Hydrock

Dunsbury Park

Stage 3 Units 500-502 Civil Report

For Portsmouth City Council

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1. INTRODUCTION

Hydrock Consultants have been appointed by Portsmouth City Council to provide structural & civil engineering design services for a new industrial park in Outside Waterlooville. The first phase of the development including main infrastructure is currently under construction. This Report focuses on the next phase of the development.

This report describes the RIBA Stage 3 structural & civils proposals for units 500-502 of the development and appraises the existing site and summarises the geotechnical investigations undertaken to date; outlines structural design criteria and assumptions, and outlines structural & civil proposals; highlights any potential risks and opportunities (programme/cost and health/safety); and describes the next steps for commencement of RIBA Stage 4.

Figure 1 - Proposed site plan, showing Units 500-502 site boundary

2. PROJECT DESCRIPTION

2.1 Proposed Building and Site

Site Address: Fitzwygram Way, Waterlooville, Hampshire Nearest Postcode P07 8NY

The site is irregular in shape and has an area of approximately 21 ha.

The proposed site is located off Fitzwygram way just off Junction 3 of the A3(M)

This phase of the proposed development consists of 3 single storey industrial units of varying size, each with an area of 2 storey office space and separate yard & parking areas. The units will provide level access for goods vehicles

Table 1: Proposed Unit Summary	*Ground Floor Area (ft2)*	*1st Floor Office (ft2)*	*Goods Vehicles*
Unit 500	*27,175*	*4090*	*Level Access*
Unit 501	*22,500*	*2500*	*Level Access*
Unit 502	*15,100*	*2660*	*Level Access*

3. SITE ANALYSIS

3.1 Site Location

OS N:109255

OS E:469784

National Grid: SU697092

3.2 Site History

Following is a summary of a study of historical Ordnance Survey maps.

The site has remained predominantly undeveloped, with the exception of the road traversing roughly across the centre of the site, which was first noted in 1867, later named as Park Lane (1897). A footpath was noted across the northern area of the site. Portsmouth City Council has been engaged in development of infrastructure since 2014 (including site roads, site levelling/plateaus and utility connections). The construction of the roundabout and main road infrastructure (Fitzwygram Way) at the south boundary of the site appeared to be completed in 2016. Currently, Plot 4 is under construction.

With regards the surrounding areas, some features such as a clay pit, brick and tile-works and brick kiln were noted within 200m of the site between 1859 and 1867. In 1970s the construction of residential developments across the area started and continued to increase until 1985. Earthworks were noted along the west boundary of the site between 1980 and 1991 related to the construction of A3 (M).

One historical tank record was noted to the west of the site in 1970 over 100m away. No historical records related to historical garages or military land was identified within 500m of the site during the desk study research. Eight records of electricity substations were identified within 167m to 500m of the site between 1970 and 1993. One record of a gas governor was identified at 478m west of the site between 1984 and 1992.

3.3 Current site

Dunsbury Park comprises a commercial development that is partway through construction. Plot 2 is completed and occupied by Fat Face, Plots 3a and 3b are completed and occupied by DPD and Volkswagen, Plot 4 is currently under construction by BAM. The majority of the main infrastructure has been installed including access via the A3(M) comprising Fitzwygram Way which terminates west of Woolston Road.

Remaining areas designated for development comprise Units 100, 400, 500-502, 600-601 and 700. These are currently unoccupied and undeveloped.

Notes from Site walkover

- Units 500-502 appear to have been subject to some earthworks and an approximate construction platform has been created.
- Surface materials in Unit 502 area appear to be an imported fill material of limestone gravel in a fine matrix, some patches of fine to coarse flint gravel. Unit 502 area is 2-3m lower than HCA.
- Units 501 and 500 appear similar to 502 and approximate construction area of each seem to have been constructed with access ramps on east of each area going up to the next.

- Unit 502 terrace is approximately 3-5m higher than 501. Unit 501 is approximately 5-10m higher than 500. Unit 500 is approximately 3-5m higher than Fitzwygram Way to the south.
- Units 500-502 surrounded by Heras fencing. To the west is a large bund with grass and juvenile trees.
- Evidence for new drainage infrastructure having been installed close to the eastern boundary of 500-502. New manholes present.
- Electricity cables can be seen entering the site below ground from overhead wooden poles to the west of Unit 501.
- New drainage infrastructure appears to have been installed - new manhole seen in south east, similar to 500-502.
- A Habitat Creation Area (HCA) is shown off-site to the north of Unit 502.

3.4 Topography

The site is set at various levels and has a history of landfilling activities and earthworks. A number of large earth mounds have been constructed in and around the site.

Area drops down sharply towards southern boundary. Beyond is a watercourse (Hermitage Stream) flowing beneath a

bridge comprising Fitzwygram Way approximately 5-10m lower than Unit 100 area.

3.5 *Boundaries and Adjacent Buildings*

The site is bounded to the south and west by woodland. The A3(M) is situated to the west. To the north are further undeveloped areas. Residential properties are present to the east beyond woodland

Figure 2 - Google Earth image

3.6 Flood risk and mitigation

A detailed assessment of flood risk has identified that the site is primarily within Flood Zone 1, and is at low or negligible risk of flooding from all sources assessed. Refer to Hydrock Flood risk assessment, reference 19453-HYD-XX-XX-RP-FR-0001, for more information.

