

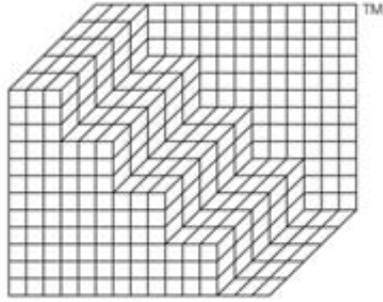
hayle harbour :: regeneration South Quay

Development Proposal for South Quay/Foundry Yard Hayle Harbour

December 2010



Utilities Assessment



Buro Happold

027802 Hayle Harbour South Quay Utilities Assessment

**Outline Planning Application
Job no 027802**

December 2010

Revision 00

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date **02/12/10**

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1 Executive Summary

This utility assessment uses information obtained from the previous report, utility companies, stakeholders and results from recent negotiations with South West Water and Western Power Distribution.

There is an opportunity for adequate utilities being available at this site as the proposed development is to be located on a brown-field site, which is close to Hayle Town Centre.

There are no known problems with being able to supply water, gas, telecommunications and electricity to the proposed food store, retail/restaurant outlets and residential units on South Quay. Storm and foul water drainage can be accommodated by the harbour and existing infrastructure, respectively.

Small scale diversions and protection of utilities will be required to accommodate the proposed changes to the highway layout and alignment associated with the development proposals. These can be undertaken at the same time as any connections needed to provide a supply to the site.

Further discussion is required with South West Water (SWW) to confirm the available capacity in the adjacent existing network and determine the point of connection. It is likely SWW will require a pressure/flow test and hydraulic modelling to be undertaken in order to determine the available spare capacity. Similarly, subject to SWW capital maintenance proposals for foul sewers, further negotiations will be required to determine whether foul water from the site can be discharged by gravity to the adjacent sewer, or will require to be pumped from a new pumping station to East Quay, for onward transmission via the existing pumping station.

A single electricity substation is unlikely to be able to supply the site and a new substation will be required within the development, but there is still an opportunity for a combination of supplies to be made available. The provision of a new substation can be incorporated within the existing electricity network.

The existing and proposed utility services for South Quay are shown on the drawing in Appendix A at the end of this report.

2 Drainage

There are no significant concerns in regards to the drainage of the proposed site. Outline proposals for the storm water drainage have previously been discussed with the Environment Agency and the foul water drainage requirements with South West Water (SWW).

2.1 Storm Water Drainage

South Quay itself has no existing storm water drainage infrastructure. The existing surface water drainage system local to the proposed development area consists of a system of combined sewers located within the highway area, discharging to the sewage treatment works south of Griggs Quay to the west of Hayle Harbour.

The topography for the area shows a natural fall towards the Quays hence the route of the combined sewers follow the main highways local to the pools and creeks. From the asset record information received from South West Water it appears the pumping station on North Quay pumps to the station on East Quay and the combined discharge is pumped from East Quay via Penpol Terrace and Carnsew Road to the sewage treatment works. The existing combined storm overflows from the two pumping stations discharge to the tidal waters between North and East Quays.

The strategy for draining surface water from the proposed development areas will be to construct a separate network of gravity storm drainage. This network will be arranged to follow public areas to ensure that as much of the system can be vested in South West Water as public sewers under a Section 104 agreement of the 1991 Water Industry Act. The discharge locations for the surface water will be arranged where possible to be into tidal waters. The principle of this approach has been agreed with the Environment Agency. Discussions with the Environment Agency are ongoing to seek their approval to discharge and agree the necessary consents i.e. Flood Defence and Discharge Consents. The piped network will collect flow from roofs and paved areas and convey it to the harbour areas, likely to be into Penpol Creek through several outlet locations. Consideration will be given to re-use roof water from the larger retail and commercial developments as grey water for toilet flushing and irrigation use.

New outfalls will be required through the harbour walls at a level likely to be between high and low tidal water levels, the details of these will also require agreement with the Harbour Company to ensure they do not impact on navigation or mooring. All flows from vehicular areas are to

pass through hydrocarbon interception prior to discharge to protect water quality. Attenuation is not proposed to the surface water system given the development areas' proximity to the sea.

The anticipated maximum storm water discharge from the site is 40 l/s as set out in the Flood Risk Assessment.

