in Rising Main
- C Cascade
- Y Gulley
- E Ejector
- O Oil Injector
- I Inlet
- B Hydrobrake
- T Vent Column
- X Valve
- U Unspecified
- Q Expediency Node
- G Ghost (to allow pipe bends)

SEWER SHAPE

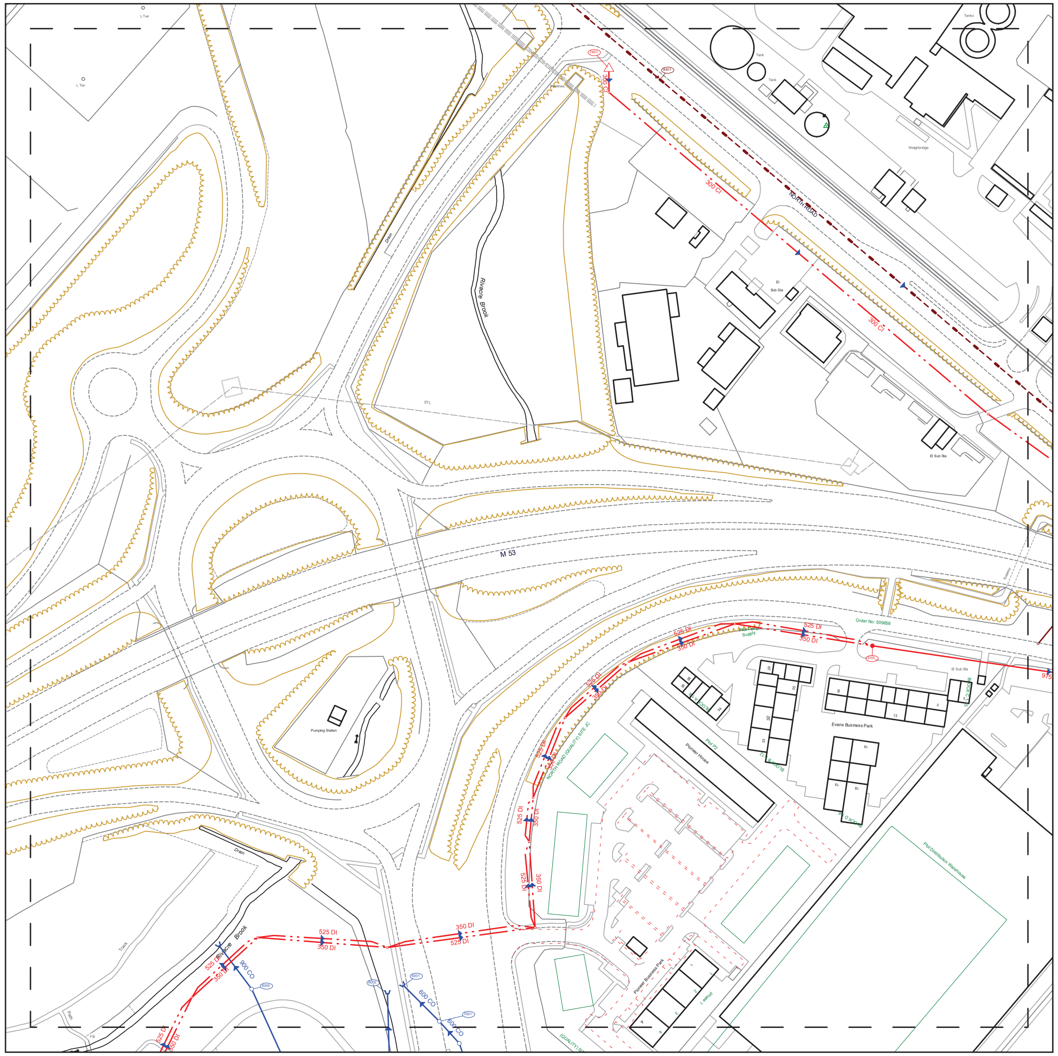
- C Circular
- E Egg
- O Oval
- F Flat Top
- R Rectangular
- S Square
- T Trapezoidal
- A Arch
- B Barrel
- H Horseshoe
- U Unspecified

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- CI Cast Iron
- SI Spun (Grey) Iron
- CO Concrete
- CS Concrete Segments (Bolted)
- CS Concrete Segments (Unbolted)
- CC Concrete Box Culvert
- DI Ductile Iron
- GR Glass Reinforced Concrete
- GR Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polyethylene
- RP Reinforced Plastic Matrix
- ST Steel
- VC Vitrified Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

OS Sheet No: SJ3978SW
Scale 1:1250 Date: 25-Jul-2012
7 Nodes
Sheet 1 of 1

United Utilities
SEWER RECORDS



OS Sheet No: SJ3878SE

Scale 1:1250 Date: 25-Jul-2012

Printed by: Liz Bywater

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
5001		C	Z		525		C	DI		45.19
5001		C	Z		350		C	DI		44.6
5002		F	F							
6001		S	F							
6002		S	F							
6003		C	Z		525		C	DI		65.7
6003		C	Z		350		C	DI		65.19
6004		C	Z		525		C	DI		74.67
6004		C	Z		350		C	DI		75.12
6005	12.99	S	M	7.04	900		C	CO	905	27.15
7001	13.67	S	M	10.57	600		C	CO		25.46
7002		C	Z		525		C	DI		43.85
7002		C	Z		350		C	DI		43.1
7003		C	Z		525		C	DI		23.59
7003		C	Z		350		C	DI		22.09
7101		C	Z		525		C	DI		43.97
7101		C	Z		350		C	DI		43.08
7102		C	Z		525		C	DI		43.11
7102		C	Z		350		C	DI		42.52
7401		C	P		300		C	CI		11.92
7402		C	Z		300		C	CI		249.04
8101		C	Z		525		C	DI		56.93
8101		C	Z		350		C	DI		56.3
8201		C	Z		525		C	DI		70.37
8201		C	Z		350		C	DI		69.87
8401		F	H							319.69
9101		C	M		975		C	CO		178.9
9301		C	Z		300		C	CI		92.42

WASTE WATER SYMBOLOGY

FOUL / SURFACE / COMBINED / DUAL — MANHOLE

SIDE ENTRY MANHOLE

PRIVATE SEWER — ABANDONED SEWER

SITE TERMINATION — T-JUNCTION (SADDLE)

AIRVALVE — LAMP HOLE

CASCADE — OIL INTERCEPTOR

CONTROL KIOSK — PENSTOCK

CONTROL VALVE — RODDING EYE

GULLEY — SOAKAWAY

HATCHBOX — TUMBLING BAY

HEADWALL — UNSPECIFIED

HYDROBRAKE — VALVE

INLET — WASHOUT

GHOST NODE (inc. GN - Rising Main & GN - Dual Function)

EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)

CATCHPIT — SIDE ENTRY CATCHPIT

CHAMBER — SIDE ENTRY CHAMBER

DROPSHAFT — SIDE ENTRY DROPSHAFT

SHEET EDGE — VENT COLUMN

SEWER OVERFLOW — DISCHARGE POINT (OUTFALL)

TANK — WASTE WATER TREATMENT WORKS

PUMPING STATION — EJECTOR STATION

SLUDGE PUMPING STATION

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C Cascade
Y Gulley
E Ejector
O Oil Injector
I Inlet
B Hydrobrake
T Vent Column
X Valve
U Unspecified
Q Expediency Node
G Ghost (to allow pipe bends)

SEWER SHAPE

C Circular
E Egg
O Oval
F Flat Top
R Rectangular
S Square
T Trapezoidal
A Arch
B Barrel
H Horseshoe
U Unspecified

SEWER MATERIAL

AC Asbestos Cement
BR Brick
CI Cast Iron
SI Spun (Grey) Iron
CO Concrete
CS Concrete Segments (Bolted)
CS Concrete Segments (Unbolted)
CC Concrete Box Culvert
DI Ductile Iron
GR Glass Reinforced Concrete
GR Glass Reinforced Plastic
PS Plastic / Steel Composite
PV Polyvinyl Chloride
PE Polyethylene
RP Reinforced Plastic Matrix
ST Steel
VC Vitrified Clay (All Clayware)
PP Polypropylene
PF Pitch Fibre
MA Masonry - In Regular Courses
MA Masonry - Randomly Coursed
U Unspecified

OS Sheet No: SJ3878SE
Scale 1:1250 Date: 25-Jul-2012
28 Nodes
Sheet 1 of 1

United Utilities
SEWER RECORDS

There are no nodes in SJ3978NW.