3.7 Below ground features

3.7.1 Utilities

No existing utilities are recorded through the 500-502 site. As built drawings of a gas main show this runs close and parallel with the main trunk road running west/east through the full development site. Mains electric enters site from the east and runs either side of the existing trunk road as does installed water mains.

3.7.2 Drainage (existing)

Within the site boundary there are various land drains that have been installed. These are installed to deal with surface water run-off in the temporary situation. Additionally, there is a foul water sewer that runs close to the eastern boundary of the site. From survey information it is clear that this does not serve anything beyond the site boundary and appears to have been installed in preparation for the new units. The anticipated connection

point for the foul water is just within the south west corner of the site boundary at an approximate level of 25.02m AOD. The surface water connection point is slightly to the east of this at a level of 25.85m AOD and lies outside the development boundary.

3.7.3 Mining

The site is not within an area of recorded mining and mining risk is not considered further in this report.

3.8 Network Rail or other Rail provider adjacent to site

No records of railway infrastructure within 250m of the site.

4. GROUND CONDITIONS

Please refer to Hydrock geotechnical investigation report reference 19453-HYD-XX-XX-RP-GE-1004.

The ground conditions as proven by the investigation (s) undertaken at the site comprise:

- Made Ground – Surface Covering, between ground level and 0.30m below ground level (bgl), comprising sandy to very sandy gravel of limestone aggregates; over
- Made Ground - Engineered Fill between 0.05m bgl to 1.00m bgl generally comprising very yellowish brown silty fine sand (probable lime/ cement-based stabilised soils).
- Made Ground - General, at the eastern side of the site from 0.70m bgl to 1.50m bgl comprising orangish/ yellowish brown silty sand with rare mudstone and brick fragments.
- Topsoil, at the western side of the site, between ground level and 0.12m bgl comprising orangish brown sandy silt/clay with abundant rootlets.
- Bognor Sand Member, across the centre and south areas of the site between 0.40m bgl and 2.30m bgl, comprising medium dense yellowish/ orangish brown with occasional light grey mottling, silty fine sand or very sandy silt with rare flints.
- London Clay Formation (weathered), across the entire site, between 0.40m bgl to 3.30m bgl, generally comprising firm, orangish brown and light grey mottled sandy silt clay.
- London Clay Formation, across the entire site, between 0.40m bgl and up to a maximum depth of 25.50m bgl, generally comprising firm, orangish brown and light grey mottled sandy silt clay. Becoming stiff with depth.

4.1 Ground Water

During the investigation, groundwater was encountered at depths between 1.20m bgl and 3.00m bgl within the trial pits and the windowless sampler boreholes, and at 5.50m bgl, 8.50m bgl and 10.70m bgl within the cable percussive boreholes.

Water levels recorded post-fieldwork ranged from 0.86m bgl to 1.98m bgl in plot 500; between 0.34m bgl to 2.69m bgl in plot 501; and between 1.58m bgl to 4.00m bgl in plot 502.

There is shallow groundwater within the Bognor Sand Member, London Clay Formation (weathered) and the sandy fraction of the London Clay Formation. A deeper groundwater unit is present at approximately 10m below ground level (bgl) within the London Clay Sand Beds.

4.2 Ground Heave

Underlying cohesive soils (e.g. London Clay) will likely be susceptible to volume change due to changes in moisture content, this can result in ground heave, the risk of this is higher within proximity to existing trees & vegetation.

The existing made ground & London clay have been classified as medium volume change potential. Refer to figure 4..

Foundations to be designed to in accordance with NHBC guidelines for building in shrinkable soils and to take into account existing & proposed vegetation.

Stratum	No. of tests	Plasticity Index			Modified Plasticity Index			Plasticity designation	Volume Change Potential
		Min.	Max.	Av.	Min.	Max.	Av.		
Made Ground - Engineered fill	2	20	26	23	20	26	23	Low to medium	Medium
London Clay Formation (weathered)	7	16	35	25	16	35	25	Medium	Medium
London Clay Formation	19	26	33	29	22	33	28	Medium to high	Medium

4.3 *Contamination* & Ground gas

Conclusions of contamination Generic risk assessment	Human health: • No exceedances were detected above the GAC. Plant growth: • No exceedances were detected above the GAC. • Controlled Waters: A groundwater sample from location WS5.02, presents high concentrations of ammonium, ammoniacal nitrogen, phenol and ARO>EC7-EC8, when compared to DWS and EQS. Ground gases or vapours: • Low to moderate risk from ground gases (subject to additional monitoring) and CS2 conditions apply. Radon: • The site is not in a Radon Affected Area. Water supply pipes: • Standard pipework is envisaged. However, confirmation should be sought from the water supply company at the earliest opportunity.

The mitigation measures proposed to remove unacceptable risks include:

Installation of ground gas mitigation measures to comply with CS2 (subject to further investigation).