No storm water drainage is proposed for discharge into Carnsew Channel as this will be linked directly to the Carnsew Pool in the future. Carnsew Pool is recognised as a Site of Special Scientific Interest (SSSI) and a sensitive ecological area where water quality must be maintained.

The raised ground levels required for the future flood protection of the development will assist in providing the proposed drainage gradients for pipework as well as sustainable drainage solutions and grey water recycling, which is currently favoured by the Environment Agency and Local Authority.

2.2 Foul Water Drainage

The existing South West Water foul sewerage system is as previously described under the 'Surface Water Drainage Existing Situation' as the sewers are a combined system of surface water and foul water within the highway adjacent to South Quay.

Existing sewer records are not sufficiently clear to be able to confirm that a suitable gravity sewer connection exists. It is considered unlikely that the existing adjacent gravity foul drainage system will have sufficient spare capacity to accommodate the development and hence allowance has been made for a new submersible (underground) pumping station and rising main delivering to the site of the East Quay foul water pumping station as shown on the drawing in Appendix A.

SWW have previously advised Buro Happold and ING RED UK (Hayle Harbour) Limited that the existing sewers are subject to a saline water intrusion rate of 80% of the capacity of the East Quay Pumping Station (pump forward rate approximately 280l/s), at high tides.

It is therefore still possible that subject to SWW capital maintenance proposals for remedial works to reduce this unsatisfactory saline water intrusion, that spare capacity may become available in the existing gravity foul sewers and pumping stations/mains, to accommodate the South Quay development.

Further negotiations will be required with SWW as the detailed design of the proposal progresses, to determine whether foul water from the site can be discharged by gravity to the adjacent sewer, or will require to be pumped from a new pumping station to East Quay. Subject to further

investigation, it may also be possible to initially connect early phases of the development to the existing gravity system with a commitment from the developer to provide a new pumping station and rising main if and when required, as the rest of the South Quay is developed.

The original Outline Planning Application (OPA) for South Quay indicated that the daily foul flow rate equated to 15 l/s. The currently proposed site for the larger Food Store would occupy the area previously planned primarily for Retail and Residential, suggesting that approximately 60% of the residential would be omitted.

Therefore, allowing for a 60% reduction in the residential flow rates $12 \text{ l/s} \times 0.6 = 7.2 \text{ l/s}$ & $15 - 7.2 = 7.8 \text{ l/s}$ for the remaining residential, retail and commercial. Adding the estimated daily flow from the food store of 0.33 l/s would give a total average daily flow of approximately 8.13 l/s (peak factor of 6DWF giving a peak flow of 49 l/s).

In summary, the estimated daily foul sewage rate would reduce from 15 l/s to 8.13 l/s by the introduction of a food store in lieu of residential development.

The strategy for draining foul water from the proposed development areas will therefore be to construct a separate network of gravity foul drainage. Again this network will be arranged to follow public areas to ensure that as much of the system can be vested in South West Water as public sewers under a section 104 agreement of the 1991 Water Industry Act. The discharge locations for the foul water will be arranged to be as close as reasonable to the existing pumping stations on East Quay. Obviously the new development will increase flows both through the pumping stations and their respective rising mains and could potentially impact on the capacity of the sewage treatment works. SWW have advised that a foul drainage modelling exercise will need to be undertaken which would be a combination of flow monitoring and network modelling. The results of the evaluation would advise what works, if necessary, would be required to upgrade the existing system to cater for the demands of the new development. Consultations with the Environment Agency and South West Water are ongoing to establish what actions will be necessary in this respect.

3 Utilities

3.1 Anticipated Utility Loads

An estimate of the utility loadings for this site has been made based on available loading data with an allowance for initial base loads.