WASTE WATER SYMBOLOGY

MANHOLE
FOUL
SURFACE
COMBINED
DUAL
SIDE ENTRY MANHOLE
PRIVATE SEWER
ABANDONED SEWER
T JUNCTION (SADDLE)
SITE TERMINATION
AIRVALVE
LAMP HOLE
CASCADE
OIL INTERCEPTOR
CONTROL KIOSK
PENSTOCK
CONTROL VALVE
RODDING EYE
GULLEY
SOAKAWAY
HATCHBOX
TUMBLING BAY
HEADWALL
UNSPECIFIED
HYDROBRAKE
VALVE
INLET
WASHOUT
GHOST NODE (inc. GN - Rising Main & GN - Dual Function)
EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)
CATCHPIT
SIDE ENTRY CATCHPIT
CHAMBER
SIDE ENTRY CHAMBER
DROPSHAFT
SIDE ENTRY DROPSHAFT
SHEET EDGE
VENT COLUMN
SEWER OVERFLOW
DISCHARGE POINT (OUTFALL)
TANK
WASTE WATER TREATMENT WORKS
PUMPING STATION
EJECTOR STATION
SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

F	Foul	T	Transition
S	Surface	O	Overflow
C	Combined	U	Unspecified

MANHOLE / NODE TYPE

M	Manhole	Z	Ghost in Rising Main
J	Junction	C	Cascade
L	Lamphole	Y	Gulley
H	Hatchbox	E	Ejector
R	Rodding Eye	O	Oil Injector
F	Outfall	I	Inlet
V	Combined Sewer Overflow	B	Hydrobrake
		T	Vent Column
P	Pumping Station	X	Valve
S	Soakaway	U	Unspecified
D	Dual Function Manhole	Q	Expediency Node
		G	Ghost (to allow pipe bends)
W	Treatment Works		

SEWER SHAPE

C	Circular	T	Trapezoidal
E	Egg	A	Arch
O	Oval	B	Barrel
F	Flat Top	H	Horseshoe
R	Rectangular	U	Unspecified
S	Square		

SEWER MATERIAL

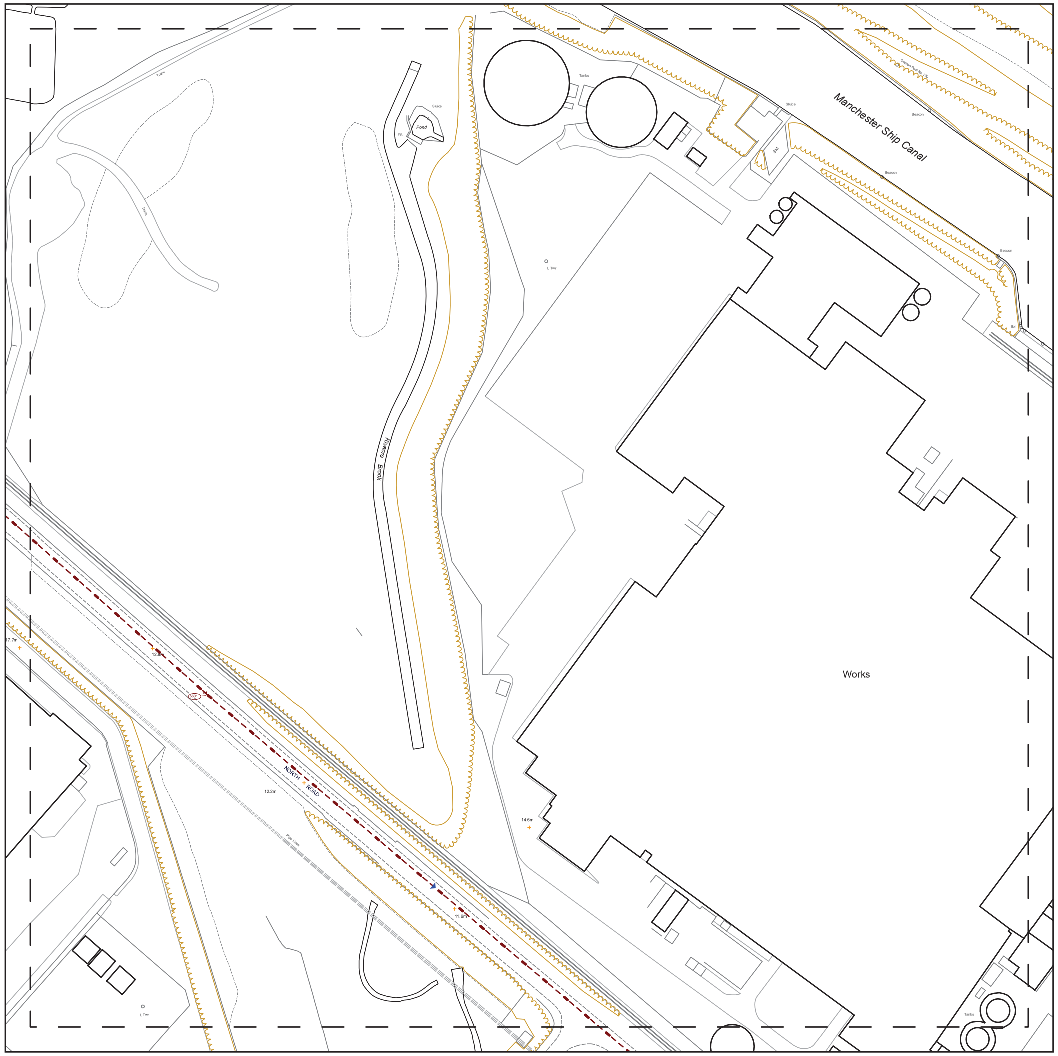
AC	Asbestos Cement
BR	Brick
CI	Cast Iron
SI	Spun (Grey) Iron
CO	Concrete
CS	Concrete Segments (Bolted)
CS	Concrete Segments (Unbolted)
CC	Concrete Box Culvert
DI	Ductile Iron
GR	Glass Reinforced Concrete
GR	Glass Reinforced Plastic
PS	Plastic / Steel Composite
PV	Polyvinyl Chloride
PE	Polyethylene
RP	Reinforced Plastic Matrix
ST	Steel
VC	Vitrified Clay (All Clayware)
PP	Polypropylene
PF	Pitch Fibre
MA	Masonry - In Regular Courses
MA	Masonry - Randomly Coursed
U	Unspecified

OS Sheet No: SJ3978NW
Scale 1:1250 Date: 25-Jul-2012
No Nodes
Sheet 1 of 1

United Utilities
SEWER RECORDS

OS Sheet No: SJ3978NW
Scale 1:1250 Date: 25-Jul-2012

Printed by: Liz Bywater



OS Sheet No: SJ3878NE

Scale 1:1250 Date: 25-Jul-2012

Printed by: Liz Bywater

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
5601		F	H							296.66

WASTE WATER SYMBOLOGY

FOUL, SURFACE, COMBINED, DUAL — MANHOLE

SIDE ENTRY MANHOLE

PRIVATE SEWER — ABANDONED SEWER

SITE TERMINATION — T-JUNCTION (SADDLE)

