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PORT OF MOSTYN

MOSTYN GBS CONSTRUCTION SITE

FLOOD CONSEQUENCE ASSESSMENT

JULY 2023

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JULY 2023

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DRAWINGS

1 INTRODUCTION

1.1 General

1.1.1 Wardell Armstrong LLP has been commissioned to undertake a Flood Consequence Assessment (FCA) on behalf of The Port of Mostyn Limited, relating to the proposed development at the Port of Mostyn, Holywell.

1.1.2 This assessment has been carried out in accordance with the guidance set out in the Welsh Government Technical Advice Note 15 'Development and Flood Risk' (TAN15).

1.2 Methodology

1.2.1 The methodology for this FCA has comprised a desktop study supplemented by liaison with the Lead Local Flood Authority (Gwynedd Council) and Natural Resources Wales (NRW).

1.2.2 In accordance with TAN15, the following has been carried out in preparing this assessment:

- an assessment of the consequences of flooding from the proposed development site.
- consideration of recommendations for the management of the identified consequences.

1.2.3 In carrying out this assessment, reference has been made to relevant plans and documents, including:

- Planning Policy Wales (1998) Technical Advice Note 14: Coastal Planning.
- Planning Policy Wales (2021) Technical Advice Note 15: Development and Flood Risk.
- Flintshire County Council (2011) Preliminary Flood Risk Assessment Report.
- Flintshire County Council (2013) Flintshire Local Flood Risk Management Strategy.
- Natural Resources Wales flood mapping.

Planning Policy Wales – Technical Advice Note (TAN 15)

1.2.4 The Welsh Assembly government gives guidance to planning authorities in Wales on how to respond on flood risk grounds to development proposals. In July 2004, the Technical Advice Note 15 (TAN 15) 'Development of Flood Risk' was published and expects planning authorities to apply a risk-based approach to development planning and control through a Sequential Test involving location justification, type of development and flooding consequences.

1.2.5 In December 2021, TAN15 was revised and renamed 'Development, Flooding and Coastal Erosion' which was scheduled to become fully operational in June 2023. At the time of writing the FRA, this revision had been put on hold. The NRW Screening and Scoping opinion requested that the revised guidance is to be used within this FRA. Where appropriate, both the 2004 and 2021 TAN15 reports have been referred to within the FCA.

1.2.6 In October 2017, the Welsh Government highlighted areas potentially at risk from flooding through the latest TAN15 Development Advice Maps (DAMS's). which show areas potentially at risk from flood events of a 0.1% annual probability for river, tidal and coastal areas (e.g., 1 in 1,00-year event). The Development Advice Maps divide the land area of Wales into three flood risk zones. These are denoted A, B and C, with zone C further divided into subzones C1 and C2.

Table 1: TAN15 Development Advice Map Flood Zones

Zone	Description	Use within the precautionary framework
A	Considered to be at little or no risk of fluvial or tidal/coastal flooding.	Used to indicate that Justification Test is not applicable and no need to consider flood risk further.
B	Areas known to have been flooded in the past evidenced by sedimentary deposits.	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
C	Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal).	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the Justification Test including assessment of consequences.
C1	Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	Used to indicate that development can take place subject to application of Justification Test, including acceptability of consequences.
C2	Areas of the floodplain without significant flood defence infrastructure.	Used to indicate that only less vulnerable development should be considered subject to application of Justification Test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

1.2.7 Section 5 of the 2004 TAN15 categorises development according to its vulnerability to flooding. There are three categories: emergency services; highly vulnerable development; and less vulnerable development. All residential premises and vulnerable industrial developments are categorised as *'highly vulnerable'*. Commercial, retail, and general industrial development are categorised as *'less vulnerable'*.

Planning Policy Wales – Technical Advice Note (TAN 14)

1.2.8 The Welsh Assembly Government published the Technical Advice Note 14 (TAN14) *'Coastal Planning'* in March 1998 which guides planning authorities in Wales on the considerations given for proposed developments within coastal zones.

The National Strategy for Flood and Coastal Erosion Risk Management in Wales 2010

1.2.9 This UK National Strategy for flood and coastal erosion risk management was adopted in Wales in 2010. This strategic document sets national policies on flood and coastal erosion risk management in Wales in order to reduce the consequences, raise awareness, and to provide an effective response system to flood and coastal erosion events.

Northwest England and North Wales Shoreline Management Plan 2 (SMP2)

1.2.10 The Shoreline Management Plan 2 (SMP2) is the second generation SMP following a review of the previous SMP in 2012. This sets out a strategic approach for the prevention and sustainable management of negative effects that coastal flooding and erosion pose along coastlines and estuaries, whilst maximising the beneficial effects of coastal protection, habitats, and beaches.

1.2.11 The aim of the SMP is to consider and reduce the risks to people, historic and natural environments, and socio-economic conditions.

Dee River Basin Management Plan 2021 – 2027 Summary (2022)

1.2.12 River Basin Management Plans (RBMPs) are required for each River Basin District under the WDF regulations. The Dee River Basin DBMP was undertaken jointly by NRW and the Environment Agency, and the 2012 report is the second of three planning cycles. The RBMP outlines the current condition of the River Basin District, plus the Programme of Measures for improving the water quality by 2027.

Dee River Basin District Flood Risk Management Plan (2016)

1.2.13 The River Dee extends from Snowdonia to the Dee Estuary, with the site area situated in the northern extent of the district. Every six years, Flood Risk Management Plans (FRMPs) are produced to identify the risk of flooding from rivers, the sea, groundwater, surface water and reservoirs within a river basin in order to confirm how flood and coastal risk can be managed, setting the measures for the next six years.

Flintshire County Council Preliminary Flood Risk Assessment (2011)

1.2.14 Flintshire County Council produced The Flintshire County Council Preliminary Flood Risk Assessment in 2011 to provide a high-level summary of past and future flood risks from a range of sources and to identify areas of significant flood risk *('Flood Risk Areas'*).

1.2.15 The report shows that the site is not located within a 1km grid square determined to be above the flood risk 'threshold' (based on the number of people, business or services flooded to depths of more than 0.3m during the 1 in 200-year storm event).

Updated Wave Overtopping and Assessment Manual and Calculation Tool

1.2.16 The report, produced as part of the Flood Risk and Coastal Erosion Risk Management and Research Programme contains guidance on predicting the rate that waves will overtop sea walls and other structures. The estimations are made using the online calculation tool (Bayonet GPE) and based on several inputs, including the design of the structure, depth of water and the height and frequency of the waves.

2 SITE AND CATCHMENT CHARACTERISTICS

2.1 Site Description and Location

2.1.1 A summary of the site and its characteristics is provided in Table 2.

Table 2: Site Summary	
Site Name	Port of Mostyn
Site Address	Dock Road, Mostyn, Holywell CH8 9HE
Site Area	c.27ha
National Grid Reference	SJ 15983 81594
Proposed Development	Construction of offshore wind turbine foundations
Local Planning Authority	Flintshire County Council
Lead Local Flood Authority	Flintshire County Council
Sewerage Undertaker	Welsh Water

2.1.2 The Port of Mostyn (site) is located on the Welsh side of the estuary of the River Dee, approximately 0.5km north to the village of Mostyn. The nearest postcode to the port is CH8 9HE and the approximate National Grid Reference to the centre of the site is SJ 15791 81212.

2.1.3 The site comprises warehouses, carparks, and large areas of hardstanding and loose surfacing. The site is bounded to the north and west by the intertidal Dee Estuary, to the south by a railway line and the A548, and to the east by industrial units and associated infrastructure.

2.1.4 Ground levels within the site are relatively flat, ranging between approximately 7mAOD and 8mAOD with no overall direction of fall. The topographical survey for central areas of the site is shown on Drawing No. PMS15065 (Sheet 01 – 08) *'Port of Mostyn Topographical Survey'.*

2.2 Existing Watercourses and Waterbodies

2.2.1 The site is located within the estuary of the River Dee. The closest Main Rivers to the site are a network of unnamed watercourses approximately 3km north-west of the site, situated to the north-west of the village of Ffynnongroyw. There is an unnamed watercourse that discharges into the Dee Estuary in Holywell, approximately 5km to the south-east of the site. Ordnance Survey mapping shows several unnamed watercourses flowing generally northwards within areas of higher ground to the south of the site. These are also assumed to discharge to the Dee Estuary.

2.3 Existing Drainage Regime

2.3.1 The site is served by private surface water drainage networks. Sections of the network discharge to soakaways, with the remainder discharging to the Dee Estuary via a single outfall point located in the west of the port. Unsurfaced areas within the site area drain naturally via evaporation and infiltration.

2.4 Ground Conditions

2.4.1 The online British Geological Survey (BGS) 'GeoIndex Onshore' mapping shows that the site is underlain by mudstone, siltstone, and sandstone bedrock of the Pennine Middle Coal Measures Formation. The online NRW 'Natural Environment' mapping shows that the bedrock is classified as a Secondary A aquifer, defined as *'permeable layers capable of supporting water supplies at a local rather than a strategic scale, and in some cases forming an important source of base flow to rivers'.*

2.4.2 Superficial tidal flat deposits, classified as an 'undifferentiated Secondary aquifer' which are defined as *'aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type'.*

2.4.3 BGS mapping also shows that Made Ground is present within the majority of site areas.

3 DEVELOPMENT PROPOSALS

3.1 Description of Proposals

3.1.1 The proposed development will repurpose the existing port site for the construction of wind turbine foundations. Existing buildings within the port area will be demolished to create a large area of open ground for the construction and storage of the foundation structures. Offices, workshops and welfare facilities will be constructed at the periphery in the south of the site.

3.1.2 The proposed development will also include a concrete batching plant, storage areas and areas of car parking. The proposed layout is shown on Drawing No. AG(00)12 'Mostyn Docks – Site Plan' and in Figure 1 below.

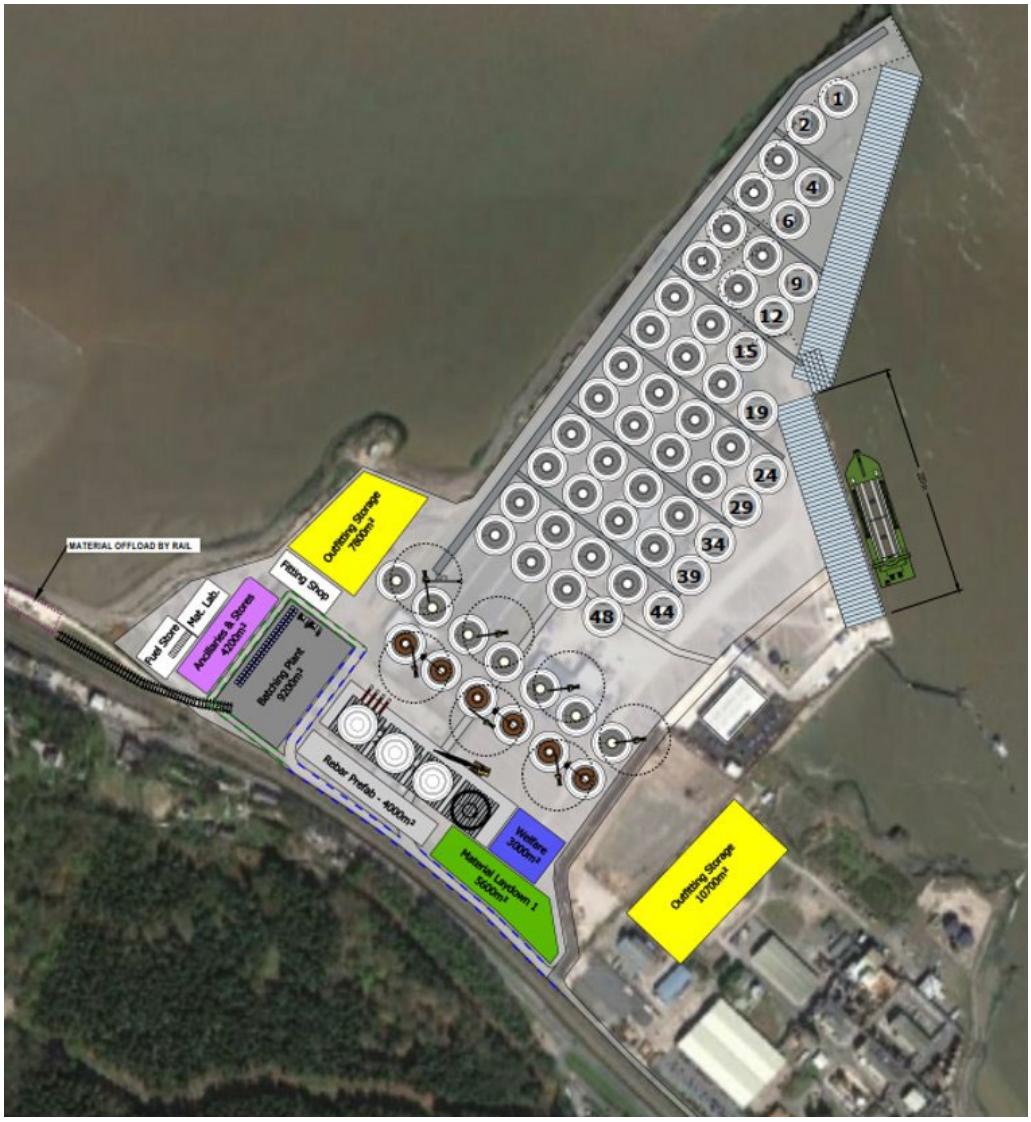


Figure 1. Proposed Port Development

3.1.3 As part of the wider development, 'marine works' will infill an area of open water in the estuary, to the north-east of the port area, in order to create a new area of hardstanding. A section of existing quay wall will be retained and upgraded, and a 360m length of new quay wall will be constructed to the east. The area in between the two sections of wall will be infilled with approximately 600,000m^3 of engineered fill. This will be finished with type 1 stone and will create approximately 4 hectares of new hardstanding.