Hence, for each utility service, the following initial assessment has been made: -

HAYLE HARBOUR SOUTH QUAY RE-DEVELOPMENT

UTILITIES DEMAND / GENERATION RATES

Description	Unit	Employment Rate / per 7m ²	Total	Employment Occupancy	Potable Water		Electricity		Gas			
					Est. Ave Daily Demand Rate (lit)	Est. Ave Daily Demand (lit)	Demand Rate (kW)	Total Demand (kW)	Demand Rate	Total		
Residential												
Pool Quarter												
2B 2 Storey Townhouses	Dwellings		17		0.007	0.12	1.0	17.0	8kW/flat	136.0		
3B 2 5 Storey Townhouses	Dwellings		7		0.007	0.08	1.0	7.0	8kW/flat	56.0		
2B Apartments	Dwellings		6		0.007	0.04	1.0	6.0	8kW/flat	48.0		
Commercial												
Foodstore E (incl. Plant and end Lobby)	m ²	37.417	2,230	140			0.84		360.0	1160.0		
Unit A - Retail	m ²	37.417	682	18	0.001	0.01	0.1	68.2	100w/m ²	68.2		
Unit B - Retail	m ²	37.417	704	19	0.001	0.01	0.1	70.4	100w/m ²	70.4		
Unit C - Retail	m ²	37.417	704	19	0.001	0.01	0.1	70.4	100w/m ²	70.4		
Unit D - Cinema	m ²	2,200.3	433	197	0.001	0.14	0.1	43.3	100w/m ²	43.3		
Unit F - Retail	m ²	37.417	173	6	0.001	0.00	0.1	17.3	100w/m ²	17.3		
Unit G - Retail	m ²	37.417	234	8	0.001	0.00	0.1	23.4	100w/m ²	23.4		
Unit H - Restaurant	m ²	1	372	372	0.001	0.26	0.1	37.2	100w/m ²	37.2		
Other												
Sewage Pumping Station									10.0			
Street Lighting									20.0			
Slide Gate									36.0			
Totals												
Total Residential Dwellings			30				0.208		30.0	240.0		
Total Commercial Areas			6,432	772			1.279		1280.2	1470.2		
Total Other Areas							0.000		66.0	0.0		
Total Demand / Generation							Total (lit/s)	1.49	Total (kW)	1376.2	Total (kW)	1710.2

Assumptions

Assumed occupancy rate 2.5 persons per dwelling

Potable water pipes shall be sized to cater for fire fighting flows. The table above makes no allowance for fire fighting demand.

Assumptions

1.

Potable Water

200litres / head / day for domestic consumption / property
 2persons / dwelling
 therefore 600 litres / day / dwelling
 60 litres / head / day for commercial / community

2.

Electrical

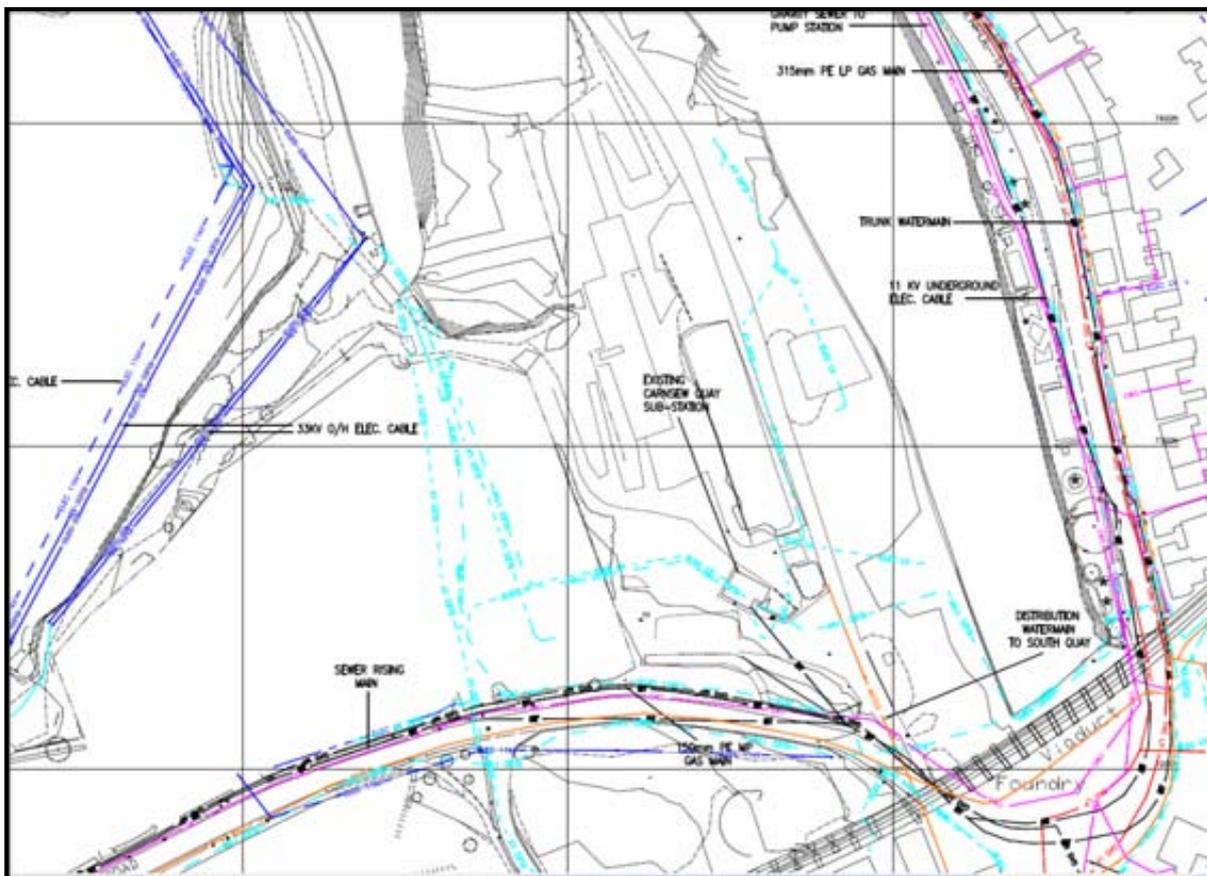
Flats 14W/unit
 Houses 20W/unit
 Business Centres & Units 100watts/m² (assumes air conditioning)
 Retail 80watts/m² (no air conditioning)
 Light industrial 30watts/m² + process (assumes 50watts/m²)
 Hotels 0.5kW/room + 60kW kitchen
 Community facilities as per business units
 Other loads
 - Slide gate and associated plant 36kW
 - Street lighting 20kW