AIRVALVE — LAMP HOLE

CASCADE — OIL INTERCEPTOR

CONTROL KIOSK — PENSTOCK

CONTROL VALVE — RODDING EYE

GULLEY — SOAKAWAY

HATCHBOX — TUMBLING BAY

HEADWALL — UNSPECIFIED

HYDROBRAKE — VALVE

INLET — WASHOUT

GHOST NODE (inc. GN - Rising Main & GN - Dual Function)

EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)

CATCHPIT — SIDE ENTRY CATCHPIT

CHAMBER — SIDE ENTRY CHAMBER

DROPSHAFT — SIDE ENTRY DROPSHAFT

SHEET EDGE — VENT COLUMN

SEWER OVERFLOW — DISCHARGE POINT (OUTFALL)

TANK — WASTE WATER TREATMENT WORKS

PUMPING STATION — EJECTOR STATION

SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

- F Foul
- S Surface
- C Combined
- T Transition
- O Overflow
- U Unspecified

MANHOLE / NODE TYPE

- M Manhole
- J Junction
- L Lamphole
- H Hatchbox
- R Rodding Eye
- F Outfall
- V Combined Sewer Overflow
- P Pumping Station
- S Soakaway
- D Dual Function Manhole
- W Treatment Works
- Z Ghost in Rising Main
- C Cascade
- Y Gulley
- E Ejector
- O Oil Injector
- I Inlet
- B Hydrobrake
- T Vent Column
- X Valve
- U Unspecified
- Q Expediency Node
- G Ghost (to allow pipe bends)

SEWER SHAPE

- C Circular
- E Egg
- O Oval
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- R Rectangular
- S Square
- T Trapezoidal
- A Arch
- B Barrel
- H Horseshoe
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SEWER MATERIAL

- AC Asbestos Cement
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- DI Ductile Iron
- GR Glass Reinforced Concrete
- GR Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polyethylene
- RP Reinforced Plastic Matrix
- ST Steel
- VC Vitrified Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

OS Sheet No: SJ3878NE
Scale 1:1250 Date: 25-Jul-2012

1 Nodes

Sheet 1 of 1

United Utilities

SEWER RECORDS

Filing

From: Filing
Sent: 02 March 2021 09:43
To: Paul Quirk
Subject: FW: Port Cheshire, North Road Industrial Estate, Ellesmere Port , CH65 1AB – UU Ref 4200036841

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 11 February 2021 10:13
To: Jason Jones <jjones@sgiconsulting.co.uk>
Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: RE: Port Cheshire, North Road Industrial Estate, Ellesmere Port , CH65 1AB – UU Ref 4200036841

Hello Jason

I can confirm that you can make an indirect connection to the North Rd pumping station via the existing private 225mm foul sewer shown on your plan. I assume your client owns the pipe and as such will grant permission. If not you will have to obtain permission from the owner of the pipe.

Thanks

Graham Perry

Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

From: Wastewater Developer Services
Sent: 11 February 2021 09:03
To: Perry, Graham <Graham.Perry@uuplc.co.uk>
Subject: FW: Port Cheshire, North Road Industrial Estate, Ellesmere Port , CH65 1AB – UU Ref 4200036841

Many thanks

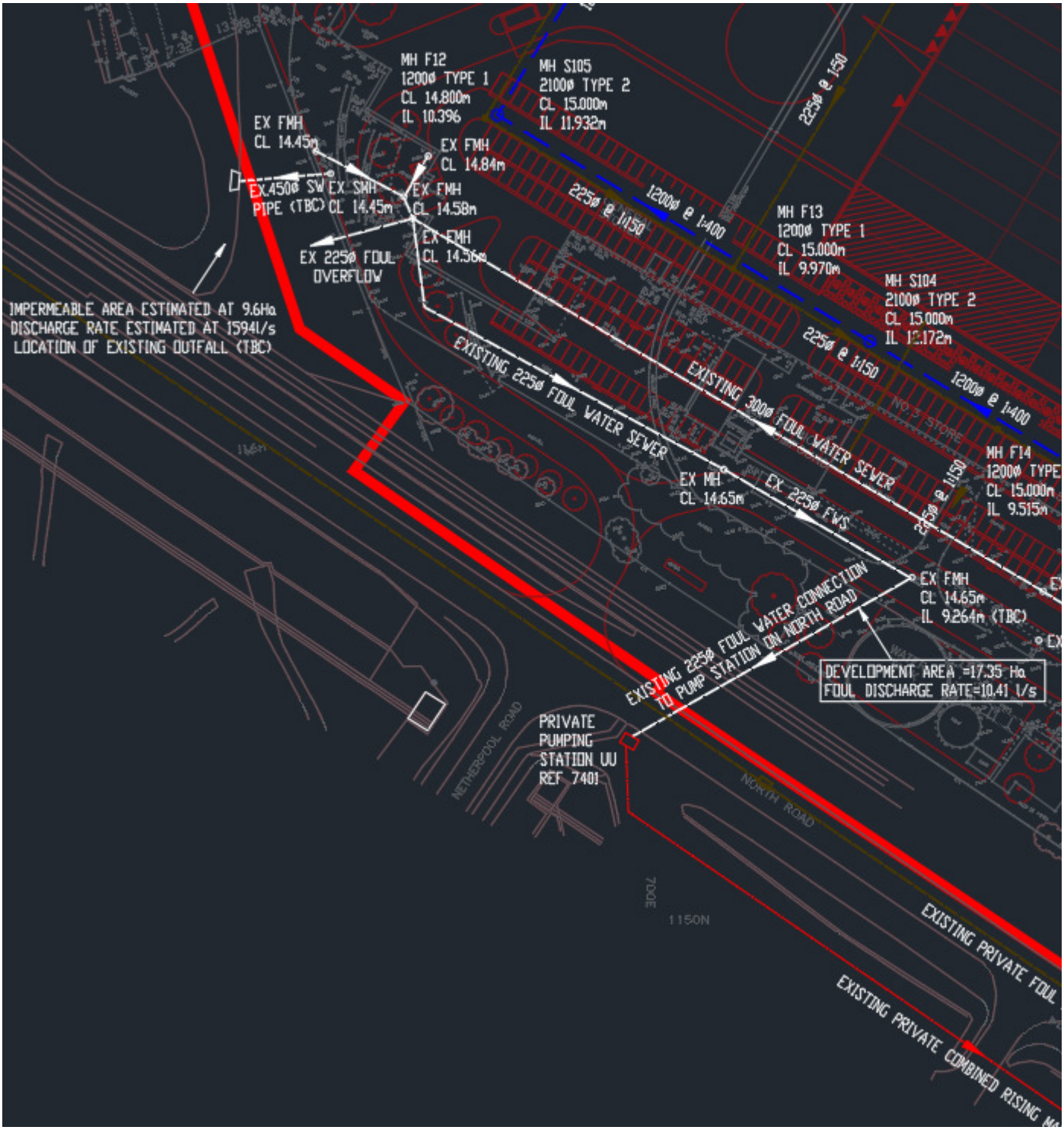
Sharon

From: Jason Jones [mailto:jjones@sgiconsulting.co.uk]
Sent: 10 February 2021 21:53
To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>; Perry, Graham <Graham.Perry@uuplc.co.uk>
Subject: Port Cheshire, North Road Industrial Estate, Ellesmere Port , CH65 1AB – UU Ref 4200036841

Hi Graham,

Thanks for getting back to me so quickly.