3.1.4 There is the potential requirement for a 200m by 25m roll-on-roll off (RoRo) linkspan pontoon to be installed, with options to install this alongside the new quay wall, or alongside the existing quay. The proposed works are shown on Figure 2.

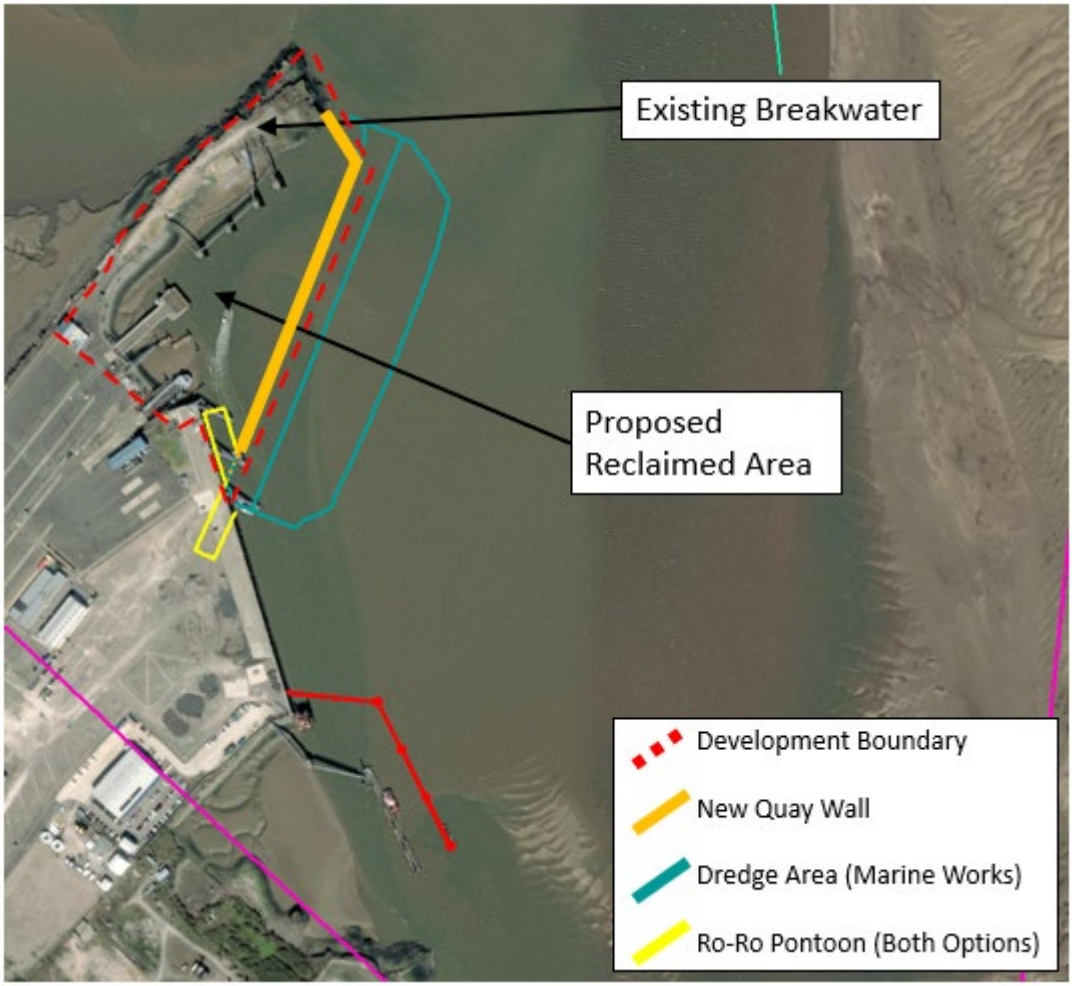


Figure 2. Proposed Infill Development

3.2 Development Advice Map

3.2.1 The 'Development Advice Map' for flood risk obtained from the Natural Resources Wales website is included as Figure 2 below.

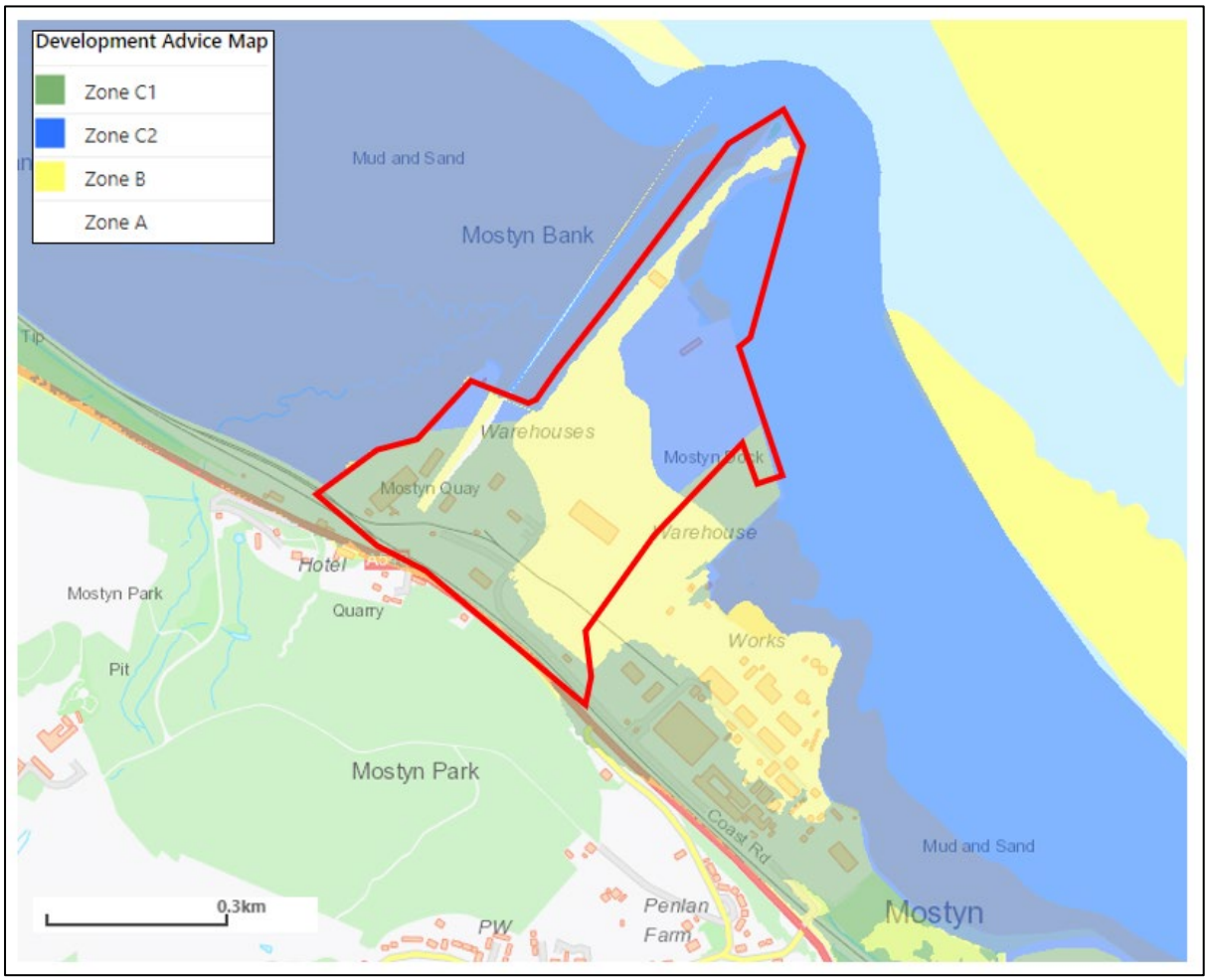


Figure 3. Natural Resources Wales Development Advice Map Extract

3.2.2 Mapping shows that central areas of the site are situated in Zone B, which are defined as *'areas known to have flooded in the past, evidenced by sedimentary deposits'*. A narrow section of land aligned north-eastwards and following the general footprint of the existing breakwater is also within Zone B.

3.2.3 South-western areas of the site are situated within Zone C1, defined as *'areas of the floodplain which are developed and served by significant infrastructure, including flood defences*'. North-eastern areas of the site are situated in Zone C2, defined as *'areas of the floodplain without significant flood defence infrastructure'*.

3.3 Flood Risk Vulnerability

3.3.1 Based on Sections 5 of the 2004 TAN15, the proposed development would comprise a '*general industrial, employment, commercial and retail development'*, which would be classified as a Less Vulnerable development.

3.3.2 A Less Vulnerable development would be considered appropriate within Zone C1 and C2 following the application of the Justification Test and that the Acceptability Criteria are met.

3.4 Justification Test

3.4.1 The Justification Test, outlined in Section 6 of the 2004 TAN15 aims to direct new developments away from Zone C and towards suitable land in Zone A (or otherwise to Zone B), where river and coastal flooding will be less of an issue. All other new developments should only be permitted within zones C1 and C2 if determined by the planning authority to be justified in that location if it can be demonstrated that:

I. Its location in Zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or

II. Its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region.

AND

III. It concurs with the aims of PPW and meets the definition of previously developed land;

IV. The potential consequences of a flooding event for the particular type of development have been considered and are found to be acceptable.

3.4.2 The proposed development will repurpose the existing port, allowing it to be used for the construction of wind turbine foundations. The proposed development will see the construction of large bases for offshore wind turbines and the proposed development would, therefore, need to be situated on the coastline to allow these structures to be transported off-shore.

3.4.3 The proposed development would also provide key employment opportunities within the area, with up to 1,000 people employed. This would, therefore, be in accordance with item II of the Justification Test.

3.4.4 The proposed site would meet the definition of previously developed land, as outlined in Planning Policy Wales (‘*land is that which is or was occupied by a permanent structure…. and associated fixed surface infrastructure’*). This would, therefore, be in accordance with item III of the Justification Test.

3.4.5 With the potential consequences of flooding events considered and addressed as part of this Flood Consequence Assessment, item IV of Justification Test will also be met, and the overall Justification Test is considered to be passed.

4 FLOOD CONSEQUENCE ASSESSMENT

4.1 Historical Flooding

4.1.1 According to the Natural Resources Wales '*Recorded Flood Extents*' mapping (see Figure 3), southern areas of the site were flooded in February 1990. It is understood that this occurred when existing flood defences were overtopped. Reports from staff present on site during the event suggest that only a small proportion of the site in the western corner was affected, and that the access road remained unaffected.

4.1.2 The Flintshire County Council PFRA records five historical flooding events which affected more than five properties in 2000. The closest flooding event was in the town of Bagilit, approximately 8.4km to the south-east of the site boundary. The 2018 PFRA addendum refers to a flooding incident from an ordinary watercourse that occurred in Bagilit in 2016 which led to '*significant harmful consequences*'. It is understood that these events did not affect the development site.

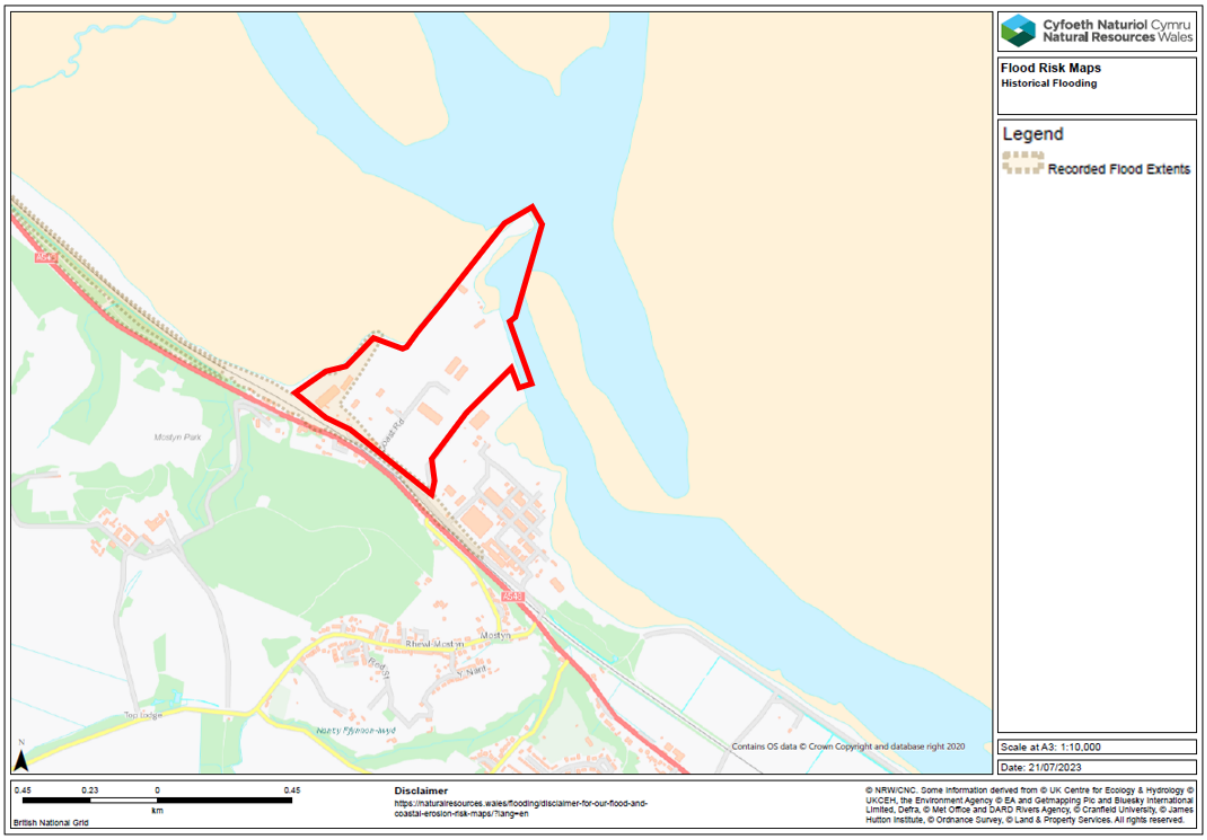


Figure 4. Historical Flood Risk

4.2 Consequences of Flooding to the Development

4.2.1 Flooding can occur from a range of sources including, but not limited to rivers, tidal waters and the sea, surface water runoff, groundwater, sewers and drains, and artificial sources such as canals and reservoirs. The presence of a potential flooding source does not, however, necessarily translate into a high risk of flooding. Following the source-pathway-receptor approach, flooding can only affect the site (receptor) if there is a pathway from the identified sources.