The methodology for the remediation should be presented in a Remediation Strategy, which will need to be submitted to the warranty provider and the regulatory authorities for approval.

In addition, the production of a Materials Management Plan and its approval by a Qualified Person will be required to allow reuse of suitable material at the site.

Verification reports by a competent independent geo-environmental specialist will be required following completion of any remedial works.

The guidance indicates that the site is not in a Radon Affected Area and no radon protection measures are required.

4.4 Unexploded Ordnance (UXO)

Hydrock desk study assessment of the site indicated further assessment is required with regard to UXO in relation to ground investigation. A specialist UXO risk assessment was recommended and has been undertaken by 1st Line Defence, completed in July 2021. The full report (reference DA13636-00) is presented in Appendix B of the Hydrock GIR (ref: 19453-HYD-XX-XXRO-GE-1004).

The specialist UXO risk assessment indicates a Low-Medium Risk from items of German aerial delivered

UXO and Low from Allied UXO across the site. However, it is recommended that all works have:

- A written site-specific site management plan for UXO (presented in Appendix B of Hydrock GIR).
- Site specific UXO awareness briefings to all personnel conducting intrusive works.

4.5 Soil Classification / Durability Requirements for Buried Concrete

Based on guidelines provided in BRE Special Digest 1 (BRE 2005) and the information presented in

Section 5.5.9 (Table 5.13):

- The shallow soils (Made Ground, Bognor Sand Member and London Clay Formation (weathered) can be classified as Design Sulfate Class DS-1 and ACEC Class AC-1.
- The deeper soils (clays of the London Clay Formation) can be classified as Design Sulfate Class DS-4m and ACEC Class AC-4m for strip / trench fill / pad foundations.

This equates to a Design Chemical Class1 of:

- DC-1 for the shallow soils (Made Ground, Bognor Sand Member and London Clay Formation (weathered); and
- DC-4 for the deeper soils (clays of the London Clay Formation)

A designated concrete FND4m is suitable for the site ground conditions

5. CIVIL ENGINEERING PROPOSALS

5.1 Drainage Strategy - Storm

5.1.1 Pre-Development Surface Water - Summary

Ref: 30142/2001. & 4330/SERV/5001/P0.

The land was a greenfield site prior to the wider development, with Peter Brett Consultants designed the offsite works as part of the site wide infrastructure.

Existing surface water drainage comprises gravel drains to prevent flooding across the site as it has been left. Ultimately these drain to the south east and connect to the drainage ditches that make up the site wide drainage in this area of the site.

5.1.2 Post-Development Surface Water - Summary

Surface water drainage for units 500-502 will be via conventional gravity pipe system which discharges to final connection point outside the south east corner of the boundary. The existing manhole in this location is on a 300mm pipe that connects an existing ditch beyond the eastern boundary of the site below Fitzwygram Way to a ditch to the south.

Each unit has individual discharge rates as calculated pro rata from allowable discharge rates per plot as summarised by Peter Brett Consultants. The main access road has been restricted separately. The three units and the access road will each have their own attenuation sized according to their impermeable area and allowable discharge rate as a proportion of the site wide area. This will then allow maintenance of this infrastructure to be the responsibility of each individual unit.

Where applicable, the surface water management strategy has incorporated the recommendations of the 'Non-Technical Standards for Sustainable Drainage' and general 'good practice' in terms of providing a Sustainable Drainage System (SuDS) which does not adversely impact on flood risk either within the site of beyond the development boundary.

5.1.3 Performance Criteria

The surface water drainage strategy for the new development should aim to deliver a safe, functional, cost effective and, as far as possible, sustainable drainage system (SuDS) which considers the following design principles to ensure:

- *That natural drainage features are protected;*
- *That public health and safety risks are taken into account and managed;*
- *The constructability of the surface water system;*
- *The maintainability of the surface water system;*
- *The long-term economic viability of the system;*
- *That sustainability issues are taken into account;*
- *That the information requirements of stakeholders are adequately addressed;*
- *That the potential value of the surface water system, in enhancing the rural and urban environment is recognized and optimized.*

The surface water below ground gravity drainage system is to provide connections from all new rainwater pipes, channels, gullies and road gullies at ground floor level. The locations of the drainage components are to be fully coordinated with all relevant architectural, landscaping and services drawings.

The surface water drainage system shall be designed to the following performance criteria:

Performance Criteria	*Storm Event*
Pipes running under full conditions with no surcharge	*1 in 2-year storm return period*
No flooding	*1 in 30-year storm return period*
Extreme flooding to be retained on site	*1 in 100-year storm return period*

The drainage system should be designed so that flooding does not occur during the 1 in 100-year rainfall event in any part of the building, or in any utility plant susceptible to water.

An allowance for 40% climate change is to be incorporated into the surface water drainage design in accordance with local and national planning policy.

It is understood that Bradbrook have allowed for a specific impermeable area per plot as part of their site wide drainage infrastructure design, any change from this not change the allowable discharge rate.

As well as providing sufficient SuDS, it is noted that the permeable paving is a requirement of the LOD site specification as part of the brief.