According to our records there is an established 225 diameter connection from the site into the pumping station and we would like to reuse this connection (therefore no cost for the rebuild of the wet well). The connection of the foul drainage into the 975 dia combined sewer would be a signficant cost due to the distance and 3rd party ownership agreements.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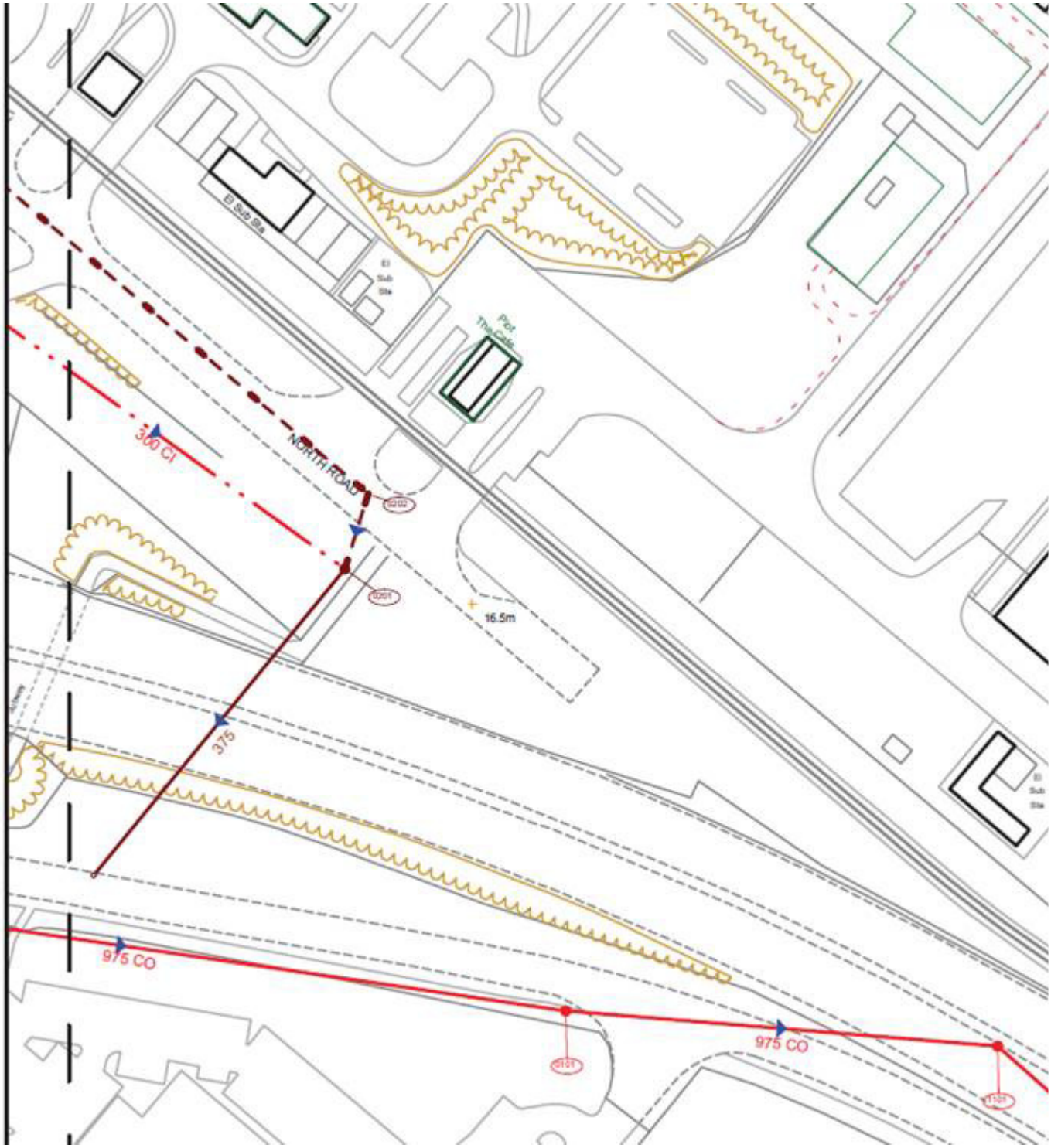
1200ø TYPE 1
CL 14.800m
IL 10.396
MH S105
2100ø TYPE 2
CL 15.000m
IL 11.932m
EX FMH
CL 14.45m
EX FMH
CL 14.84m
EX FMH
CL 14.58m
EX FMH
CL 14.56m
EX 450ø SW EX SWH
PIPE (TBC) CL 14.45m
EX 225ø FOUL
OVERFLOW
225ø @ 1:150
1200ø @ 1:400
MH F13
1200ø TYPE 1
CL 15.000m
IL 9.970m
MH S104
2100ø TYPE 2
CL 15.000m
IL 12.172m
IMPERMEABLE AREA ESTIMATED AT 9.6Ha
DISCHARGE RATE ESTIMATED AT 1594l/s
LOCATION OF EXISTING OUTFALL (TBC)
EXISTING 225ø FOUL WATER SEWER
EXISTING 300ø FOUL WATER SEWER
EX MH
CL 14.65m
EX 225ø FWS
MH F14
1200ø TYPE
CL 15.000m
IL 9.515m
EX FMH
CL 14.65m
IL 9.264m (TBC)
EXISTING 225ø FOUL WATER CONNECTION
TO PUMP STATION ON NORTH ROAD
DEVELOPMENT AREA =17.35 Ha
FOUL DISCHARGE RATE=10.41 l/s
PRIVATE
PUMPING
STATION UU
REF 7401
NETHERPOOL ROAD
NORTH ROAD
EXISTING PRIVATE FOUL
EXISTING PRIVATE COMBINED RISING MA



Kind Regards,

Jason Jones

Associate Infrastructure Engineer

T: **(44) 0161 837 1500**
DDI: **(44) 0161 837 1517**

Shepherd Gilmour
Consulting Engineers

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 10 February 2021 21:34

To: Jason Jones <jjones@sgiconsulting.co.uk>
Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: Pre Development Enquiry for : Port Cheshire, North Road Industrial Estate, Ellesmere Port , CH65 1AB – UU Ref 4200036841

Dear Sirs,

Pre Development Enquiry for: Port Cheshire, North Road Industrial Estate, Ellesmere Port , CH65 1AB – UU Ref 4200036841

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

https://www.unitedutilities.com/builders-developers/working-near-our-assets/

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 975mm diameter public combined sewer within North Rd located to the south east of your proposed development at an unrestricted rate.

I can confirm that the waste water pumping station you refer to in your enquiry does belong to United Utilities.

I have noted that you were looking to drain foul directly into the wastewater pumping station but we have no upstream network to connect your outfall to and it would be near impossible to make a new direct connection into the wet well of the station without a rebuild. I have asked our network team to investigate this further but to date I have not had a response.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.
This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The North West SuDS Pro-Forma provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:
https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

https://www.gov.uk/government/publications/groundwater-protection-position-statements

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the open ordinary watercourse located to the west of the site.

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the pubic sewerage network under any circumstances

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:
https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