Fluvial Flooding

4.2.2 The Natural Resources Wales fluvial flood map assigns Low, Medium, and High risk to areas susceptible to fluvial flooding. These are defined as follows:

- Low – each year, these areas have a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%);
- Medium – each year, these areas have a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%);
- High – each year, these areas have a chance of flooding of greater than 1 in 30 (>3.3%).

4.2.3 All other areas will have an annual probability of flooding of less than 1 in 1000 (<0.1%) and are considered to be at a 'very low' risk. An extract from the NRW fluvial flood risk mapping is included as Figure 5 below.

4.2.4 The proposed development is wholly located outside of any area with an increased risk of fluvial flooding (shown in Figure 5). The closest area at risk of fluvial flooding is located approximately 1.9km to the west of the site. The section of the River Dee adjacent to the site is tidally-influenced and by its nature would not pose a risk of fluvial flooding to the proposed development.

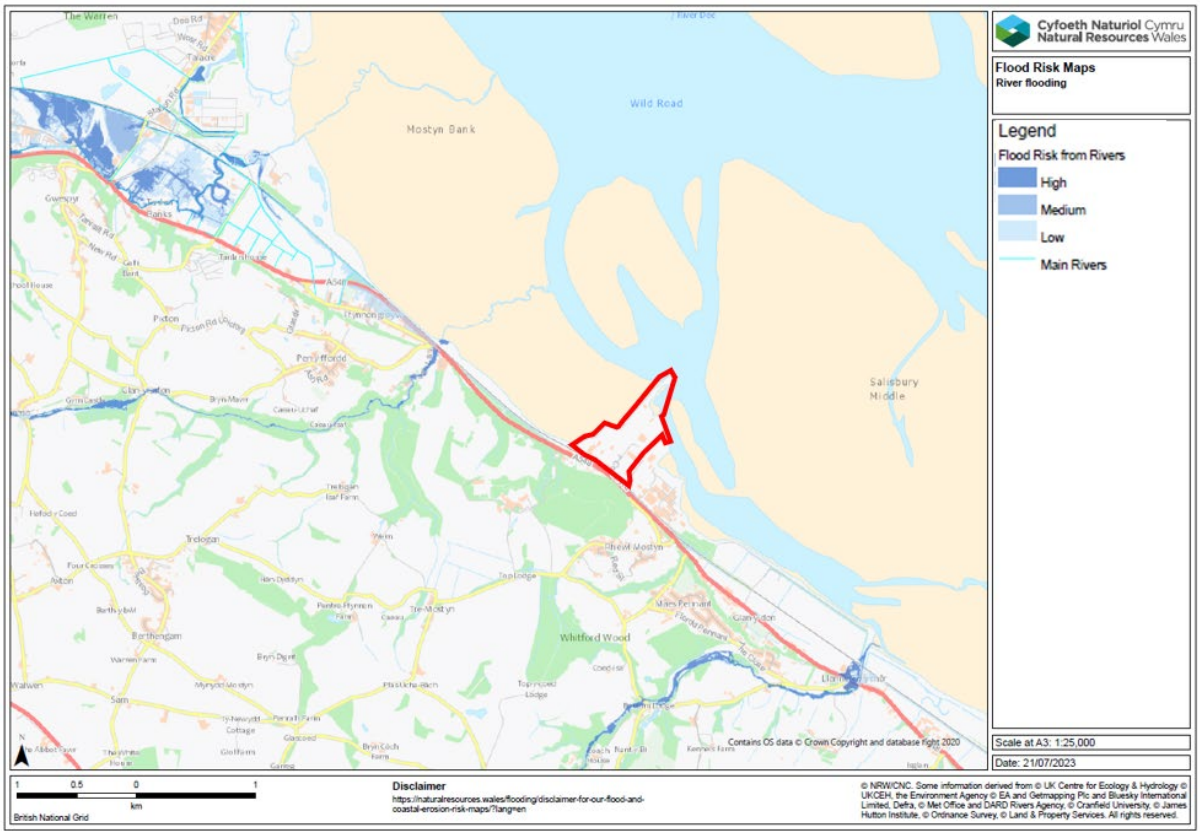


Figure 5. Fluvial Flood Risk

Tidal Flooding

4.2.5 The NRW flood risk map for tidal flooding assigns Low, Medium, and High risk to areas susceptible to tidal flooding. These are defined as follows:

- Low – each year, these areas have a chance of flooding of between 1 in 1000 (0.1%) and 1 in 200 (0.5%);
- Medium – each year, these areas have a chance of flooding of between 1 in 200 (0.5%) and 1 in 30 (3.3%);
- High – each year, these areas have a chance of flooding of greater than 1 in 30 (>3.3%).

4.2.6 All other areas are considered to be at a Very Low risk of tidal flooding. The NRW tidal risk map (included as Figure 6) shows areas around the existing breakwater would be at a high risk of tidal flooding. These generally correspond with the area of Zone C2 shown on the Development Advice Map (DAM) as shown in Figure 1.

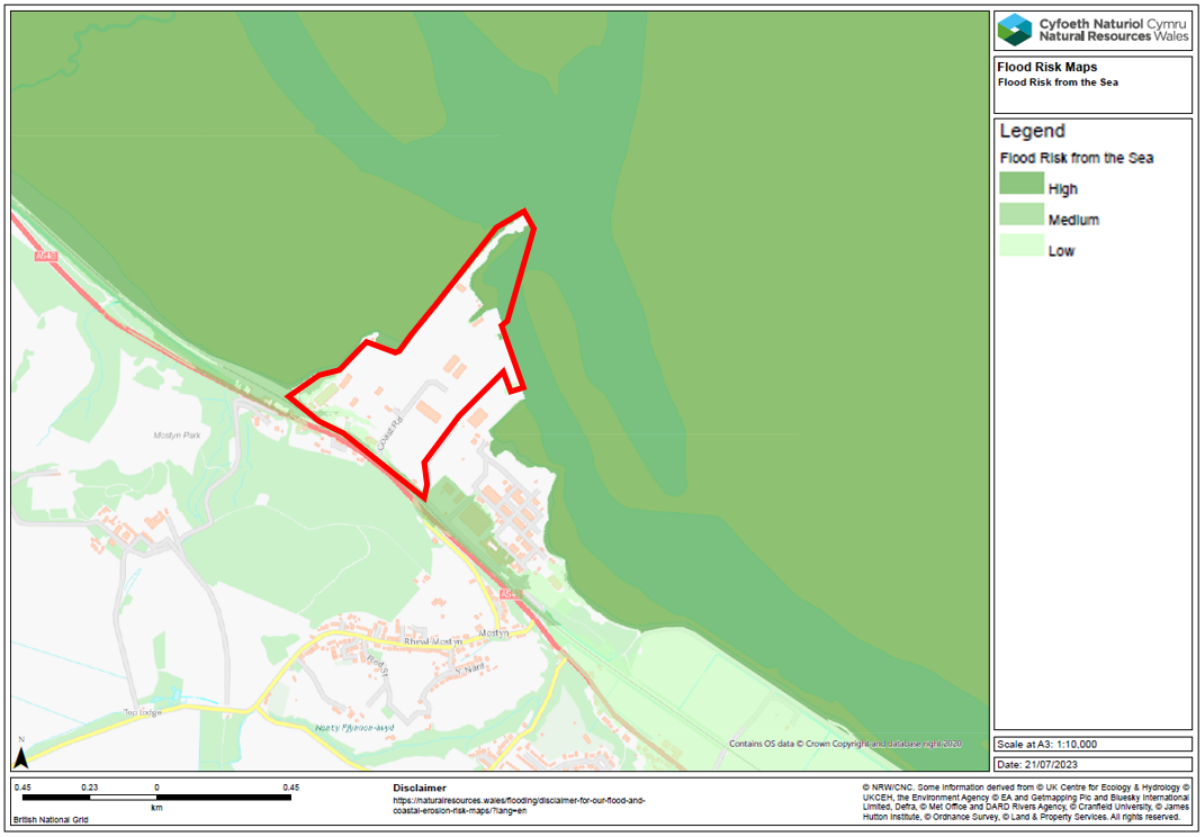


Figure 6. Tidal Flood Risk

4.2.7 Areas in the south-west of the site are shown to be at a Low to Medium risk. This corresponds with areas of Zone C1 on the DAM.

Surface Water Flooding

4.2.8 Surface water flooding occurs during periods of intense rainfall where surface water is unable to infiltrate the ground, overwhelming drainage systems, resulting in localised flooding.

4.2.9 The NRW mapping for the flood risk from surface water runoff and small (ordinary) watercourses assigns Low, Medium, and High risk to areas susceptible to flooding from these sources. All other areas can be considered to be at a very low risk. An extract from the NRW map for flooding from surface water and small watercourses is included as Figure 7 below.

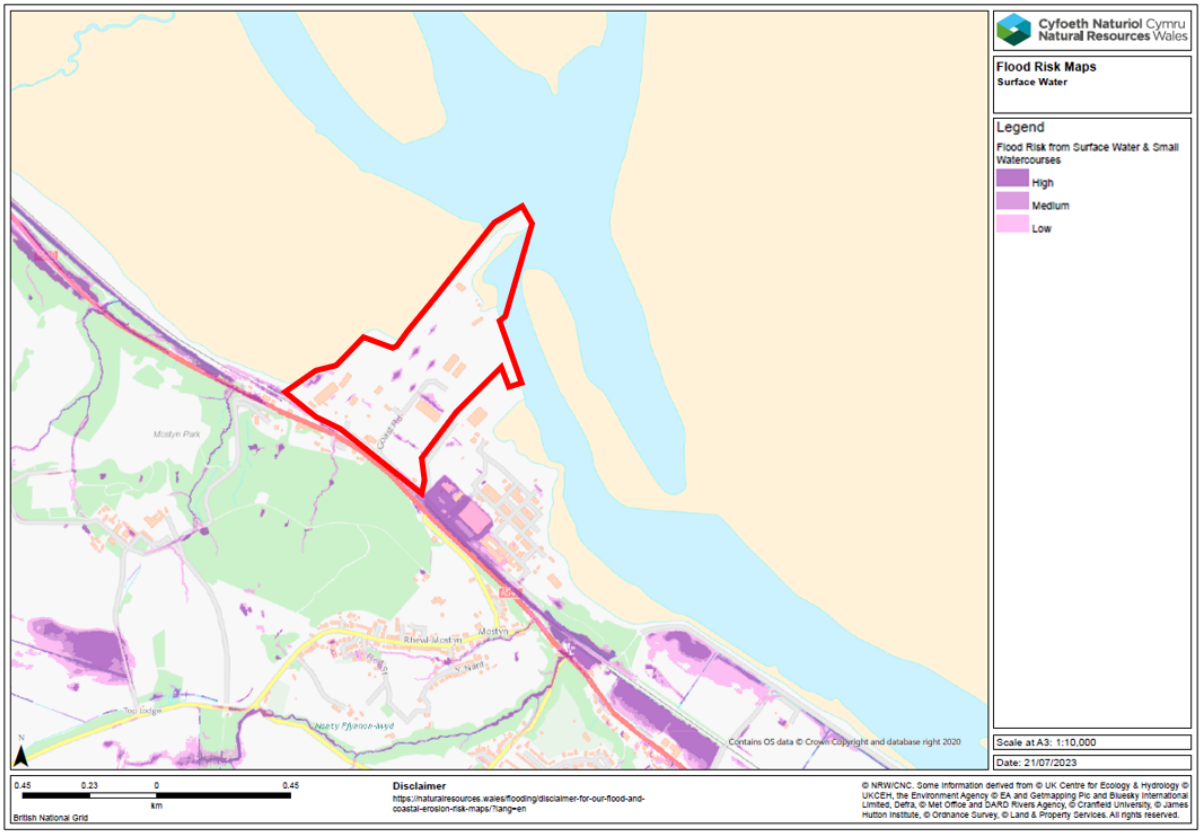


Figure 7. Surface Water Runoff (Overland Flow) and Small Watercourses Flooding Extent

4.2.10 As shown in Figure 7, the majority of the proposed development is at a very low risk of surface water flooding. There are small, isolated areas in central and southern areas of the site that are at High risk of flooding, and it is assumed that these are due to the topography of the site area, where surface water runoff could accumulate during extreme storm events. Larger areas adjacent to the southeast corner of the southern site area are also at a High risk.

4.2.11 Surface water 'Velocity' mapping from the NRW National Flood Hazard and Risk mapping (see Figure 8) shows that there would be no overland flow pathways into the site area. Runoff from the A548 and railway line adjacent to the southern boundary of the site would not extend into the site. Runoff generated in the vicinity of the industrial development to the south-east of the site would also not enter the site area.