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Potable water demand may potentially be reduced by water saving measures such as low flush toilets, reduced flow fittings etc.

The demand figure stated for electricity is a diversified demand across the entire development. This should be used for discussions with the local utility in sizing electrical infrastructure.

An extract of the existing utilities plan is provided below.



EXISTING SERVICES KEY:

	GAS LP		GAS MAIN LP
	GAS MP		GAS MAIN MP
	BT		BT
	ELEC 11KV		ELECTRICITY UNDERGROUND
	ELEC 33KV		ELECTRICITY OVERHEAD
	WATER		WATER
	CWD		COMBINED DRAINAGE

1. Service locations are indicative only. Alignments shown have been based on information provided by service providers. Actual locations have not been verified on-site.

3.2 Utility Constraints

The availability and constraints for the South Quay Development are considered as follows:

Utility	Availability	Constraints / Comments
Water	SW Water Main in road to south of site. Existing connection to this site.	Relatively low load, no capacity issues expected but to be confirmed. Provision of fire hydrant capacity may be restrictive.
Gas	Medium and low pressure mains in road to south of site	Relatively low load, no capacity issues expected but to be confirmed
Electricity Sub-station	Existing substation immediately adjacent to the site. It is understood that this is within the adjoining Jewson land boundary although wayleaves and access will need to be reviewed.	Whilst supply should not be an issue it is likely that a new substation and dedicated access will be needed to supply the required demand. The elevation of the new substation will need to allow for future water level rise.
Electricity Cables	Numerous underground cables pass through the site and also underground/overhead on south/west of site.	New 11kV cables required to supply new substation within site. Existing Cables within site will require to be diverted
IT/Comms	BT cables in road to south of site. Existing connection to this site also shown	BT Exchange possibly close to site at Foundry Post Office (but this has not been confirmed) if additional services required

3.3 Electricity Supply

Investigations have been undertaken by Buro Happold to assess the transformer rating of the existing substation, whether the existing substation has any spare capacity to supply additional customers and the feasibility of providing an extra 1,000 kVA to the new development from the local electrical network.

Consultation with Western Power Distribution (WPD) regarding the existing transformer substation, confirmed that it is located at Carnsew Quay, shown below in **Figure 1**.