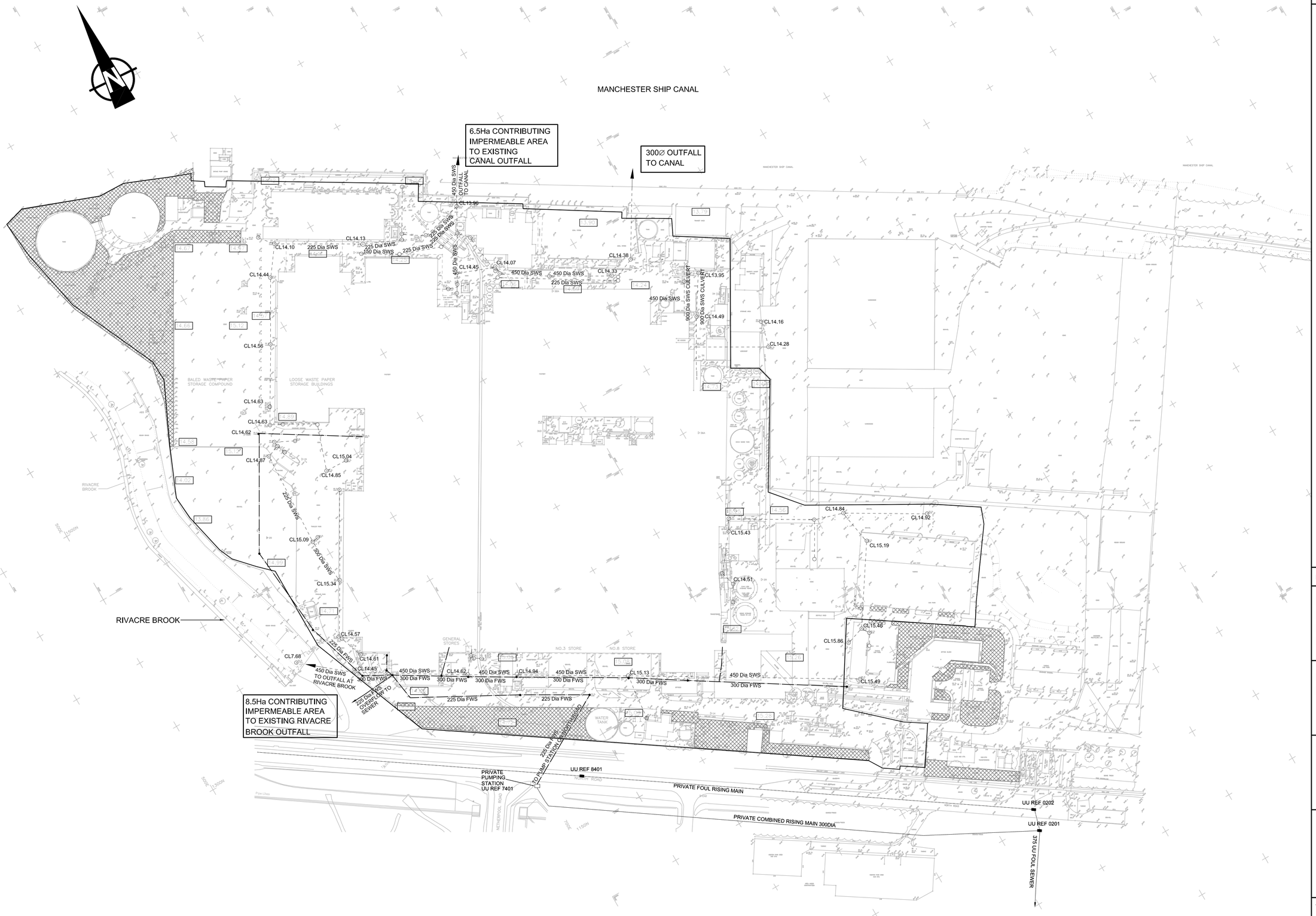
If you have received a great service today why not tell us?
Visit: unitedutilities.com/wow

Shepherd Gilmour
Consulting Engineers

APPENDIX D1

Colchester House, 40 Peter Street, Manchester M2 5GP
(44)0161 837 1500
www.shepherd-gilmour.co.uk

IF IN DOUBT – ASK



DRAWING FILE LOCATION:-

Notes

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE CONSTRUCTION (DESIGN and MANAGEMENT) REGULATIONS 2007.

KEY:

- MAIN SURFACE WATER
- MAIN FOUL WATER
- EXISTING LEVEL (14.45)
- PERMEABLE AREAS
- BOUNDARY

AREAS:

TOTAL DEVELOPMENT AREA = 16.1Ha
PERMEABLE AREA = 1.1Ha
IMPERMEABLE AREA = 15Ha

AREAS AS ASSESSED AS DRAINING TO:
MANCHESTER SHIP CANAL = 6.5Ha
RIVACRE BROOK = 8.5Ha

Rev	REVISION	By	Date
A	SITE BOUNDARY AMENDED	MG	03/12/12

PEEL PORTS GROUP LIMITED
MARITIME CENTRE
PORT OF LIVERPOOL
L21 1LA

PORT BRIDGEWATER
ELLESMERE PORT

PRE–DEMOLITION
DRAINAGE LAYOUT

LEES ROXBURGH Consulting Engineers
THE GENESIS CENTRE, SCIENCE PARK SOUTH,
BIRCHWOOD, WARRINGTON, CHESHIRE, WA3 7BH.
Tel: 01925 812898 Fax: 01925 838864

Job No.	Drawing No.	Revision.
5418	01–01	A

Scale 1:1250 @ A1 Date 10-2012

Drawn By	Designed By	Checked By
DTH	DTH	JEL

Shepherd Gilmour
Consulting Engineers

APPENDIX E1

Colchester House, 40 Peter Street, Manchester M2 5GP
(44)0161 837 1500
www.shepherd-gilmour.co.uk

Drainage notes

1. This drainage drawing is to be read in conjunction with all relevant Architect's, Engineer's drawings and specifications.
2. Do not scale this drawing. Any ambiguities, omissions and errors on the drawings shall be brought to the Engineer's attention immediately. All dimensions must be checked and verified on-site before construction commences.
3. All external underground drainage works are to be constructed in accordance with the Civil Engineering Specification for the Water Industry 7th Edition (CESWI), Sewers for Adoption 7th Edition (SFA) and any site-specific details provided on the contract drawings.
4. All internal underground drainage works are to be constructed in accordance with the Building Regulations Approved Document H (2015 Edition) and any site-specific details provided on the contract drawings.
5. The contractor must survey any retained drainage on-site and report the line, level and condition of the existing drainage to the engineer. We would recommend that the existing drainage is cleansed before any surveying and that these works are undertaken before the contractor commences on-site.
6. Any redundant manholes are to be broken out to at least 600mm below formation level and backfilled with an approved compacted granular material.
7. Any redundant pipes up to and including 300mm diameter are to be filled with a 10:1 PFA/cement mix or broken out and backfilled with an approved compacted granular material. Any redundant pipes over 300mm diameter are to be broken out and backfilled with an approved compacted granular material.
8. Adoptable Drainage Pipes:- All foul and surface water pipes up to and including 300mm diameter are to be Vitrified Clay in accordance with BS EN 295-1. All pipes greater than 300mm diameter to be Concrete Class 120 in accordance with BS EN 1916:2002.
9. Private Drainage Pipes:- All foul and surface water pipes up to and including 100mm diameter are to be Vitrified Clay in accordance with BS EN 295-1 or Solid Walled PVC-U in accordance with BS EN 1401. All foul and surface water pipes greater than 100mm diameter are to be Vitrified Clay in accordance with BS EN 295-1, Concrete Class 120 in accordance with BS EN 1916:2002 or Structural Walled PVC-U in accordance with WIS 4-35-01 and BS EN 13476.
10. All concrete manholes are to be in accordance with BS EN 1917. All plastic inspection chambers are to be in accordance with BS EN 13598.
11. All pipes laid within vehicle trafficked areas with less than 900mm of cover shall be surrounded in Class Z bedding. All pipes less than 300mm below the underside of a ground floor slab shall be surrounded in Class Z bedding. Where Class Z bedding is used as a surround a compressible material must be placed at every pipe joint to provide flexibility. All other pipes are to be laid in a Class S bedding.
12. All underground drainage must be protected during the construction phase where intermediate cover is less than 900mm.
13. Where foul and surface drains and/or sewers cross within 100mm of each other then concrete protection (Class Z bedding) may be required to prevent any potential cross-contamination.
14. All cover levels shown are approximate only. All manhole covers are to be set at the proposed finished pavement or floor level provided by the Architect.
15. All foul and surface water connections to be 100mm diameter unless stated. All external gully connections and channel drain sump/gully connections to be 150mm diameter unless otherwise stated. All gully and channel drain outlets to be trapped and roddable. All internal gullies and channel drains to be specified by others.
16. Channel drains to have a 200mm minimum concrete bed and haunch and be fitted with a heal guard cast iron grating. Gratings to be to load Class D400 specification unless otherwise agreed.
17. All foul water stacks and RWP's to have low level rodding access plates unless an alternative means of access or maintenance is agreed. The access plate size must be in accordance with Document H and sited above any connected ground floor appliance spill level.
18. All drainage connections passing through foundation bases and/or edge beams to be located within sealed sleeves. With the approval of the Engineer, drainage connections may be cast-in with flexible joints either side. Flexible joints to be no greater than 150mm from face of the concrete.
19. All manhole covers located within the road and car parking areas shall be Class D400. Covers within hard and soft landscaped areas with pedestrian traffic only shall be Class B125. Covers located within block/slab paving areas are to be recessed to suit the proposed paving and of the appropriate grade. All internal covers are to be recessed, double sealed bolt down type such as howe green 5000 series or similar approved.
20. Channels within Type 1 & 2 manholes must use pre-formed using clayware sections for pipes up to and including 300mm diameter. All manhole channels to be set at the appropriate level for the incoming and outgoing pipe gradients.
21. All manholes connections to be formed at soffit to soffit unless otherwise stated. All internal branch connections to be made with swept bends in the direction of flow in the main pipe.
22. All internal drainage connections are to provided to the penetration positions shown on and coordinated by the Architect