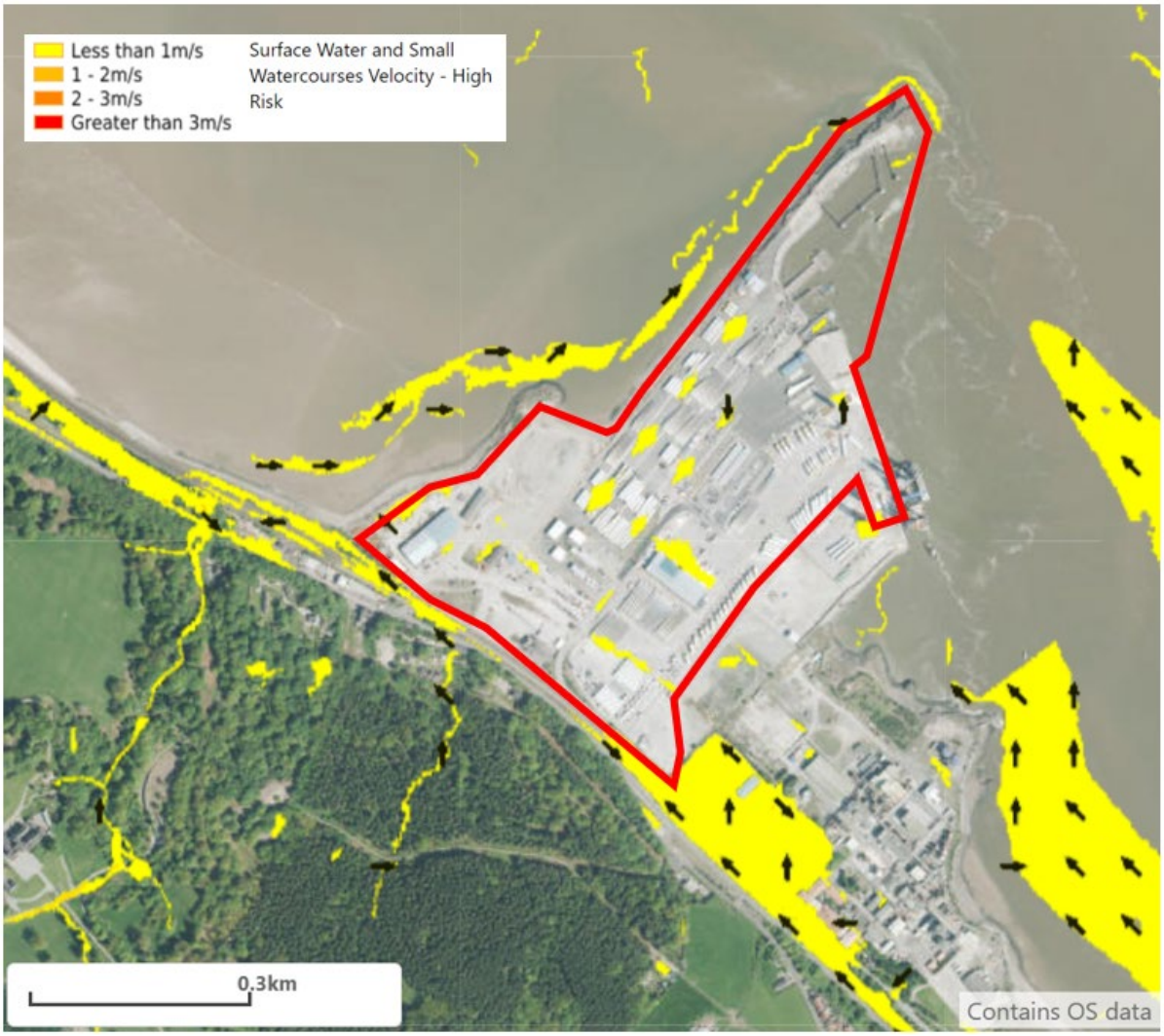


Figure 8. Surface Water Runoff Velocity

Groundwater Flooding

4.2.12 Groundwater flooding can occur anywhere where prolonged rainfall causes groundwater levels rise above ground level and can occur at the same time as flooding from other sources, such as overland flow Large areas of the existing site are constructed from engineered materials, and it is assumed that there is little natural bedrock within the Port area. It is assumed, therefore, that there will be no significant volumes of groundwater and the risk of flooding from this source is, therefore, discounted.

Sewer Flooding

4.2.13 Sewer flooding can occur during high intensity rainfall events of a relatively short duration that exceeds the drainage capacity of the sewer system. Public sewer records show that the proposed development area is served by a combination of soakaways and a surface water drainage network that discharges into the Dee Estuary and it is considered that the site is at low risk from sewer flooding.

Artificial Flooding

4.2.14 There are no canals, reservoirs, or impounded bodies of water within the sites vicinity and based on the available evidence, the risk of flooding from artificial sources is discounted.

4.3 Summary of Flood Consequences to the Site

4.3.1 Table 3 summarises the flood consequences to the proposed development. The risk is described in further detail in this section.

Table 3: Summary of Flood Consequences to the Site

Type	Source	Pathway	Risk
Fluvial Flooding (Rivers)	**N**	-	-
Tidal Flooding	**Y**	**Y**	**LOW**
Surface Water Runoff	**Y**	**N**	-
Groundwater Flooding	**N**	-	-
Sewer/Drain Flooding	**Y**	**N**	-
Artificial Flooding	**N**	-	-

4.3.2 The only potential source with a pathway to the site is, therefore, tidal flooding.

Tidal Flooding Risk

4.3.3 Coastal design sea level data was obtained from Natural Resources Wales for the Welsh coastline which includes data for coastal and estuary nodes. Data for the estuary nodes is summarised in Table 4 below, with the location of the node points shown on Figure 9. Data for the coastal nodes is summarised in Table 5 with the location of the node points shown on Figure 10.

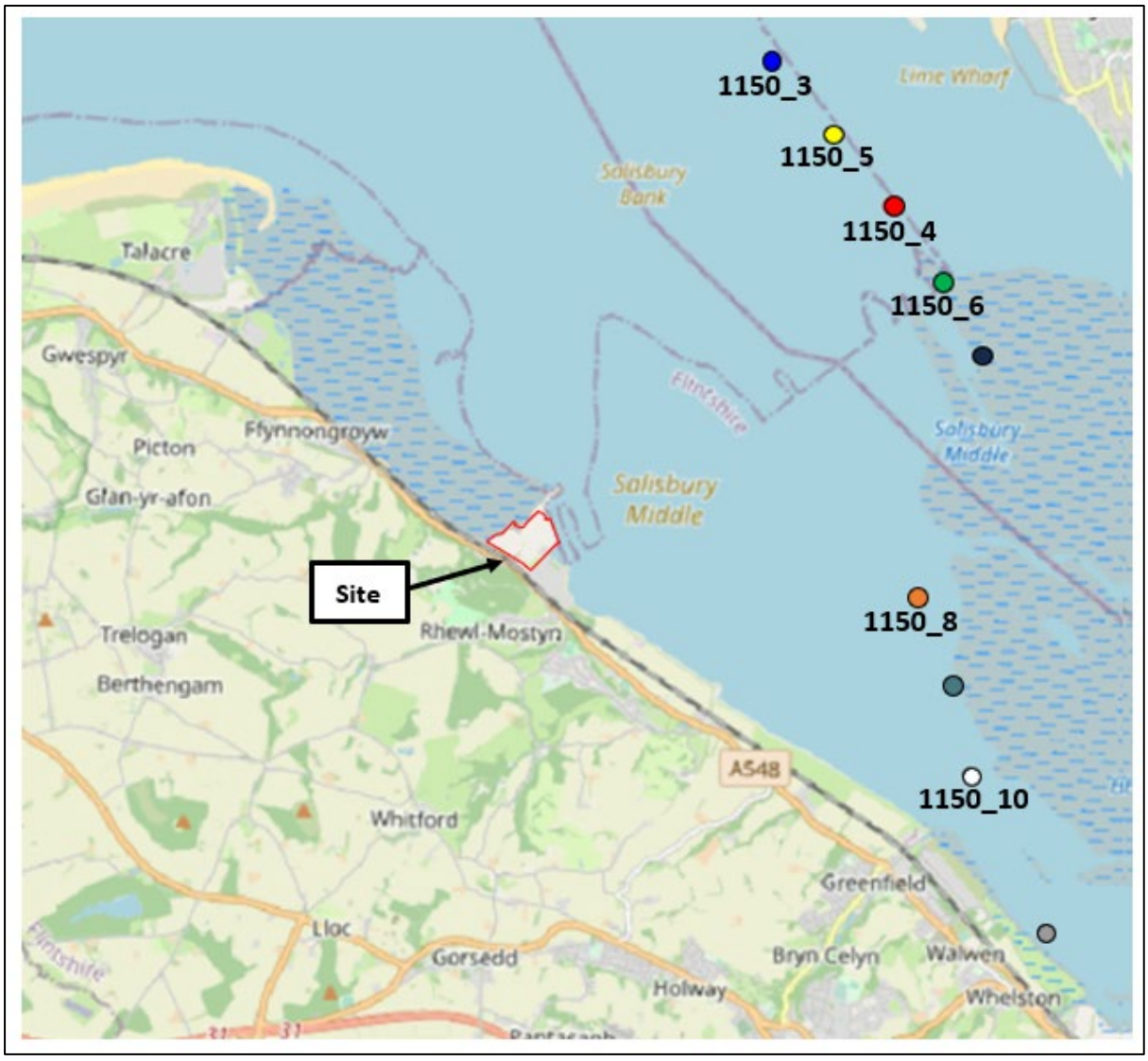


Figure 9. Estuary Node Locations

Table 4. Sea Levels – Estuary Nodes					
Node ID	Return Period				
	1:1 (mAOD)	1:25 (mAOD)	1:100 (mAOD)	1:200 (mAOD)	1:1000 (mAOD)
1150_3	5.26	5.7	5.88	5.98	6.22
1150_5	5.32	5.76	5.94	6.04	6.28
1150_4	5.31	5.78	5.97	6.07	6.31
1150_6	5.35	5.82	6.01	6.11	6.36
1150_8	5.41	5.92	6.13	6.24	6.49
1150_10	5.47	5.98	6.19	6.3	6.55

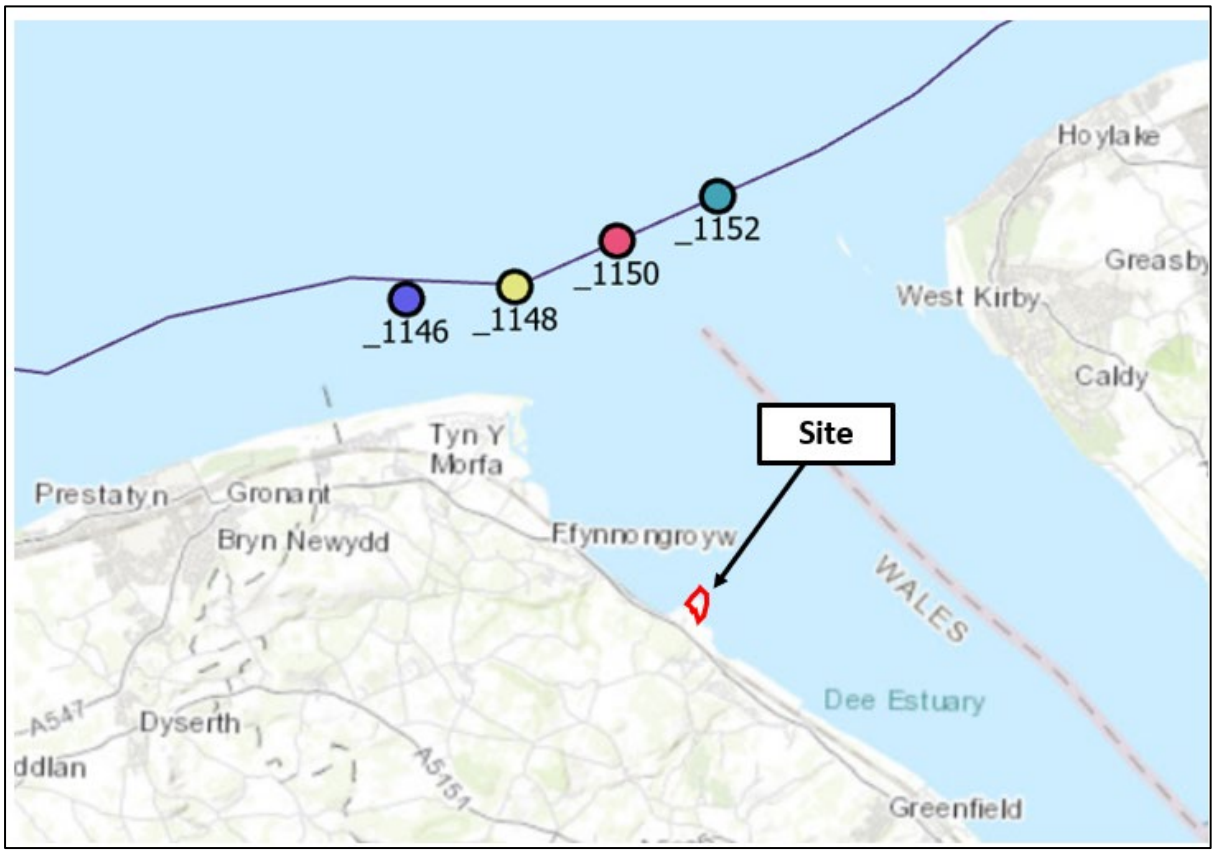


Figure 10. Extreme Sea Level Model Nodes

Table 5. Sea Levels – Coastal Nodes							
Node ID	HAT[1] (mAOD)	MHWS[2] (mAOD)	Return Period				
			1:1 (mAOD)	1:25 (mAOD)	1:100 (mAOD)	1:200 (mAOD)	1:1000 (mAOD)
1146	5.14	3.93	5.06	5.49	5.67	5.76	6.27
1148	5.19	3.96	5.10	5.54	5.72	5.81	6.32
1150	5.23	3.99	5.15	5.59	5.77	5.86	6.38
1152	5.26	4.03	5.19	5.64	5.82	5.91	6.44

1. HAT (Highest Annual Tide Level)
2. MHWS (Mean High Water Spring Tide Level)

4.3.4 Based on topographical survey data, ground levels along the western boundary of the site range between approximately 6.77mAOD in the south to approximately 8.28mAOD at the northern point of the breakwater. Ground levels along the harbour wall at the north-eastern boundary of the site range from 7.46mAOD to 7.66mAOD.