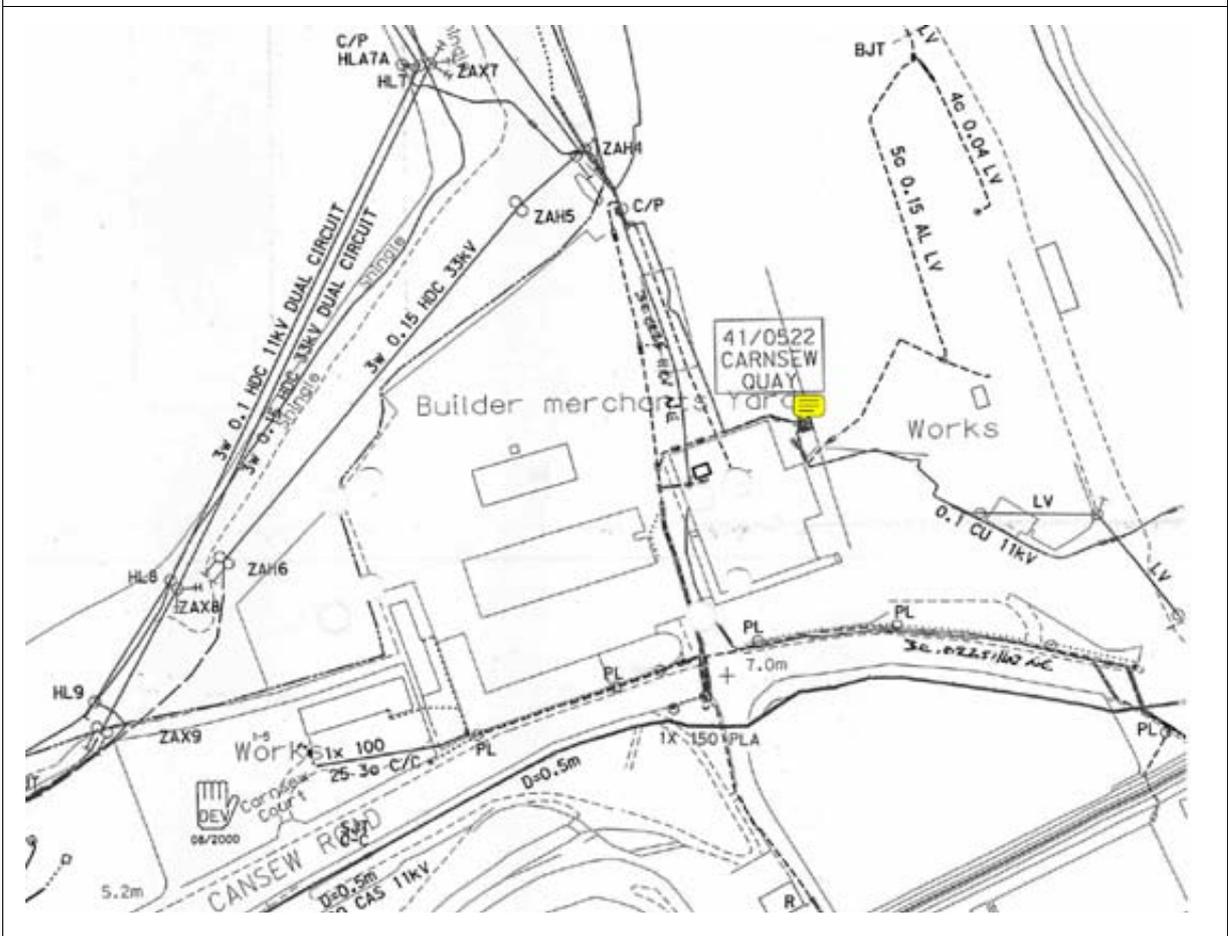
Figure 1 – Satellite Image Indicating Approximate Location of Existing Carnsew Quay Substation



3.3.1 Existing Substation – Rating

The existing substation at Carnsew Quay is owned and operated by Western Power Distribution and is referred to on WPD drawings (shown below in Figure 2) as Substation 41/0522. The substation appears to be a packaged unit located outside on a concrete pad within the Jewson's Warehouse site on the Northern side of Carnsew Road (B3301). The unit is rated at 500kVA.