As part of the detailed design the impact of rainfall at each of the relevant storm events on the drainage network and any attenuation or infiltration features are to be simulated using Micro Drainage or similar.

In the event that flows from rainfall exceed the 1 in 100-year rainfall event or system failure through lack of maintenance, surface water run-off is to be directed via exceedance routes away buildings and/or critical infrastructure.

5.1.4 Sustainable Drainage Systems (SuDS)

All opportunities to implement green/traditional SuDS, have been considered as far as reasonably practicable.

Hierarchy	Description	Setting	Required area	Implemented
Green roofs	A planted soil layer is constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation.	Building	Building integrated.	No. Have been considered however are not in keeping with the architects' requirements for the building.
Rainwater harvesting	Rainwater is collected from the roof of a building or from other paved surfaces and stored in an over ground or underground tank for treatment and reuse locally. Water could be used for toilet flushing and irrigation.	Building	Water storage (underground or above ground).	**Yes.** **A small amount of water can be harvested for use in toilets, landscape maintenance etc.**
Soakaway	A soakaway is designed to allow water to quickly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug filled with gravel or rubble. Water can be piped to a soakaway where it will be stored and allowed to gradually seep into the ground.	Open space	Dependent on runoff volumes, water table and soils.	No. Site deemed unsuitable for infiltrating to ground.
Filter strip	Filter strips are grassed or planted areas that runoff is allowed to run across to promote infiltration and cleansing.	Open space	Minimum length 5m.	No. Have been considered however insufficient space to introduce within soft landscaping
Permeable paving	Paving which allows water to soak through. Can be in the form of paving blocks with gaps between solid blocks or porous paving where water filters through the block itself. Water can be stored in the sub-base beneath or allowed to infiltrate into ground below.	Street / open space	Can typically drain double its area.	**Yes.** **Permeable paving has been considered to provide an element of SuDS to the site and assist in reducing the onsite hydro carbons prior to discharging off site.**
Bioretention area	A vegetated area with gravel and sand layers below designated to channel, filter and cleanse water vertically. Water can infiltrate into the ground below or drain to a perforated pipe and be conveyed elsewhere. Bioretention systems can be integrated with tree-pits or gardens.	Street / open space	Typically, surface area is 5-10% of drained area with storage below.	No. Have been considered however are not in keeping with the architects' requirements.

Hierarchy	*Description*	*Setting*	*Required area*	*Implemented*
Swale	*Swales are shallow depressions designed to convoy and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath. Can be lined or unlined to allow infiltration.*	*Street / open space*	*Account for width to allow safe maintenance typically 2–3 metres wide.*	*No.* *Already in use across site for storage and disposal of road drainage.*
Hardscape storage	*Hardscape water features can be used to store run-off above ground within a constructed container. Storage features can be integrated into public realm areas with a more urban character.*	*Street / open space*	*Could be above or below ground and sized to storage need.*	*No.* *As storage has been provided for the site in the offsite basin this approach has not been considered.*
Pond / Basin	*Ponds can be used to store and treat water. 'Wet' ponds have a constant body of water and run-off is additional, while 'dry' ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration into the ground or to store water for a period of time before discharge.*	*Open space*	*Dependent on runoff volumes and soils.*	No. As storage has been provided for the site in the offsite basin this approach has not been considered.
Wetland	*Wetlands are shallow vegetated water bodies with a varying water level. Specially selected plant species are used to filter water. Water flows horizontally and is gradually treated before being discharged. Wetlands can be integrated with a natural or hardscape environment.*	*Open space*	*Typically, 5–15% drainage area to provide good treatment.*	*No.* *As storage has been provided for the site in the offsite basin this approach has not been considered.*
Underground storage	*Water can be stored in tanks, gravel or plastic crates beneath the ground to provide attenuation.*	*Open space*	*Dependent on runoff volumes and soils.*	***Yes.*** ***Underground storage will be used to adhere to plot allowable discharge rates.***

The drainage design should adopt the principles of SuDS where appropriate taking into consideration the site context and location.

The principals of SuDS are that they should be designed to maximise the opportunities and benefits that can be secured surface water run-off management in terms of quality, quantity, flood risk, and amenity.

The implementation and selection of SuDS techniques is largely dependent on the site layout and context. Some SuDS techniques may be more appropriate than others.

5.1.5 Water Quality

Consideration is to be given to both post-development water quality treatment and to ensure that water quality is not impacted during the construction works.

Permeable paving is generally considered to be effective in the removal / capture of hydrocarbons in car parks, and swales, basins and bio-retention areas, when appropriately designed, can also treat run-off. Where the site does not facilitate the use of SuDS for surface water run-off treatment, then oil interceptors should be specified.

The use of 'trapped gully pots' and catch-pits should also be considered for smaller low risk areas.

During construction adequate provisions are to be put in place to ensure that any construction silts, spillages will be protected from the entering the existing drainage network.

5.1.6 Exceedance flow management

In the event that flows from rainfall exceed the 1 in 100-year rainfall event, surface water run-off will be directed via exceedance routes away from the buildings to fall towards the car park and off towards the northern boundary line of the site, thereby not increasing flood risk to critical infrastructure.