4.3.5 The ground levels at the site boundaries are, therefore, higher than the modelled tidal levels (Tables 4 and 5) for all return periods and there would be no pathways for tidal flooding to enter the site area.

4.3.6 This would confirm the Zone B classification on the Development Advice Map (see Figure 1) and also confirms that the site is located outside areas at risk of tidal flooding. Ground levels within the wider Port also exceed 7mAOD.

4.3.7 The elevation of the proposed extension will be approximately 7.5mAOD, therefore, there will be no pathway for tidal flooding to extend into any area of the proposed development.

4.3.8 The risk of tidal flooding to the proposed development will, therefore, be **LOW**.

4.4 Flooding Consequences from the Proposed Development

4.4.1 New developments can pose a risk of flooding to neighbouring properties and areas downstream, often as a result of an increased impermeable area or loss of floodplain storage. This can increase the rate and volume of surface water runoff, or alterations

to the surface water flow paths, ultimately displacing flood water and increasing the risk to surrounding areas.

Fluvial Flooding

4.4.2 The proposed development is not located within the catchment of a fluvial watercourse, with the adjacent section of the River Dee being tidally-influenced. There will, therefore, be no loss of flood plain storage or impact on fluvial flood flows.

Tidal Flooding

4.4.3 The new area of hardstanding could theoretically reduce floodplain storage for the River Dee. In tidal areas where the impact of any land raising is spread over a large area, such as the Dee Estuary, there would be no discernible change to tidal flood levels. The impact from the development would, therefore, be negligible and compensatory floodplain storage would not be required.

4.4.4 The proposed extension will be constructed at a similar elevation to the existing ground levels of the adjacent areas of the port and there will be no effect on tidal flow routes.

Surface Water Flooding

4.4.5 Open ground within the existing port area is made up of impermeable hardstanding and areas of porous aggregate and loose material. The proposed extension will be constructed of type 1 aggregate and will act as a semi permeable surface and the rate and volume of runoff generated during storm events will be minimal. Where existing porous surfaces within the port area are replaced with new areas of hardstanding or building roofs, however, the total impermeable area within the site will be increased. The rate and volume of surface water runoff would, therefore, increase during storm events as a result of the proposed development.

4.4.6 The rate of surface water runoff generated during a six-hour storm event has been calculated for a range of return periods. The results are contained in Appendix 1 and summarised in Table 6 below.

Table 6: Surface Water Runoff Rates		
Return Period	**Rainfall Intensity (6 Hour Storm Event)**	**Runoff Rate**
1 in 1 Year	3.03 mm/hr	8.21 l/s/ha
1 in 30 Year	6.91 mm/hr	18.73 l/s/ha
1 in 100 Year	9.04 mm/hr	24.50 l/s/ha

4.5 Climate Change

4.5.1 Peak rainfall intensity, surface water runoff rates and volumes and flooding incidents are anticipated to increase as a result of climate change and may, therefore, require mitigation within proposed developments.

4.5.2 The 2021 Welsh Government '*Flood Consequences Assessment: Climate Change Allowances*' report states that non-residential developments will have an assumed lifespan of 75 years and based on Table 2 of the report (reproduced as Table 7 below), a 40% increase in rainfall intensity should be considered.

Table 7: Peak Rainfall Intensity Allowances			
	Time Period		
	'2020s' (2015 – 2039)	**'2050s' 2040 – 2069**	**'2080s' 2070 – 2115**
Peak Rainfall Intensity – Central	5%	10%	20%
Peak Rainfall Intensity – Upper End	10%	20%	40%

4.5.3 The rate of surface water runoff generated during a six-hour storm event has been calculated for a range of return periods based on a 40% increase in rainfall intensity. The results are contained in Appendix 1 and summarised in Table 8 below.

Table 8: Surface Water Runoff Rates Climate Change Scenario		
Return Period	**Rainfall Intensity (+40% CC) (6 Hour Storm Event)**	**Runoff Rate**
1 in 1 Year	4.24 mm/hr	11.49 l/s/ha
1 in 30 Year	9.68 mm/hr	26.33 l/s/ha
1 in 100 Year	12.66 mm/hr	24.50 l/s/ha

4.5.4 An allowance for sea level rises as a result of climate change should also be considered for coastal developments. Table 9 shows the projections for sea level rise within the Flintshire Local Authority Area for the central and upper end allowances.

Table 9: Mean Sea Level Rise		
Allowance	**Mean Sea Level Rise by 2100**	**Mean Sea Level Rise by 2120**
Central (70th Percentile)	0.76m	0.91m
Upper End (95th Percentile)	1.03m	1.23m

4.5.5

4.5.6 Table 10 shows the extreme sea level data from Table 5, modified to account for the Upper End 2120 mean sea level rise (i.e. the worst-case scenario).

Table 10. Extreme Sea Levels Climate Change Scenario							
Node ID	**HAT[1] (mAOD)**	**MHWS[2] (mAOD)**	**Return Period**				
			1:1 (mAOD)	**1:25 (mAOD)**	**1:100 (mAOD)**	**1:200 (mAOD)**	**1:1000 (mAOD)**
1146	6.37	5.16	6.29	6.72	6.90	6.99	7.50
1148	*6.42*	*5.19*	*6.33*	*6.77*	*6.95*	*7.04*	*7.55*
1150	6.46	5.22	6.38	6.82	7.00	7.09	7.61
1152	6.49	5.26	6.42	6.87	7.05	7.14	7.67

1. HAT (Highest Annual Tide Level)
2. MHWS (Mean High Water Spring Tide Level)
3. Estimated sea levels based on +1.23m sea level rise (taken from 2120 'Upper End')

4.5.7 Ground levels along the western boundary of the site range between approximately 6.77mAOD in the south to approximately 8.28mAOD at the northern point of the breakwater. Ground levels along the harbour wall at the north-eastern boundary of the site range from 7.46mAOD to 7.66mAOD.

4.5.8 Based on the modelled extreme sea levels for node 1148, there would be a potential pathway for tidal flows to enter the site area from the south-west during events exceeding the 1 in 25 year return period. The maximum depth of flooding within the site area during the 1 in 200 year event would be approximately 0.27m.

4.5.9 Ground levels increase northwards and eastwards across the site area and exceed 7.55mAOD in the eastern half of the site, meaning that these areas would be unaffected by all events up to and including the 1 in 1,000 year return period (including the allowance for climate change).

4.6 Flood Management Plan

Tidal Flood Management

4.6.1 NRW guidance received in 2022 for a previous planning application at the site, stated that developments should be unaffected by tidal flooding in the 1 in 200 year return period. Based on this guidance, it is proposed that the minimum finished floor level within the proposed development is set to 7.34mAOD where feasible. This is equivalent to 300mm above the 1 in 200 year return period extreme sea level, including allowance for sea level rise to 2120. Buildings would, therefore, provide safe refuge during extreme tidal flooding events. As stated in Section 4.5, the impact on raising ground levels within the site would have no impact on flood levels within the Dee Estuary.

4.6.2 Flood resilience measures can also be incorporated into the design of the buildings on site – such as waterproof paints and flooring, floor sumps and temporary flood barriers – to minimise the impact of flooding and enable it to be returned to its intended use quickly.

4.6.3 Formal flood warning and evacuation plans will be prepared and implemented at the site and all occupants will be aware of the potential flood risks.

Surface Water Management

4.6.4 It is considered that any increases runoff from the proposed development would have a minimal impact when discharged into the estuary, and that the rate of discharge from the development will not need to be restricted.

Residual Risk

4.6.5 There is the possibility of a storm event that exceeds the design standards of the proposed surface water management for new developments. The potential risks include surface water drainage exceeding the drainage networks during extreme storm events.

4.6.6 It is proposed that exceedance routes for any surface water drainage networks within the proposed development flows away from buildings and areas where persons would be present.

5 DRAINAGE STRATEGY

5.1 Surface Water Runoff

5.1.1 The existing surface water drainage networks will generally be removed when the port areas are demolished and the site cleared. New surface water drainage networks will be constructed as part of the proposed development which will follow the same drainage rationale as present. Surface water runoff from hardstanding and roof areas intercepted by linear drainage channels and/or gullies and entering gravity-fed piped drainage network, to discharge to underground soakaway structures or to the estuary at an unrestricted rate.

5.1.2 Areas of aggregate or loose material will drain via infiltration, with runoff exceeding the infiltration capacity during extreme storm events draining to the wider surface water drainage network.

5.2 Surface Water Quality

5.2.1 It is understood that presently, oil interceptors are incorporated into the drainage network to provide treatment to surface water runoff prior to its discharge into the Dee Estuary. Similar methods of water treatment will be incorporated within the proposed drainage network. Potential methods for surface water treatment would include:

- silt traps fitted to gullies and liner drainage channels;
- stone-filled filter drains;
- oil interceptors and vortex grit separators.

5.2.2 Runoff from the proposed concrete batching plant and chemical storage areas will be managed in accordance with best practices contaminated runoff will be retained on site and remediated or treated as trade effluent and removed from site.

5.3 Groundwater Quality

5.3.1 Large areas of the port site are constructed from engineered materials, and it is assumed that there are no significant volumes of groundwater present. The risk of infiltration drainage affecting groundwater quality is, therefore, minimal. It is proposed, however, to locate all soakaway features away from areas of made ground to prevent the mobilisation of any contaminants present.

6 CONCLUSIONS

6.1.1 This Flood Consequence Assessment for the proposed development at the Port of Mostyn has been carried out in accordance with the Welsh Government Technical Advice Note 15 'Development and Flood Risk' (TAN15).

6.1.2 The Welsh Government's Development Advice Map shows that the site is situated within Zone B (*'Areas known to have been flooded in the past'*), Zone C1 (*'Areas of the floodplain which are developed and served by significant infrastructure'*) and Zone C2 (*'Areas of the floodplain without significant flood defence infrastructure'*).

6.1.3 The proposed development would be classified in the 2004 TAN15 as a 'Less Vulnerable' development. A new Less Vulnerable development would only be permitted within Zone C if it is deemed to be justified in that location via the 'Justification Test'.

6.1.4 The Port of Mostyn would constitute previously developed 'brownfield' land, and the proposed development would provide employment opportunities. The proposed development would need to be located in a coastline location to allow for the transport of wind turbine bases off-shore.

6.1.5 This FCA report demonstrates that all potential consequences of flooding can be managed and would, therefore, meet the requirements of the Justification Test and it is considered that the Justification Test has passed.

6.1.6 The proposed development site is at risk of flooding from the adjacent tidal River Dee, based on the source-pathway-receptor approach. The risk of flooding from surface water, fluvial, groundwater, sewer and artificial sources is discounted.

6.1.7 The existing ground levels within the site are above the modelled tidal and estuarine flood levels for all return periods up to and including the 1 in 1000 year return period. There is, however, a risk of tidal flooding in lower lying areas in the south-west of the site when climate change is considered. It is proposed that where feasible, finished floor levels of new buildings are set to 300mm above the 1 in 200 year return period extreme sea level including allowance for sea level rise to 2120 where feasible. A formal flood warning and evacuation plan will also be implemented at the site.

6.1.8 The proposed surface water drainage strategy will retain the existing drainage rationale at the site and will incorporate infiltration as the primary means of discharging surface water runoff where feasible. Additional surface water runoff will be discharged into the River Dee once treated.

6.1.9 It is concluded on the basis of the findings of this report that the flooding consequences to and from the site will be managed effectively, therefore the Justification Test is passed. The site is, therefore, considered suitable for the type of development that has been proposed.

APPENDIX 1

Surface Water Runoff Calculations

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 1 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Rainfall Intensity - Six Hour Storm Event (1 in 1 Year Return Period)	Bryn Grifiths		
	DATE:	DATE:	DATE:

Following the Wallingford Procedure

M5-60 =	17	mm	
Ratio r =	0.4		
Duration (D)=	360	minutes	
Z1 =	1.6		

M5-360 = M5-60 x Z1

= 27.2 mm

Return Period =	1		
Z2=	0.67		

M1 360 = M5-360 x Z2

= 27.2 x 0.67

= **18.2 mm**

Rainfall intensity (mm/hr) = $\frac{MT-D}{D/60}$

= $\frac{\mathbf{18.2}}{\mathbf{6.00}}$

= **3.03 mm/hr**

Including an allowance for climate change:

20% =	**3.63**	**mm/hr**
30% =	**3.94**	**mm/hr**
40% =	**4.24**	**mm/hr**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 2 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Surface Water Runoff Rate - Six Hour Storm Event (1 in 1 Year Return Period)	B Griffiths DATE: 03/07/2023	DATE:	DATE:

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 3.03
A = area (hectares) = 1

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 3.03 x 1**

= **8.21 litres/second**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 3 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Surface Water Runoff Rate - Six Hour Storm Event (1 in 1 Year Return Period Climate Change Scenario)	B Griffiths DATE: 03/07/2023	DATE:	DATE:

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 4.24
A = area (hectares) = 1

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 4.24 x 1**

= **11.49 litres/second**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 4 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Rainfall Intensity - Six Hour Storm Event (1 in 30 Year Return Period)	B Griffiths		
	DATE: 03/07/2023	DATE:	DATE:

Following the Wallingford Procedure

M5-60 = 17 mm
Ratio r = 0.4
Duration (D)= 360 minutes
Z1 = 1.6

M5- 360 = M5-60 x Z1
= 27.2 mm

Return Period = 30
Z2= 1.53

M30 360 = M5- 360 x Z2
= 27.2 x 1.53
= **41.5 mm**

Rainfall intensity (mm/hr) = $\frac{MT-D}{D/60}$

$= \frac{\mathbf{41.5}}{\mathbf{6.00}}$

= **6.91 mm/hr**

Including an allowance for climate change:

20% = **8.30 mm/hr**
30% = **8.99 mm/hr**
40% = **9.68 mm/hr**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 5 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Surface Water Runoff Rate - Six Hour Storm Event (1 in 30 Year Return Period)	B Griffiths		
	DATE: 03/07/2023	DATE:	DATE:

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 6.91
A = area (hectares) = 1

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 6.91 x 1**

= **18.73 litres/second**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 6 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Surface Water Runoff Rate - Six Hour Storm Event (1 in 30 Year Return Period Climate Change Scenario)	(NAME AND SIGNATURE) B Griffiths	(NAME AND SIGNATURE)	(NAME AND SIGNATURE)
	DATE: 03/07/2023	DATE:	DATE:

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 9.68
A = area (hectares) = 1

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 9.68 x 1**

= **26.23 litres/second**

Calculation Sheet

wardell armstrong
your earth our world

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 7 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Rainfall Intensity - Six Hour Storm Event (1 in 100 Year)	B Griffiths		
	DATE: 03/07/2023	DATE:	DATE:

Following the Wallingford Procedure

M5-60 =	17	mm	
Ratio r =	0.4		
Duration (D)=	360	minutes	
Z1 =	1.6		
M5- 360	=	M5-60 x Z1	
	=	27.2	mm

Return Period =	100				
Z2=	1.99				
M100 360	=	M5- 360	x	Z2	
	=	27.2	x	1.99	
	=	**54.2**	**mm**		

Rainfall intensity (mm/hr) = $\frac{MT-D}{D/60}$

$= \frac{\mathbf{54.2}}{\mathbf{6.00}}$

$= \mathbf{9.04}$ **mm/hr**

Including an allowance for climate change:

20% =	**10.85**	**mm/hr**
30% =	**11.75**	**mm/hr**
40% =	**12.66**	**mm/hr**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 8 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Surface Water Runoff Rate - Six Hour Storm Event (1 in 100 Year Return Period)	B Griffiths		
	DATE: 03/07/2023	DATE:	DATE:

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 9.04
A = area (hectares) = 1

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 9.04 x 1**

= **24.50 litres/second**

Calculation Sheet

REF:

CLIENT:	PROJECT:	JOB NO.:	CALC. REF. NO.:
Port of Mostyn	Port of Mostyn Landside Development	ST20348	PAGE: 9 OF 9
CALCULATION	CALC. BY:	CHECKED BY:	APPROVED BY:
Surface Water Runoff Rate - Six Hour Storm Event (1 in 100 Year Return Period)	B Griffiths		
	DATE: 03/07/2023	DATE:	DATE:

Following the Rationale Method as described by the Wallingford Procedure

Qp = C i A

Qp = runoff (litres/second)
C = runoff coefficient
i = rainfall intensity (mm/hr) = 9.04
A = area (hectares) = 1

If the units are as follows then the equation becomes **Qp = 2.78C i A**;

Runoff coefficient C = Cv Cr, as standard values of 0.75 and 1.30 are used for Cv and Cr respectively.

If the above values for C are used the equation becomes:

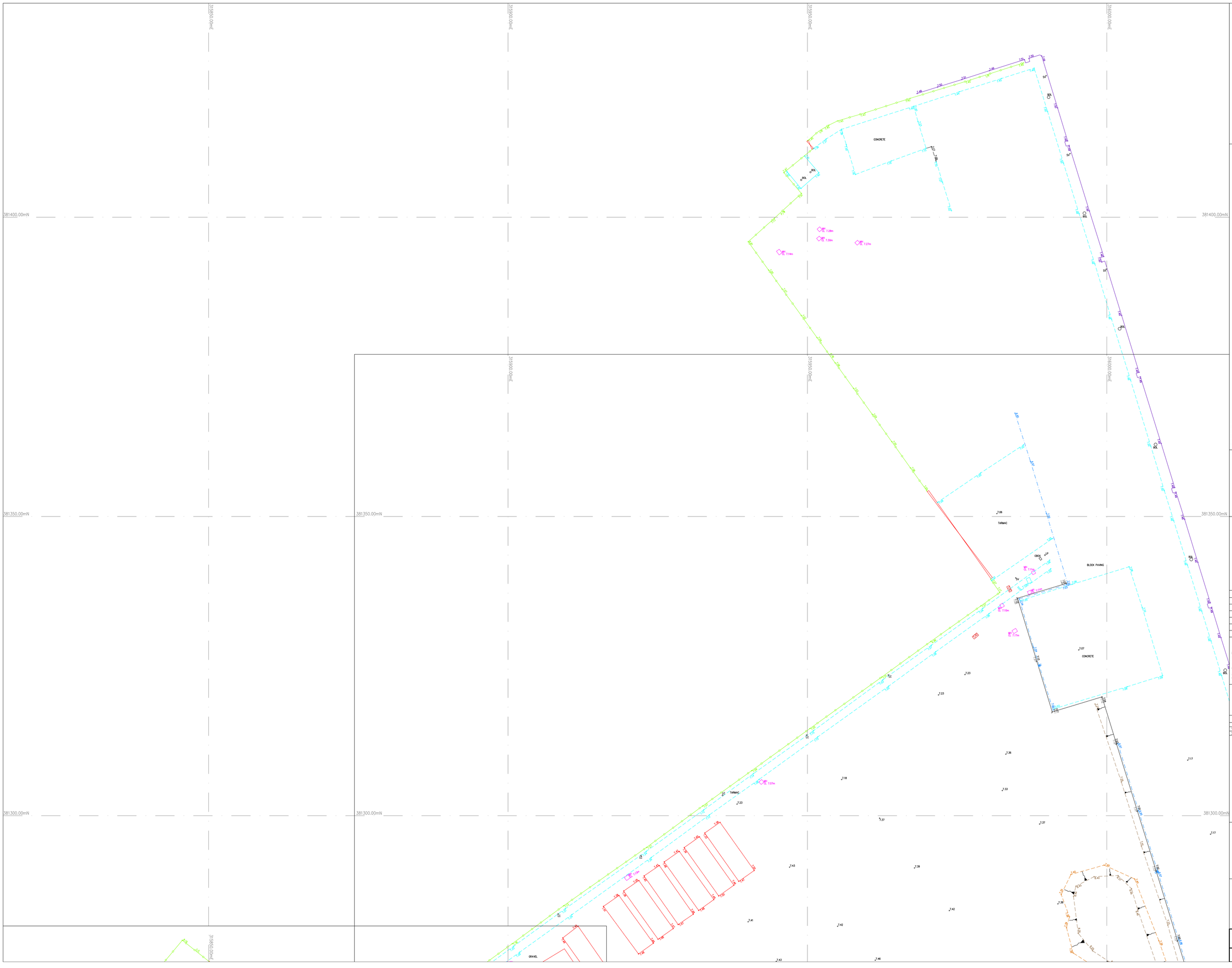
Qp = 3.61Cv i A

= 2.71 i A

= **2.71 x 9.04 x 1**

= **24.50 litres/second**

DRAWINGS



Site Grid North

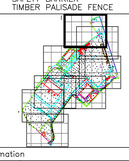
N W E S

Symbols/Abbreviations (Where Applicable):

AV:	AIR VALVE
BB:	BELISHA BEACON
BH:	BOREHOLE
BM:	BENCHMARK
BOL:	BOLLARD
B/S:	BUS STOP
CAM:	CAMERA
CS:	CABLE STAY
CATV:	C.A.T.V INSPECTION CHAMBER
CBOX:	ELECTRICITY BOX, CABLE BOX, ETC.
CCTV:	C.C.T.V CAMERA
C.PIT:	CATCH PIT
EC:	ELECTRICITY COVER
EP:	ELECTRICITY POLE
ER:	EARTH ROD
FH:	FIRE HYDRANT
FP:	FLAG POLE
G:	GULLY
G:	GULLY (ROUND)
GV:	GAS VALVE
IC:	INSPECTION COVER (SQUARE)
IC:	INSPECTION COVER (ROUND)
IL:	INVERT LEVEL
KO:	KERB OUTLET
LB:	LETTER BOX
LC:	LIGHTING COLUMN
LP:	LAMP POST
LP/BS:	LAMP POST/BUS STOP
MH:	MANHOLE (SQUARE)
MH:	MANHOLE (ROUND)
MKR:	MARKER
P:	POST
RE:	RODDING EYE
R/S:	ROAD SIGN
S/P:	SIGN POST
SNP:	STREET NAME PLATE
ST:	STOP TAP
SV:	STOP VALVE
TCB:	TELEPHONE CALL BOX
TL:	TRAFFIC LIGHT
TP:	TELEGRAPH POLE
TP/EP:	TELEGRAPH POLE/ELECTRIC POLE
T/IC:	TELECOM INSPECTION COVER
WO:	WATER OUTLET
WM:	WATER METER
	GATE
	DEFINED POINT
	CONTROL POINT
	TREE (CONIFEROUS)
	TREE (DECIDUOUS)
	FOLIAGE
	HEDGE
DPC 99.99m	DAMP PROOF COURSE LEVEL
EL 99.99m	EAVES LEVEL
FL 99.99m	FLOOR LEVEL
RL 99.99m	RIDGE LEVEL
SL 99.99m	SOFFIT LEVEL
TL 99.99m	THRESHOLD LEVEL

FENCE DESCRIPTIONS:

B/W:	BARBED WIRE FENCE
C/B:	CLOSE BOARDED FENCE
C/L:	CHAIN LINK FENCE
C/P:	CHESTNUT PALING FENCE
CONC/P:	CONCRETE PANEL FENCE
I/R:	IRON RAILING FENCE
P/R:	POST AND RAIL FENCE
P/W:	POST AND WIRE FENCE
P/C:	POST AND CHAIN FENCE
S/PAL:	STEEL PALISADE FENCE
S/B:	SAFETY BARRIER
T/PAL:	TIMBER PALISADE FENCE



Revision Information

Rev	Date	Description

INFORMATION

1) Ordnance Survey co-ordinates and level are derived from OSTN02 and OSGM02, transformed from WGS84.

2) Only services located during the site survey are shown on this plan. Further investigation may be required to ascertain the full extent of the site services.

3) Copyright of this drawing remains the property of PM Surveys UK Ltd. Do not scale from this drawing. In the event of any descrepancy, refer query to PM Surveys UK Ltd.

NOTES

Ordnance Survey Bench Mark Used

	Location	Type	Value (m)
1			
2			

PM SURVEYS UK

PM Surveys UK Ltd
Unit 4, Expressway Business Park
Station Road, Queensferry
Flintshire, CH5 2TF
Tel: 01244 821777 Fax: 01244 821002
Email: info@pmsurveys.co.uk

Client Info

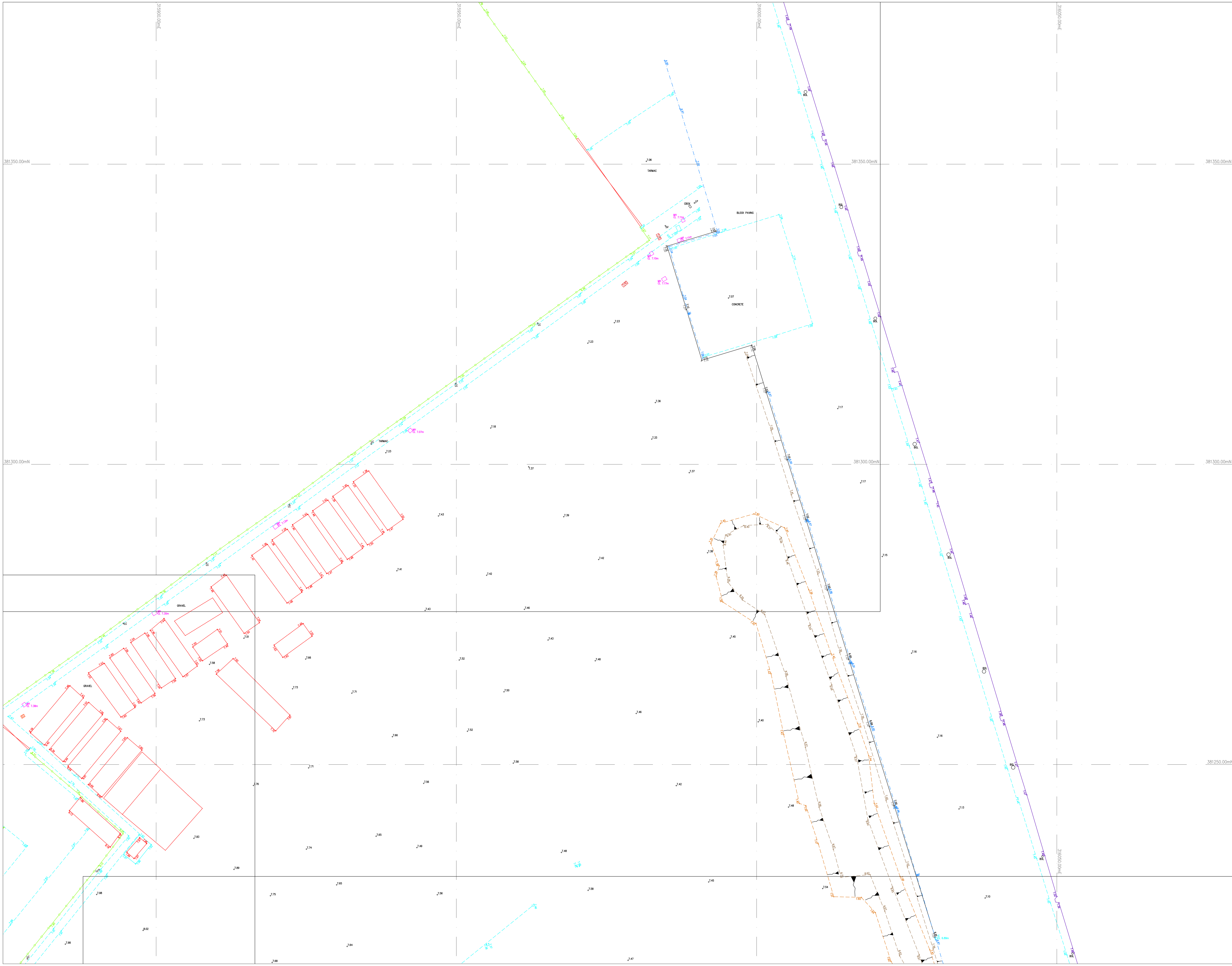
Wardell Armstrong LLP
2 The Avenue
Leigh, Greater Manchester
WN7 1ES