Filename : K:\projects\JOB-Nos C1400-1499\C1442 Project Peregrine\000 CIVILS\C1442-102_P3 Preliminary Drainage.dwg
Plot Date/Time : 25/2/2021 3:34 PM

ALL DRAINAGE SHOWN INDICATIVELY AND IS SUBJECT TO CHANGE IN DETAILED DESIGN.

Foul Flow Calculation
As per SFA7 B5.1 2(a)

FOUL NETWORK 1
Total Developable Area = 18.07Ha
18.07 x 0.6 = 10.84l/s

Rev.	Description	Rev. by	Date
P3	Drainage revised to suit new layout	WC	09.03.21
P2	Drainage revised to suit new layout	WC	25.02.21
P1	Preliminary Issue	WC	15.02.21

Shepherd Gilmour
Consulting Engineers
Colchester House, 40 Peter Street
Manchester, M2 5GP
t: 0161 837 1500
w: www.shepherd-gilmour.co.uk

Client
FIRETHORN DEVELOPMENTS LTD.

Architect
AEW ARCHITECTS

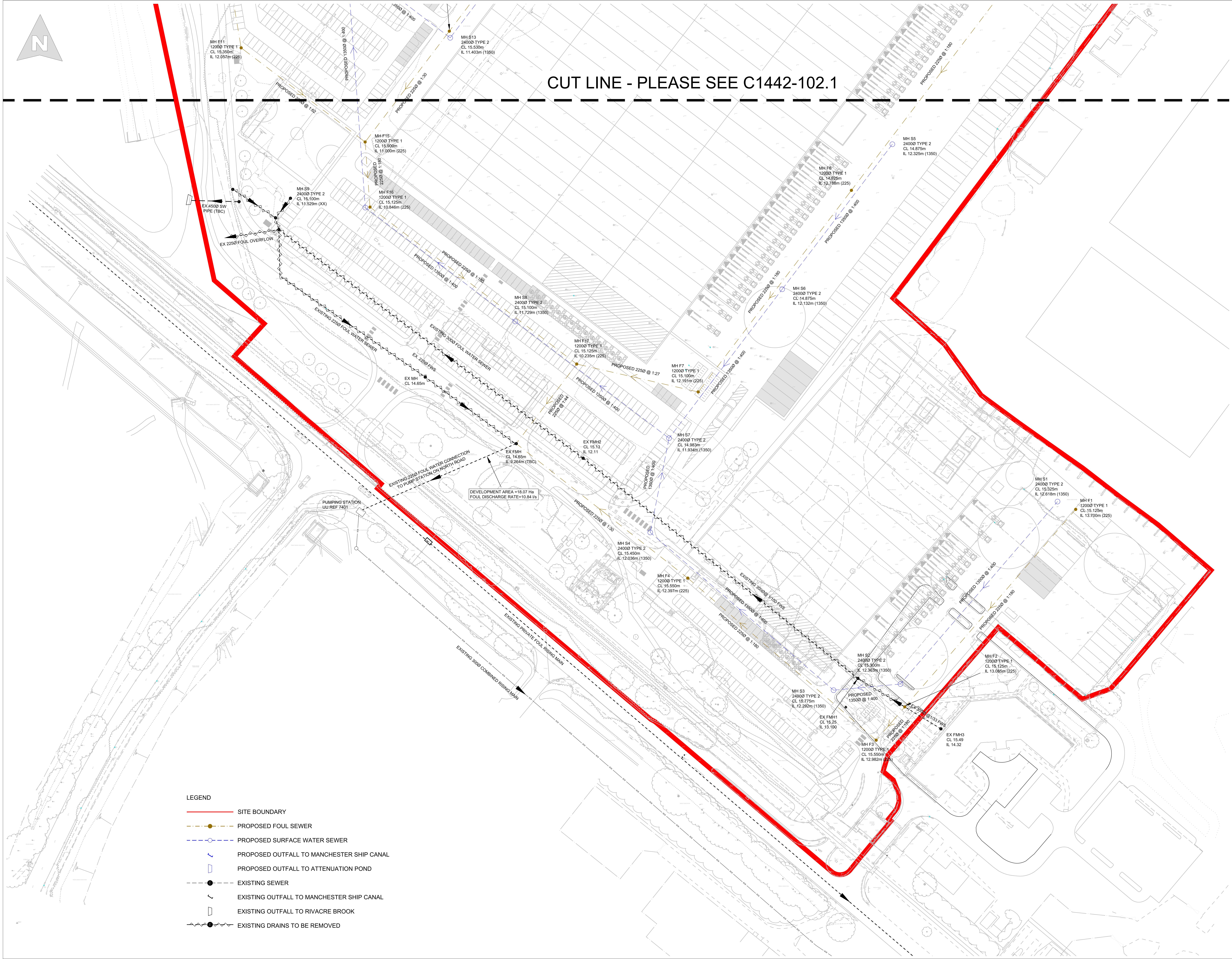
Project
LINK LOGISTICS PARK

Title
PRELIMINARY DRAINAGE
SHEET 1 OF 2

Date	09.11.2020	Drawn By	WC
Size	A0	Checked By	EAJ
Scale	1:500	Approved By	EAJ

Dwg. No. C1442-102.1

Rev P3



CUT LINE - PLEASE SEE C1442-102.1
MH F11 1200Ø TYPE 1 CL 15.350m IL 12.057m (225)
MH S13 2400Ø TYPE 2 CL 15.530m IL 11.403m (1350)
MH F15 1200Ø TYPE 1 CL 15.900m IL 11.000m (225)
MH F16 1200Ø TYPE 1 CL 15.125m IL 10.846m (225)
MH S9 2400Ø TYPE 2 CL 15.100m IL 11.529m (XX)
EX 450Ø SW PIPE (TBC)
EX 225Ø FOUL OVERFLOW
MH S5 2400Ø TYPE 2 CL 14.875m IL 12.325m (1350)
MH F6 1200Ø TYPE 1 CL 14.925m IL 12.788m (225)
MH S6 2400Ø TYPE 2 CL 14.875m IL 12.132m (1350)
MH S8 2400Ø TYPE 2 CL 15.100m IL 11.729m (1350)
MH F17 1200Ø TYPE 1 CL 15.125m IL 10.235m (225)
MH F7 1200Ø TYPE 1 CL 15.100m IL 12.191m (225)
EXISTING 225Ø FOUL WATER SEWER
EXISTING 300Ø FOUL WATER SEWER
EX 225Ø FWS
EX MH CL 14.65m
MH S7 2400Ø TYPE 2 CL 14.983m IL 11.934m (1350)
EX FMH2 CL 15.13 IL 12.11
EX FMH CL 14.65m IL 9.264m (TBC)
EXISTING 225Ø FOUL WATER CONNECTION TO PUMP STATION ON NORTH ROAD
DEVELOPMENT AREA =18.07 Ha
FOUL DISCHARGE RATE=10.84 l/s
PUMPING STATION UU REF 7401
MH S4 2400Ø TYPE 2 CL 15.450m IL 12.036m (1350)
MH F4 1200Ø TYPE 1 CL 15.550m IL 12.397m (225)
EXISTING 300Ø 1/160 FWS
EXISTING PRIVATE FOUL RISING MAIN
EXISTING 300Ø COMBINED RISING MAIN
MH S1 2400Ø TYPE 2 CL 15.325m IL 12.618m (1350)
MH F1 1200Ø TYPE 1 CL 15.125m IL 13.700m (225)
MH S2 2400Ø TYPE 2 CL 15.300m IL 12.363m (1350)
MH F2 1200Ø TYPE 1 CL 15.125m IL 13.085m (225)
MH S3 2400Ø TYPE 2 CL 15.775m IL 12.292m (1350)
EX FMH1 CL 15.25 IL 13.190
EX FMH3 CL 15.49 IL 14.32
MH F3 1200Ø TYPE 1 CL 15.550m IL 12.982m (225)
LEGEND
SITE BOUNDARY
PROPOSED FOUL SEWER
PROPOSED SURFACE WATER SEWER
PROPOSED OUTFALL TO MANCHESTER SHIP CANAL
PROPOSED OUTFALL TO ATTENUATION POND
EXISTING SEWER
EXISTING OUTFALL TO MANCHESTER SHIP CANAL
EXISTING OUTFALL TO RIVACRE BROOK
EXISTING DRAINS TO BE REMOVED