5.1.7 Flood Storage Attenuation

The drainage system will be designed so that flooding does not occur during the 1 in 100-year rainfall event in any part of the building, or in any utility plant susceptible to water.

An allowance for 40% climate change is to be incorporated into the surface water drainage design.

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5.2 Drainage Strategy - Foul

5.2.1 Pre-Development Foul Water - Summary

Ref: 4330/SERV/5001/P0.

While existing foul water drainage is present on site it appears to have been installed in preparation for future development and does not align with the current design. Everything up to the final manhole within the site boundary will require removal. The final manhole and the connection point for the site is in the south east corner of the site and has an invert level of approximately 25.02mAOD. This eventually connects to the existing Southern Water sewer travelling east-west to the south.

5.2.2 Post Development Foul Water Drainage - Summary

Foul water drainage for the new development will be via conventional gravity pipe system which connects into the existing off-site network at the above discussed *connection point* at a level of 25.02mAOD.

Units 501 & 502 will drain west to the access road before heading south. Due to level restrictions the foul water sewer will cross under the service yard of unit 500 and pick up stack locations of this unit before discharging to the final connection point. Additional stack positions are included in all units to allow the reconfiguration of office space by future tenants. These positions will need to be appropriately capped to prevent odours within the building.

The foul drainage system will be designed in accordance with Building Regulations Approved Document H and the relevant British Standards.

See Appendix B for Drainage Layout

5.3 Ownership / Maintenance

Foul and surface water drainage systems within the development boundary will be designed as separate private systems which is maintained by the development owner either directly or by a management company.

The key elements of the surface water system will require periodic maintenance to prevent failure of the system and/or a reduction in capacity of the networks.

A schedule of maintenance activities which ensure the drainage is kept in good working order is to be produced for each development plot and submitted as part of the 'Health & Safety' documentation.

EXTERNAL WORKS

5.3.1 Earthworks / Levels

Principle levels and gradients have been set *to be in accordance with Building Regulations Part M and be DDA compliant. Levels will then be co-ordinated with the drainage system and designed in accordance with the relevant British Standards.*

Cut and fill exercises will be carried out for each plot and ultimately for the site as a whole in order to reduce earth movements and the need to dispose of material off site.

Site access levels will need to be designed accordingly to suit existing entrance tie in locations and surrounding constraints.

Any ramps are to be specified in accordance with the appropriate guidelines.

A cut & fill exercise has been carried out within the site boundary, to proposed formation levels. Existing site levels do not allow for compliant access gradients or planning approved ridge heights. Unit 500 requires a ground raise of approximately 0.8m and Unit 502 requires a cut of around 3.0m. Unit 501 spans an existing level change so requires around 1.0m of cut in the north and up to 2.5m fill in areas to the south. Overall, there is a net surplus of excavation material to be exported from site in the region of 13,850m^3. Following discussion with the client it has been agreed that this will be spread across sites of future development and ideally used for earthworks in these areas. The full cut & fill drawing can be seen in the appendix B.

5.3.2 Retaining Walls

Retaining in the most part will be achieved by sheet piling along portions of the Eastern boundary where the site will cut down into the existing ground. These will be installed to approximately 6m below proposed ground level before excavations can occur to the proposed finished levels. This will mean no excavation is required outside the boundary line of the site.

The south east corner of unit 501 will require a reinforced concrete wall along the eastern boundary as this area of our site is a maximum 1.4m above the existing ground level. Because of the loads applied to this area by the neighbouring structure sheet piling is unsuitable in this location. Additional concrete walls are necessary around the proposed sub-station location as it sits at a level below the FFL of unit 501 and above unit 500. It is therefore retaining to the north and retained to the south.

Elsewhere on site the stable nature of site material has allowed for stepper natural slopes to be utilised therefore greatly reducing the need for retaining structures.

5.3.3 Vehicle Loading

External hardstanding / footpath areas will generally be designed to carry pedestrian loading only.

Car park areas are to be asphalt and permeable paving and designed to accommodate a commercial vehicle e.g. box van.

Loading yard areas are to be concrete and design to accommodate frequent use by HGV vehicles.

Note: Allowance for MEWP access for window cleaning or roof / building maintenance to be confirmed.

5.3.4 Standards

Where applicable the construction build-ups for all roads and hardstanding areas will be designed in accordance with the following guidance:

- *BS EN 13108-1:2016 - Bituminous mixtures material specifications - Part 1: Asphalt Concrete.*
- *BS 594987:2015+A1:2017 - Asphalt for roads and other paved areas – Specification for transport, laying and compaction and type testing protocols.*
- *BS EN 7533 - Pavements constructed with clay, natural stone or concrete pavers.*
- *Asphalt Information Service – Guide to the Specification of Asphalt Applications.*
- *Specification for Highways Works.*
- *Manual of Contract Documents for Highway Works (MCHW).*
- *The design of porous / permeable finishes will be by others (supplier).*

5.4 Outline Specification

Materials to be used in all pavement constructions will be specified and laid in accordance with BS 594987:2015+A1:2017. Surface finishes to all trafficked and pedestrian areas shall be as defined on drawings prepared by the Architect. Finishes of all pavement layers shall be to the tolerances set out in the aforementioned standards. The sub-grade for all roads and paving works is to be prepared in accordance with the Specification for Highway Works.