Tel: 01942 260 101
Email: iramsbottom@wardell-armstrong.com

Project

Port Of Mostyn
Topographical Survey

Project No	Sheet: A0	Surveyed By:	II
PMS15065	Scale: 1:200	Drawn By:	SW
		Approved By:	PM
Dwg PMS15065-01		Issued:	25/06/2015



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N
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○ LP/BS:	LAMP POST/BUS STOP
□ MH:	MANHOLE (SQUARE)
○ MH:	MANHOLE (ROUND)
+ MKR:	MARKER
○ P:	POST
+ RE:	RODDING EYE
+ R/S:	ROAD SIGN
+ S/P:	SIGN POST
+ SNP:	STREET NAME PLATE
+ ST:	STOP TAP
+ SV:	STOP VALVE
+ TCB:	TELEPHONE CALL BOX
+ TL:	TRAFFIC LIGHT
○ TP:	TELEGRAPH POLE
○ TP/EP:	TELEGRAPH POLE/ELECTRIC POLE
+ T/IC:	TELECOM INSPECTION COVER
+ WO:	WATER OUTLET
+ WM:	WATER METER
	GATE
×	DEFINED POINT
	CONTROL POINT
	TREE (CONIFEROUS)
	TREE (DECIDUOUS)
	FOLIAGE
	HEDGE
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EL 99.99m	EAVES LEVEL
FL 99.99m	FLOOR LEVEL
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CONC/P:	CONCRETE PANEL FENCE
I/R:	IRON RAILING FENCE
P/R:	POST AND RAIL FENCE
P/W:	POST AND WIRE FENCE
P/C:	POST AND CHAIN FENCE
S/PAL:	STEEL PALISADE FENCE
S/B:	SAFETY BARRIER
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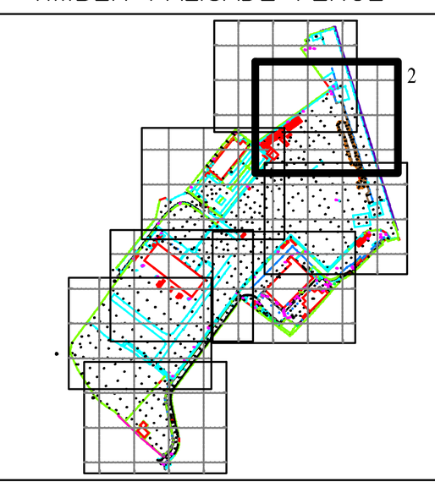

Revision Information

Rev	Date	Description

INFORMATION

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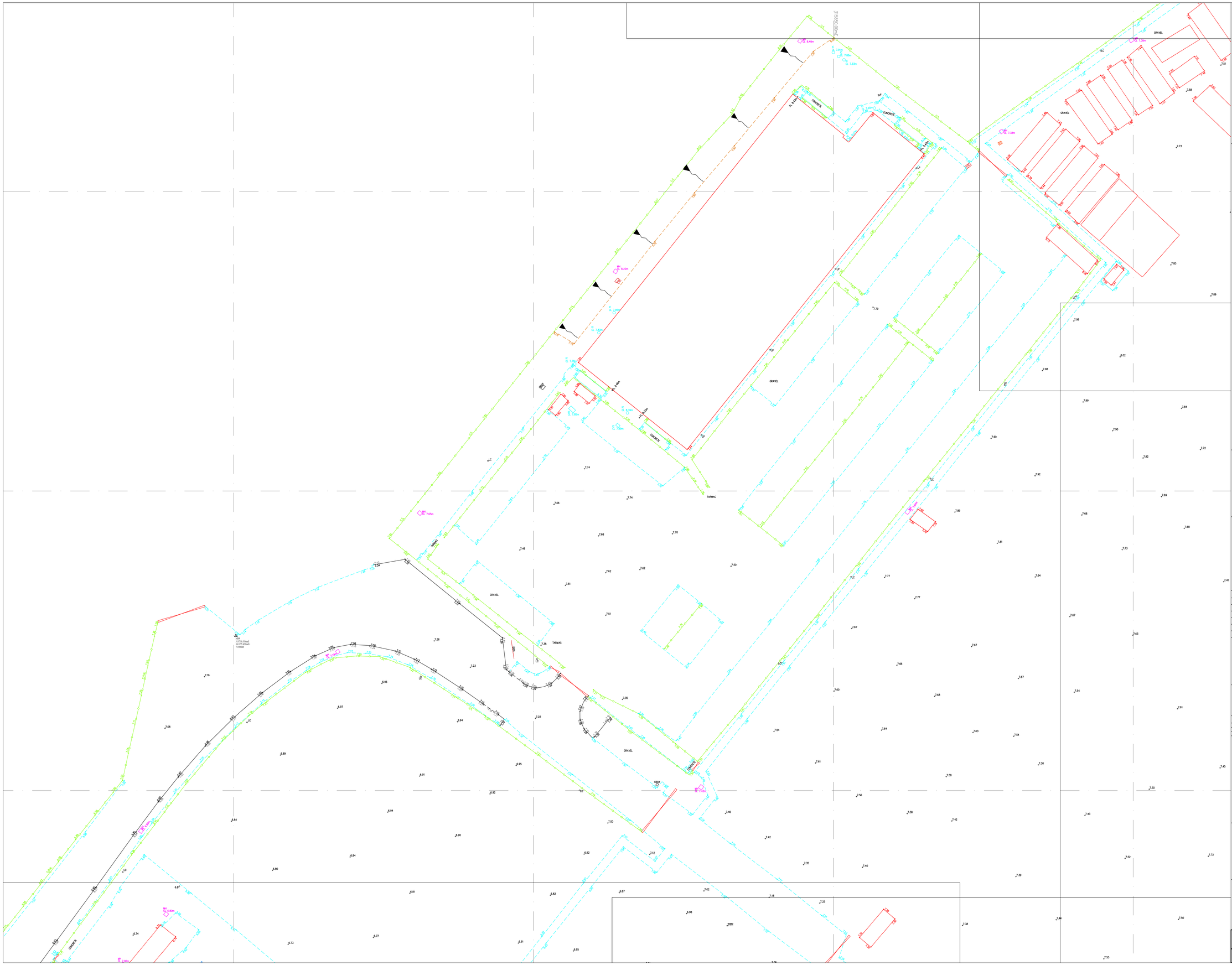
Project

Port Of Mostyn
Topographical Survey

Project No PMS15065	Sheet: A0 Scale: 1:200	Surveyed By: II Drawn By: SW Approved By: PM
Dwg PMS15065-02		Issued: 25/06/2015



Site Grid North

N
W E
S

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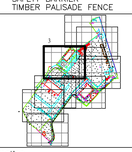

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Project

Port Of Mostyn
Topographical Survey

Project No PMS15065	*Sheet:* A0	*Surveyed By:*	II
	Scale: 1:200	*Drawn By:*	SW
		Approved By:	PM
Dwg PMS15065-03		*Issued:*	25/06/2015

Site Grid North

N

W E

S

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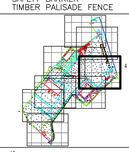

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Project

Port Of Mostyn
Topographical Survey

Project No PMS15065	*Sheet:* A0	*Surveyed By:* II	
	Scale: 1:200	*Drawn By:* SW	
		Approved By: PM	
Dwg PMS15065-04		*Issued:* 25/06/2015	

Site Grid North

N

W E

S

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Project No: PMS15065	Sheet: A0	Surveyed By:	II
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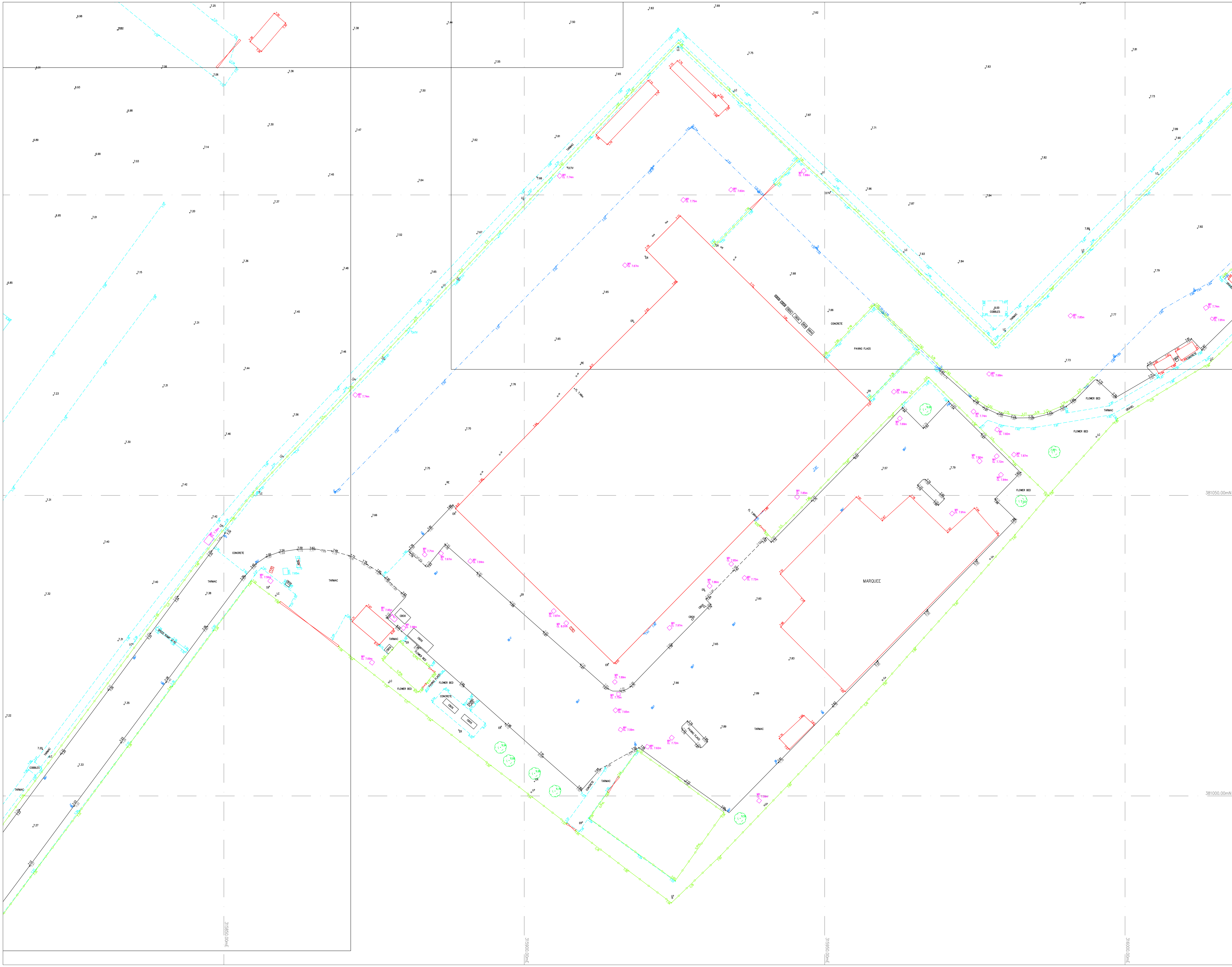
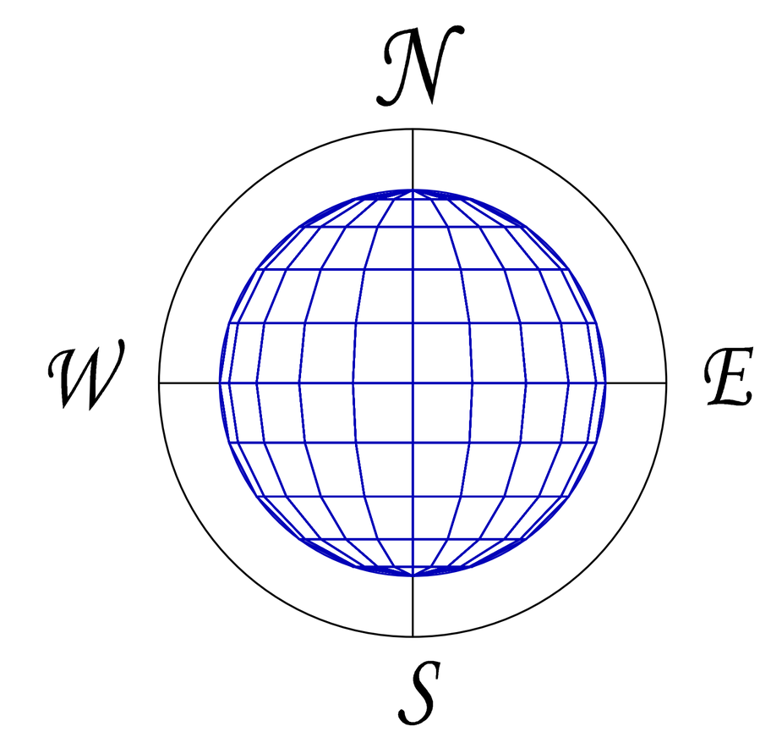
Dwg: PMS15065-05		Issued:	25/06/2015