Drainage notes

1. This drainage drawing is to be read in conjunction with all relevant Architect's, Engineer's drawings and specifications.
2. Do not scale this drawing. Any ambiguities, omissions and errors on the drawings shall be brought to the Engineer's attention immediately. All dimensions must be checked and verified on-site before construction commences.
3. All external underground drainage works are to be constructed in accordance with the Civil Engineering Specification for the Water Industry 7^{th} Edition (CESWI), Sewers for Adoption 7^{th} Edition (SFA) and any site-specific details provided on the contract drawings.
4. All internal underground drainage works are to be constructed in accordance with the Building Regulations Approved Document H (2015 Edition) and any site-specific details provided on the contract drawings.
5. The contractor must survey any retained drainage on-site and report the line, level and condition of the existing drainage to the engineer. We would recommend that the existing drainage is cleansed before any surveying and that these works are undertaken before the contractor commences on-site.
6. Any redundant manholes are to be broken out to at least 600mm below formation level and backfilled with an approved compacted granular material.
7. Any redundant pipes up to and including 300mm diameter are to be filled with a 10:1 PFA/cement mix or broken out and backfilled with an approved compacted granular material. Any redundant pipes over 300mm diameter are to be broken out and backfilled with an approved compacted granular material.
8. Adoptable Drainage Pipes:- All foul and surface water pipes up to and including 300mm diameter are to be Vitrified Clay in accordance with BS EN 295-1. All pipes greater than 300mm diameter to be Concrete Class 120 in accordance with BS EN 1916:2002.
9. Private Drainage Pipes:- All foul and surface water pipes up to and including 100mm diameter are to be Vitrified Clay in accordance with BS EN 295-1 or Solid Walled PVC-U in accordance with BS EN 1401. All foul and surface water pipes greater than 100mm diameter are to be Vitrified Clay in accordance with BS EN 295-1, Concrete Class 120 in accordance with BS EN 1916:2002 or Structural Walled PVC-U in accordance with WIS 4-35-01 and BS EN 13476.
10. All concrete manholes are to be in accordance with BS EN 1917. All plastic inspection chambers are to be in accordance with BS EN 13598.
11. All pipes laid within vehicle trafficked areas with less than 900mm of cover shall be surrounded in Class Z bedding. All pipes less than 300mm below the underside of a ground floor slab shall be surrounded in Class Z bedding. Where Class Z bedding is used as a surround a compressible material must be placed at every pipe joint to provide flexibility. All other pipes are to be laid in a Class S bedding.
12. All underground drainage must be protected during the construction phase where intermediate cover is less than 900mm.
13. Where foul and surface drains and/or sewers cross within 100mm of each other then concrete protection (Class Z bedding) may be required to prevent any potential cross-contamination.
14. All cover levels shown are approximate only. All manhole covers are to be set at the proposed finished pavement or floor level provided by the Architect.
15. All foul and surface water connections to be 100mm diameter unless stated. All external gully connections and channel drain sump/gully connections to be 150mm diameter unless otherwise stated. All gully and channel drain outlets to be trapped and roddable. All internal gullies and channel drains to be specified by others.
16. Channel drains to have a 200mm minimum concrete bed and haunch and be fitted with a heal guard cast iron grating. Gratings to be to load Class D400 specification unless otherwise agreed.
17. All foul water stacks and RWP's to have low level rodding access plates unless an alternative means of access or maintenance is agreed. The access plate size must be in accordance with Document H and sited above any connected ground floor appliance spill level.
18. All drainage connections passing through foundation bases and/or edge beams to be located within sealed sleeves. With the approval of the Engineer, drainage connections may be cast-in with flexible joints either side. Flexible joints to be no greater than 150mm from face of the concrete.
19. All manhole covers located within the road and car parking areas shall be Class D400. Covers within hard and soft landscaped areas with pedestrian traffic only shall be Class B125. Covers located within block/slab paving areas are to be recessed to suit the proposed paving and of the appropriate grade. All internal covers are to be recessed, double sealed bolt down type such as howe green 5000 series or similar approved.
20. Channels within Type 1 & 2 manholes must use pre-formed using clayware sections for pipes up to and including 300mm diameter. All manhole channels to be set at the appropriate level for the incoming and outgoing pipe gradients.
21. All manholes connections to be formed at soffit to soffit unless otherwise stated. All internal branch connections to be made with swept bends in the direction of flow in the main pipe.
22. All internal drainage connections are to provided to the penetration positions shown on and coordinated by the Architect

Filename : K:\projects\JOB-Nos C1400-1499\C1442 Project Peregrine\000 CIVILS\C1442-102_P3 Preliminary Drainage.dwg
Plot Date/Time : 25/2/2021 3:34 PM

ALL DRAINAGE SHOWN INDICATIVELY AND IS SUBJECT TO CHANGE IN DETAILED DESIGN.

Foul Flow Calculation
As per SFA7 B5.1 2(a)

FOUL NETWORK 1
Total Developable Area = 18.07Ha
18.07 x 0.6 = 10.84l/s

Rev.	Description	Rev. by	Date
P3	Drainage revised to suit new layout	WC	09.03.21
P2	Drainage revised to suit new layout	WC	25.02.21
P1	Preliminary Issue	WC	15.02.21

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Client
FIRETHORN DEVELOPMENTS LTD.