- *In-situ CBR testing will be required for pavement design.*

No material shall be used within 450mm of the surface of any road or hard standing that is frost susceptible as defined by the test described in the Transport and Road Research Laboratory Report LR90. The material shall be deemed frost susceptible if in the test the heave exceeds 13mm.

Allow for a contingency for treating soft spots equivalent to 20% of all proposed hard standings to a depth of 350mm. All topsoil, poor fill and soft spots should be excavated and replaced with suitable well compacted granular material.

Final excavation to formation / sub formation level to be carried before compaction of subgrade.

Excavation or compaction not to be carried out in wet conditions when the subgrade may be damaged or destabilized.

Compact thoroughly by roller or other suitable means, adequate to resist subsidence or deformation of the subgrade during construction and of the completed roads/ paving.

Particular care to be taken when compacting fully at intrusions, perimeters and where local excavation or backfilling has taken place.

APPENDIX A – CIVIL DRAWINGS

LEGEND

PROPOSED DRAINAGE - FOUL

100Ø@1:100 — FOUL WATER DRAIN - **PVCu**
Approx. gradient and diameter as noted, 100mm Ø UNO

FW-01 — FOUL WATER MANHOLE
PC Ring 1.2m Ø UNO

FW-01 — FOUL WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m

Note: All internal foul MH's and IC's to have recessed covers. double sealed and locking to prevent odours. Refer to layout for location.

SAC — FOUL WATER SHALLOW ACCESS CHAMBER
Max depth to invert 600mm from GL, 300mm Ø

RE — FOUL RODDING EYE
Ø as noted

YG — FOUL YARD GULLY (to be trapped)
Gully reference as noted on drawing.
Cover grade to suit loading.

FD — FLOOR DRAIN (to be trapped)
Internal use only, refer to architect for details / specification.
Roddable from above slab into standard (01) fitting.
Floor Drain / Gully to be kept charged to avoid odours.

01 & 01A — FOUL OUTLET / STACK POSITION
Shown indicative, refer to architect for setting out.
All branches 100mm Ø UNO.
01 - Outlet connects into standard 90° rest bend.
01A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.
SVP - Indicates soil vent pipe by service engineer: with access.

PROPOSED DRAINAGE - STORM

150Ø@1:100 — STORM WATER DRAIN - **PVCu**
Approx. gradient and diameter as noted, 150mm Ø UNO

SW-01 — STORM WATER MANHOLE
PC Ring 1.2m Ø UNO

SW-01 — STORM WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m

RE — STORM RODDING EYE
Ø as noted

SILT TRAP

CONCRETE ENCASEMENT TO PIPE
Refer to limits of cover table drawing 7101

01 & 01A — RAIN WATER OUTLET
Shown indicative, refer to architect for setting out.
Refer to rainwater pipe details for branch Ø.
01 - Outlet connects into standard 90° rest bend.
01A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.

AG — RAIN WATER OUTLET ACCESS GULLY
AG - Outlet connects to gully.