Site Grid North



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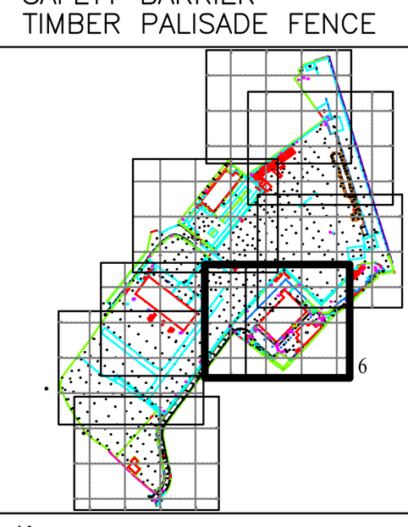

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ISO 9001 Registered Firm

PM SURVEYS UK

INTERNATIONAL ACCREDITATION BOARD

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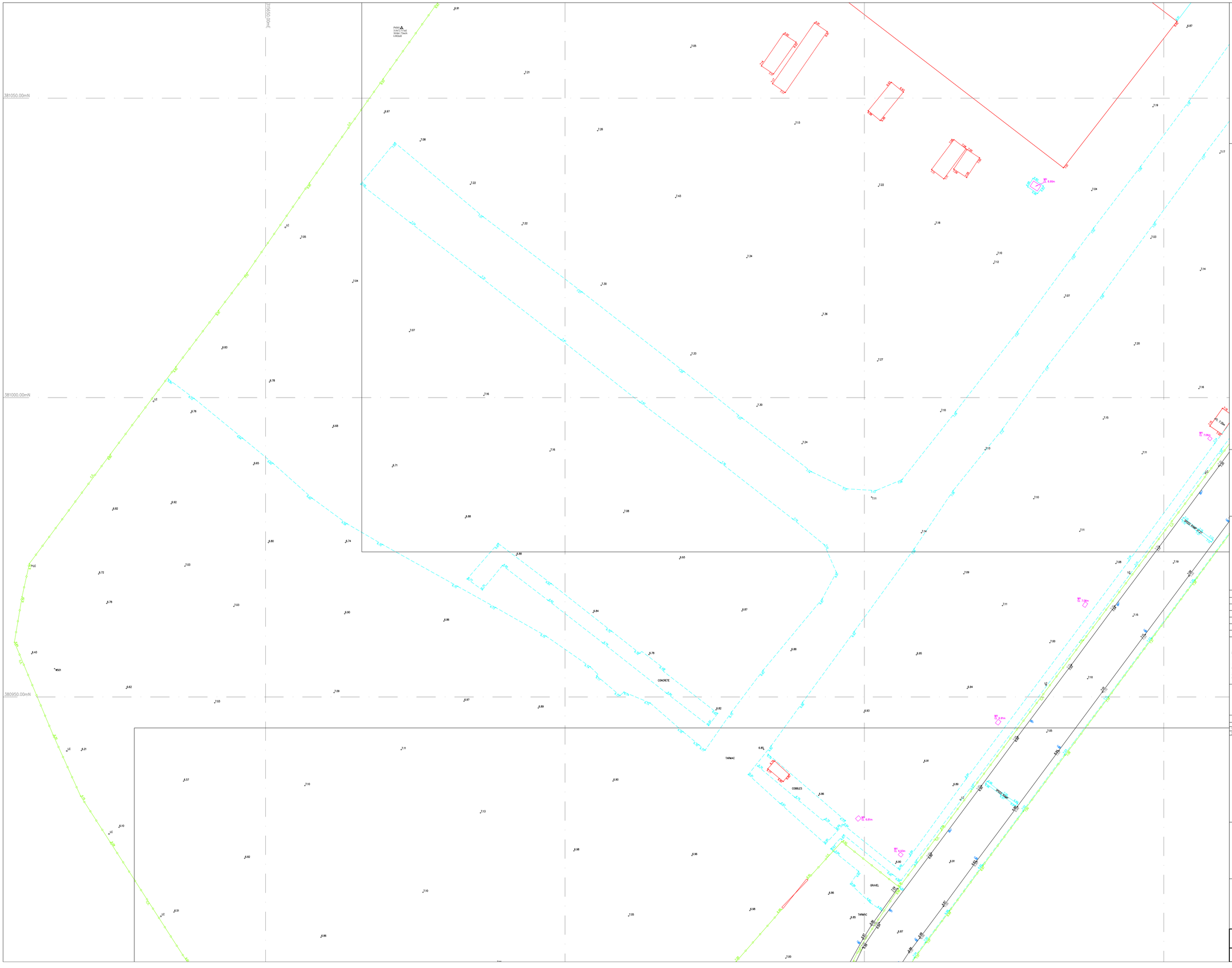
Project

Port Of Mostyn
Topographical Survey

Project No	Sheet: A0	Surveyed By: II
PMS15065	Scale: 1:200	Drawn By: SW
		Approved By: PM
Dwg PMS15065-06		Issued: 25/06/2015



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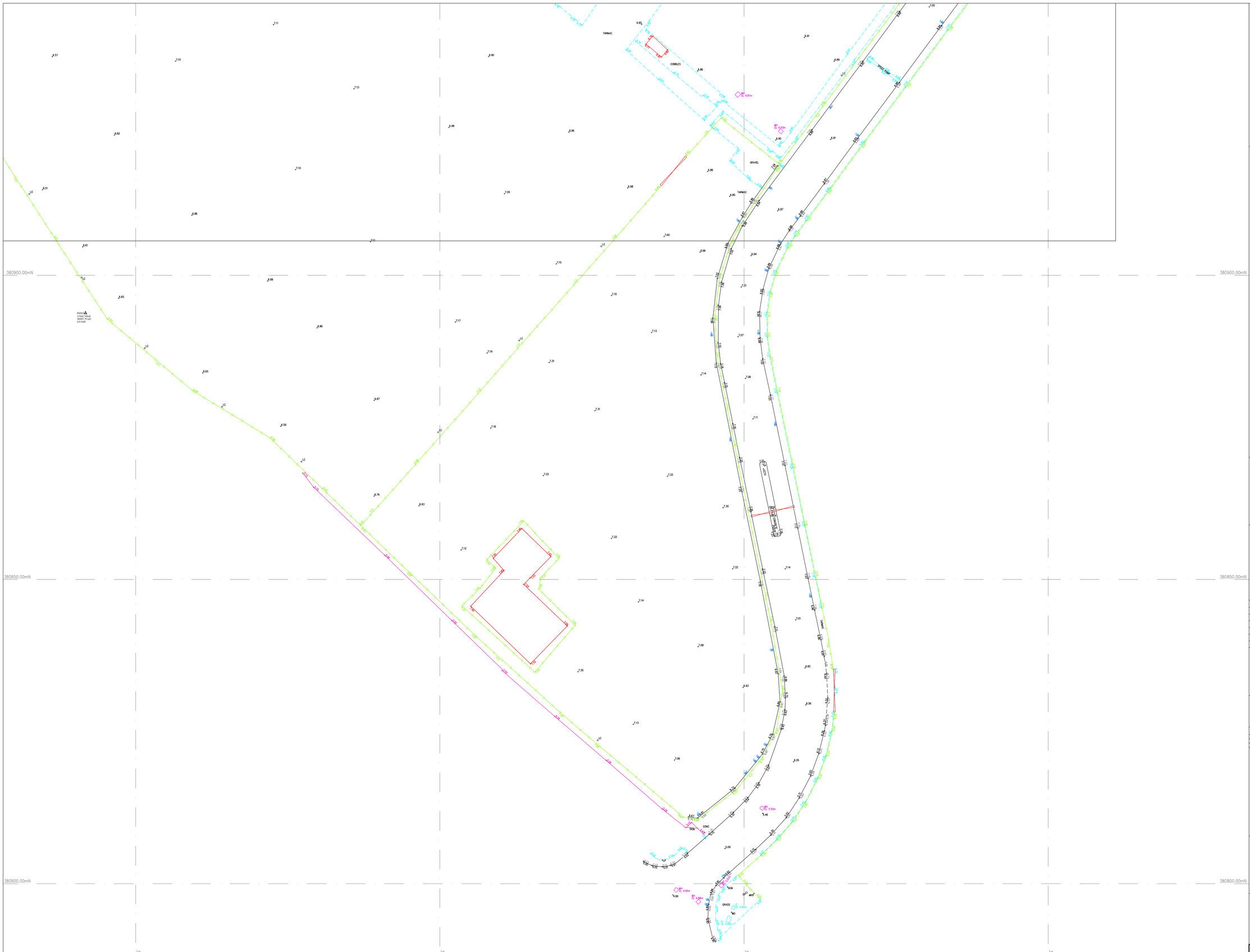

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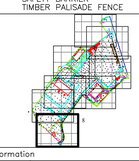
P/R:	POST AND RAIL FENCE
P/W:	POST AND WIRE FENCE
P/C:	POST AND CHAIN FENCE
S/PAL:	STEEL PALISADE FENCE
S/B:	SAFETY BARRIER
T/PAL:	TIMBER PALISADE FENCE



Revision Information

Rev	Date	Description

INFORMATION

1) Ordnance Survey co-ordinates and level are derived from OSTN02 and OSGM02, transformed from WGS84.

2) Only services located during the site survey are shown on this plan. Further investigation may be required to ascertain the full extent of the site services.

NOTES

Ordnance Survey Bench Mark Used

	Location	Type	Value (m)
1			
2			

PM SURVEYS UK

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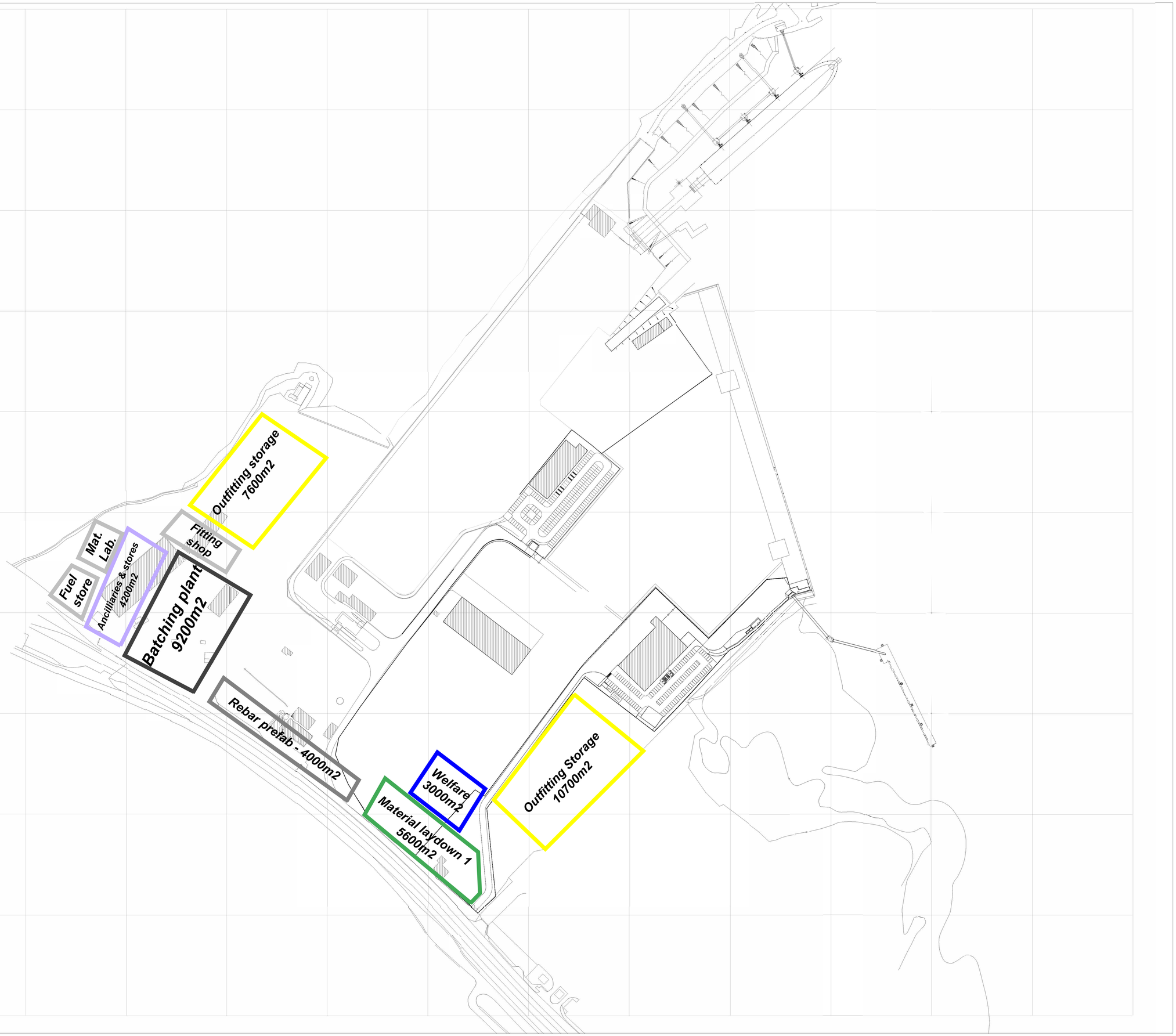
Project

Port Of Mostyn
Topographical Survey

Project No PMS15065	*Sheet:* A0 *Scale:* 1:200	*Surveyed By:* II	
		Drawn By: SW	
		Approved By: PM	
Dwg PMS15065-08		*Issued:* 25/06/2015	

NOTE - This is not an accurate survey drawing.
This drawing is issued for general information purposes only.
Location of buildings, and all other site features indicated are approximate only.
Do Not Scale.



North Point.

Key Plan.

Rev	Date	Revision Note	By	Check

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Job title
Port of Mostyn
Drawing title
Mostyn Docks - Site Plan (transport road omitted)

Status	File Name	X Ref File	
Information			
Drawn by	date	checked by	date	Scale at A0	Scale at A3
HL	22-09-15			1:1250	NTS
Job No.	CPI cat.	Dwg No.	Revision
-	AG(00)	12	-

Contractors Drawing No.

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