Architect
AEW ARCHITECTS

Project
LINK LOGISTICS PARK

Title
PRELIMINARY DRAINAGE SHEET 2 OF 2

Date	09.11.2020	Drawn By	WC
Size	A0	Checked By	EAJ
Scale	1:500	Approved By	EAJ

Dwg. No. **C1442-102.2** Rev **P3**

Shepherd Gilmour
Consulting Engineers

APPENDIX F1

Colchester House, 40 Peter Street, Manchester M2 5GP
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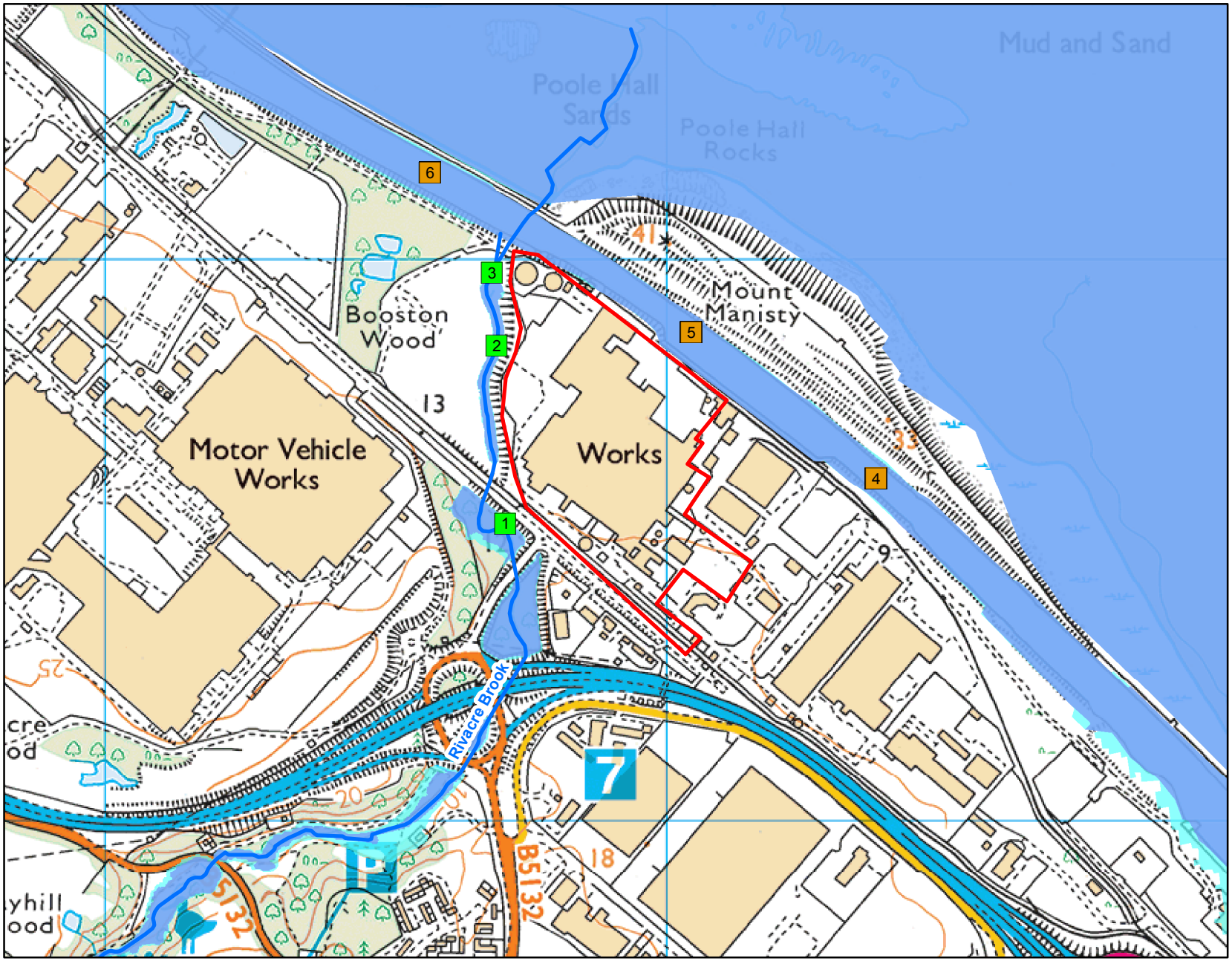
Detailed Flood Map centred on North Road, Ellesmere Port, CH65 1AB. Created on 05/01/2021 [GMMC199223AB]



Environment Agency

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Legend

- Site Location
- Rivacre Brook
- Manchester Ship Canal
- Main River
- Flood Zone 3
- Flood Zone 2

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

					Undefended (Fluvial)														Undefended (Tidal)		
Map Reference	Model Node Reference	Easting	Northing	Data	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.5 % AEP (1 in 200 year)	0.5 % AEP (1 in 200 year) + 30% increase in flow	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow	0.5 % AEP (1 in 200 year)	0.5 % AEP (1 in 200 year) + 30% increase in flow	0.1 % AEP (1 in 1000 year)
1	ea013_0246_RACR01_0462	338711	378522	Modelled Water Level (m aodN)	5.55	5.78	5.98	6.17	6.22	6.45	6.56	6.63	7.19	7.22	7.40	6.66	7.23	7.46	7.67	7.10	7.80	7.30
				Modelled Flow (cumecs)	5.02	6.91	8.35	9.61	10.01	11.58	12.38	12.85	13.73	14.02	15.91	14.45	15.25	18.05	18.62	7.70	11.04	8.51
2	ea013_0246_RACR01_0145H	338693	378853	Modelled Water Level (m aodN)	5.31	5.40	5.47	5.54	5.56	5.64	5.68	5.70	6.83	6.83	6.86	5.78	6.85	5.96	6.90	7.05	7.75	
				Modelled Flow (cumecs)	5.10	6.92	8.41	9.70	10.11	11.69	12.48	12.94	15.26	15.50	17.18	14.49	16.59	11.75	19.40	10.64	14.62	11.25
3	ea013_0246_RACR01_0000	338687	378982	Modelled Water Level (m aodN)	5.21	5.23	5.24	5.25	5.25	5.27	5.28	5.28	6.81	6.81	6.83	5.30	6.82	5.35	6.85	6.84	6.84	6.84
				Modelled Flow (cumecs)	5.29	7.10	8.58	9.88	10.27	11.84	12.62	13.07	16.08	16.32	17.97	11.62	16.38	18.04	20.22	12.95	12.95	12.95

Model data taken from Rivacre Brook 2017 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

					Model run is representative of a single gate failure on every set of sluice structures. Maximum gate opening height is set to 2.4m.									Model run is representative of present conditions and all gates are operational as per the agreed automated protocol. Maximum gate opening height is set to 2.4m. This run is the same as used in the flood map products.								
Map Reference	Model Node Reference	Easting	Northing	Data	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + Climate Change*	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + Climate Change*	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
4	ea013_Model_MSCC01_417	339375	378609	Modelled Water Level (m aodN)	4.62	4.62	4.62	4.62	4.62	4.62	4.86	4.65	6.79	4.62	4.62	4.62	4.62	4.62	4.62	4.86	4.64	6.79
				Modelled Flow (cumecs)	75.89	72.17	72.87	68.29	66.46	167.98	172.20	160.26	266.32	79.58	73.29	68.32	67.64	66.32	170.70	177.03	163.97	266.39
5	ea013_Model_MSCC01_421	339045	378869	Modelled Water Level (m aodN)	4.63	4.63	4.63	4.63	4.63	4.63	4.86	4.65	6.79	4.63	4.63	4.63	4.63	4.63	4.63	4.87	4.64	6.79
				Modelled Flow (cumecs)	72.34	68.74	69.33	64.65	62.97	162.59	166.81	155.81	265.61	75.80	69.72	64.90	64.02	62.83	165.53	171.87	159.44	265.69
6	ea013_Model_MSCC01_424	338580	379154	Modelled Water Level (m aodN)	4.61	4.61	4.61	4.61	4.61	4.61	4.86	4.65	6.79	4.61	4.61	4.61	4.61	4.61	4.61	4.87	4.64	6.79
				Modelled Flow (cumecs)	64.25	60.53	61.95	57.79	56.92	156.28	159.57	148.68	266.38	66.76	61.58	58.65	57.28	56.79	158.57	163.94	151.65	266.47

Model data taken from Manchester Ship Canal 2010 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - We only hold climate change measurements based on the previous climate change guidance (20% increase in flow). The new climate change guidance is available at https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

For the Manchester Ship Canal Models, we provide the following two scenarios:

1. Model run is representative of present conditions and all gates are operational as per the agreed automated protocol. Maximum gate opening height is set to 2.4m. This run is the same as used in the flood map products.

2. Model run is representative of a single gate failure on every set of sluice structures. Maximum gate opening height is set to 2.4m.