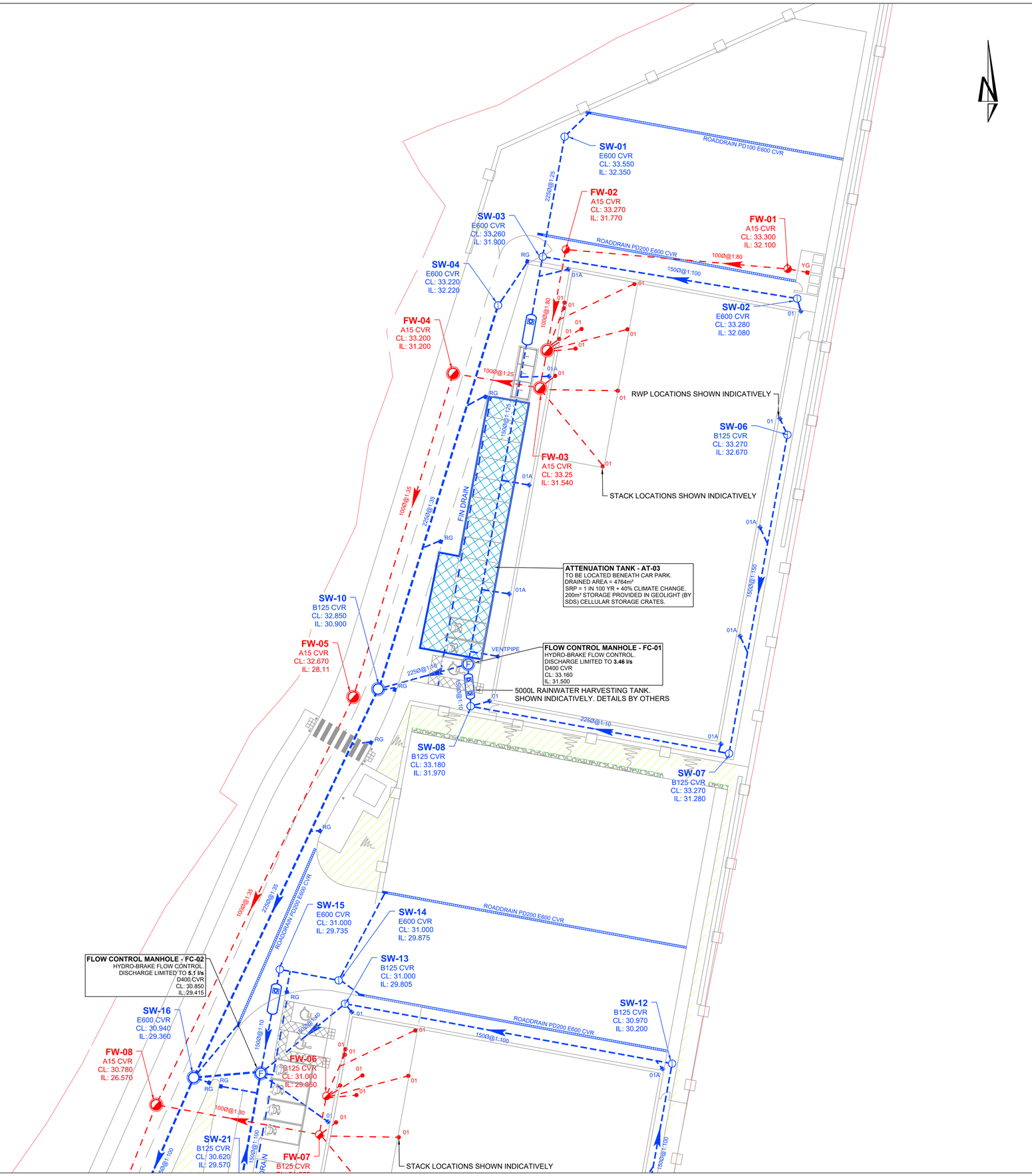
RG — ROAD GULLY (to be trapped)

YG — YARD GULLY (to be trapped)

PG — PAVED AREA GULLY (to be trapped)

DC — DRAINAGE CHANNEL
(Refer to layout for specification)

TH — THRESHOLD DRAINAGE CHANNEL
(Refer to architect for details / specification)



KEY PLAN

NOTES

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4. Levels shown in metres above Ordnance Datum (mAOD).
5. All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
6. All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
7. All drainage to be laid soffit to soffit unless otherwise shown.
8. The Contractor is to verify the line, level and diameter of existing sewers before commencing drainage works.
9. All foul drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise shown.
10. Cover levels shown on this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that access covers and frames are set at the final surface levels.
11. Where possible the contractor is to orientate manhole biscuits and covers to locate them parallel to kerbs and paving.
12. The Contractor should comply with hs(g) 47 "Avoiding Danger from Underground Services" when excavating around existing services.
13. It is the contractors responsibility to determine the location and depth of all existing services, mains and cables prior to construction.
14. Contractor to provide temporary screens in each of the down stream manholes during the construction period of the development in accordance with SFA 2.9.10 and the local sewerage undertakers requirements.
15. All in-situ concrete and precast concrete components to be manufactured using Sulphate Resisting Portland Cement, (SRPC) to BS 4027, if required, subject to soil conditions. Manhole components to be to BS EN 1917:2002.
16. All ironwork to be kite marked by BSI or certified by equal inspection authority.
17. All redundant connections to be capped off and grouted from the down stream manhole.
18. All new drainage pipes to be jetted, CCTV surveyed with DVD recording and any defects highlighted to the supervising officer. Following the rectification of any defects, the drain is to be re-surveyed with CCTV and the recordings made available to the project manager/engineer.
19. Prior to commencing the works the contractor is to confirm details of the existing drainage system as noted on the drawing.
20. Prior to commencing the works the contractor is to undertake the drainage investigation work as noted on the drawing.

REV						
P02	ARCHITECT LAYOUT UPDATED					
	A.TODD	01/02/22	A. TODD	01/02/22	J. MAGEE	01/02/22
P01	PRELIMINARY ISSUE					
	R. IRONS	05/11/21	A. TODD	05/11/21	J. MAGEE	05/11/21
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT
PORTSMOUTH CITY COUNCIL

PROJECT
DUNSBURY PARK
UNITS 500, 501 & 502

TITLE
DRAINAGE LAYOUT

HYDROCK PROJECT NO.	SCALE @ A1
C-19453-C	1:250

STATUS DESCRIPTION	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
DP-HYD-00-ZZ-DR-C-7010	P02

LEGEND

PROPOSED DRAINAGE - FOUL

100Ø@1:100 — FOUL WATER DRAIN - **PVCu**
Approx. gradient and diameter as noted, 100mm Ø UNO

FW-01 — FOUL WATER MANHOLE
PC Ring 1.2m Ø UNO

FW-01 — FOUL WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m

Note: All internal foul MH's and IC's to have recessed covers. double sealed and locking to prevent odours. Refer to layout for location.

SAC — FOUL WATER SHALLOW ACCESS CHAMBER
Max depth to invert 600mm from GL, 300mm Ø

RE — FOUL RODDING EYE
Ø as noted

YG — FOUL YARD GULLY (to be trapped)
Gully reference as noted on drawing.
Cover grade to suit loading.

FD — FLOOR DRAIN (to be trapped)
Internal use only, refer to architect for details / specification.
Roddable from above slab into standard (01) fitting.
Floor Drain / Gully to be kept charged to avoid odours.

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PROPOSED DRAINAGE - STORM

150Ø@1:100 — STORM WATER DRAIN - **PVCu**
Approx. gradient and diameter as noted, 150mm Ø UNO

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SILT TRAP

CONCRETE ENCASEMENT TO PIPE
Refer to limits of cover table drawing 7101

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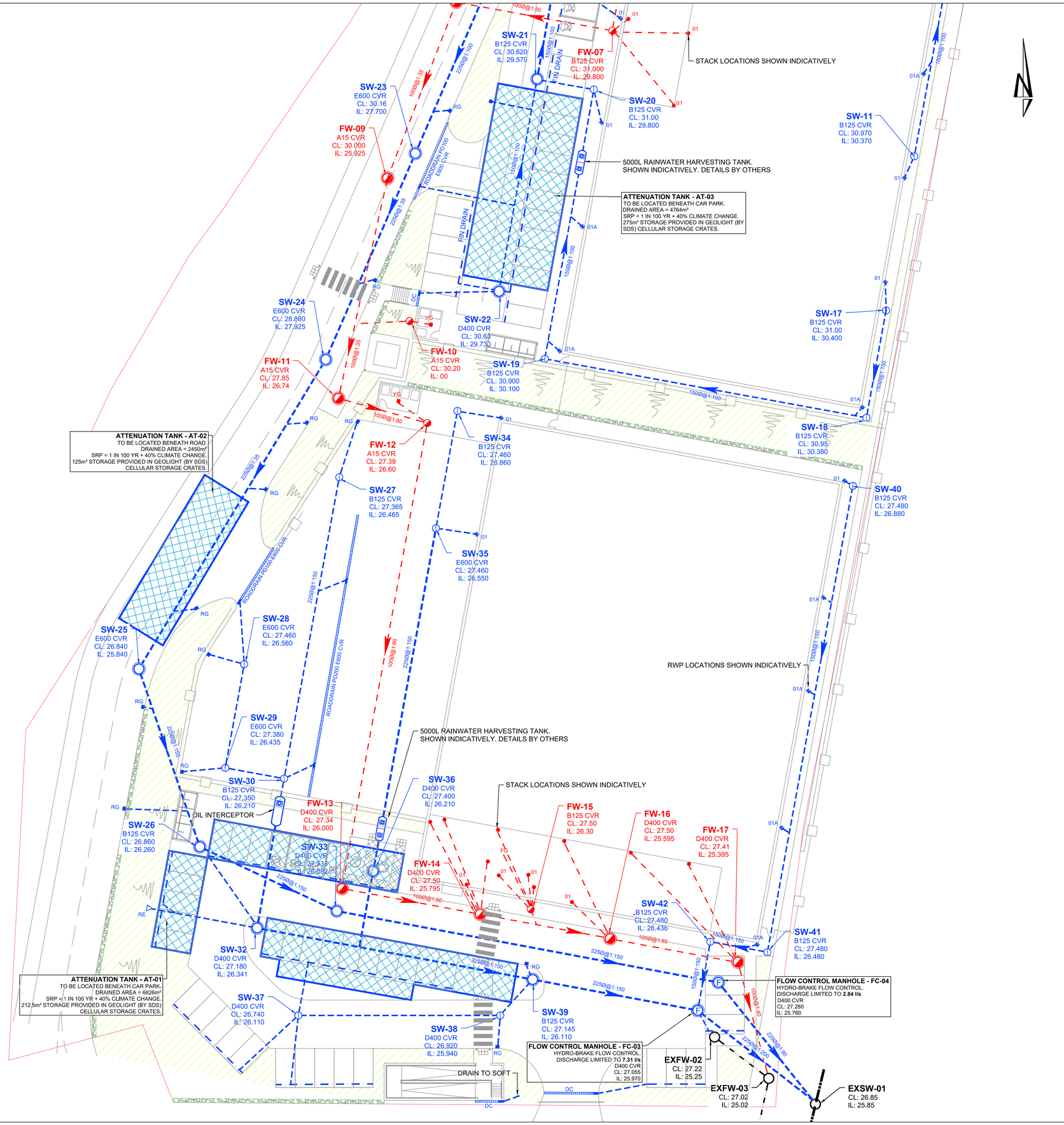

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	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
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CLIENT
PORTSMOUTH CITY COUNCIL

PROJECT
DUNSBURY PARK
UNITS 500, 501 & 502

TITLE
DRAINAGE LAYOUT

HYDROCK PROJECT NO.	SCALE @ A1
C-19453-C	1:250

STATUS DESCRIPTION	STATUS
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DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
DP-HYD-00-ZZ-DR-C-7011	P02