Figure 2 – Western Power Distribution Drawing Records Indicating Carnsew Quay Substation



3.3.2 Existing Substation – Spare Capacity

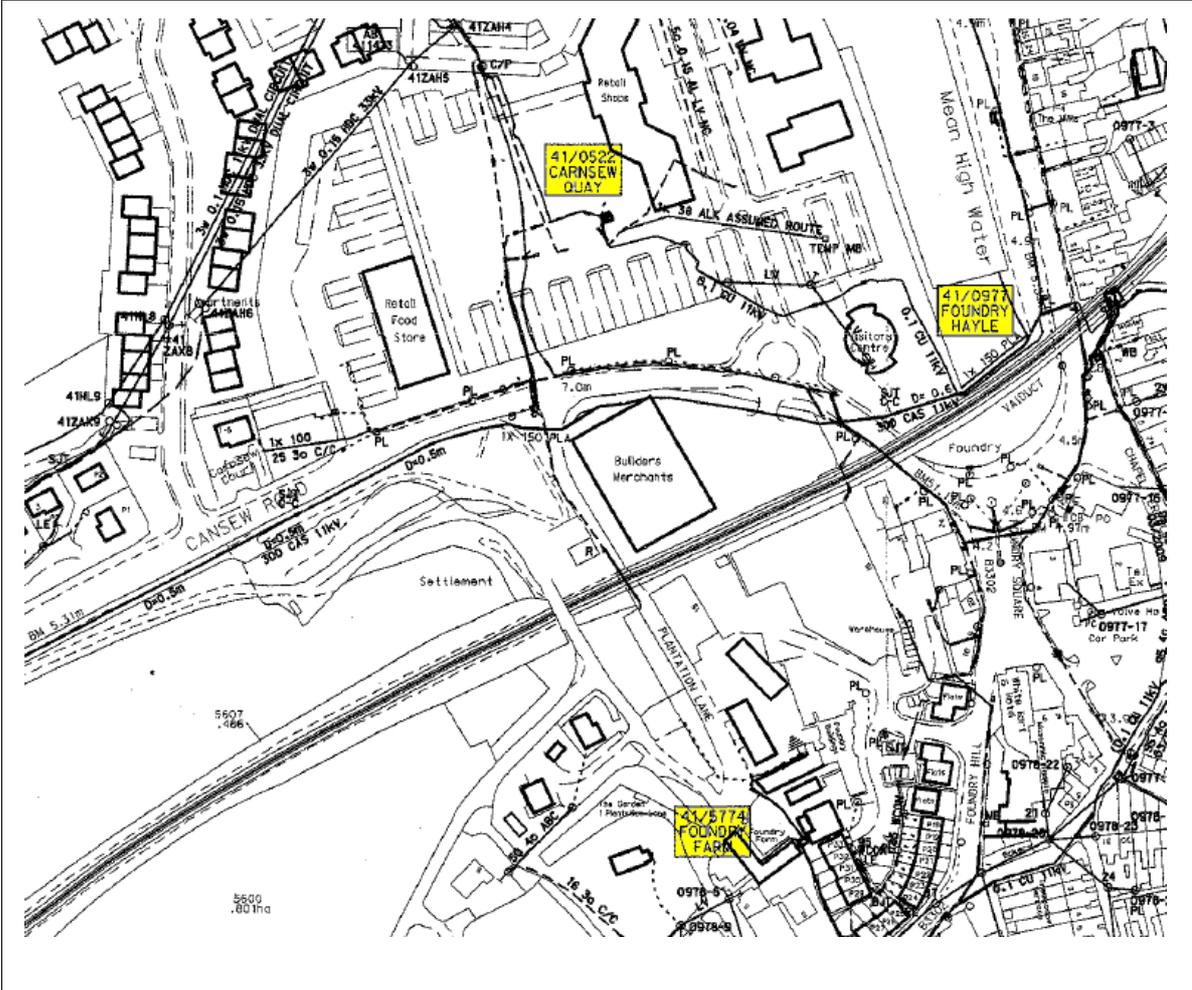
WPD records show that there are a total of 11 no. LV customers being supplied from the existing substation. These include the warehouse buildings on the Jewson's site where the substation is located and also connections to customers on the Southern side of the rail line along Plantation Lane. An assessment of current spare capacity can only be confirmed following a substation survey carried out by WPD staff, but the latest record information shows that the substation is lightly loaded, peaking at only 50kVA during the day. It is therefore estimated that it should be possible for the existing substation to support a demand load of 400kVA +/- 10%. Any additional demand from a new development would require a degree of network reinforcement. This is however, readily available, as described below.

3.3.3 Alternative Sources of Supply

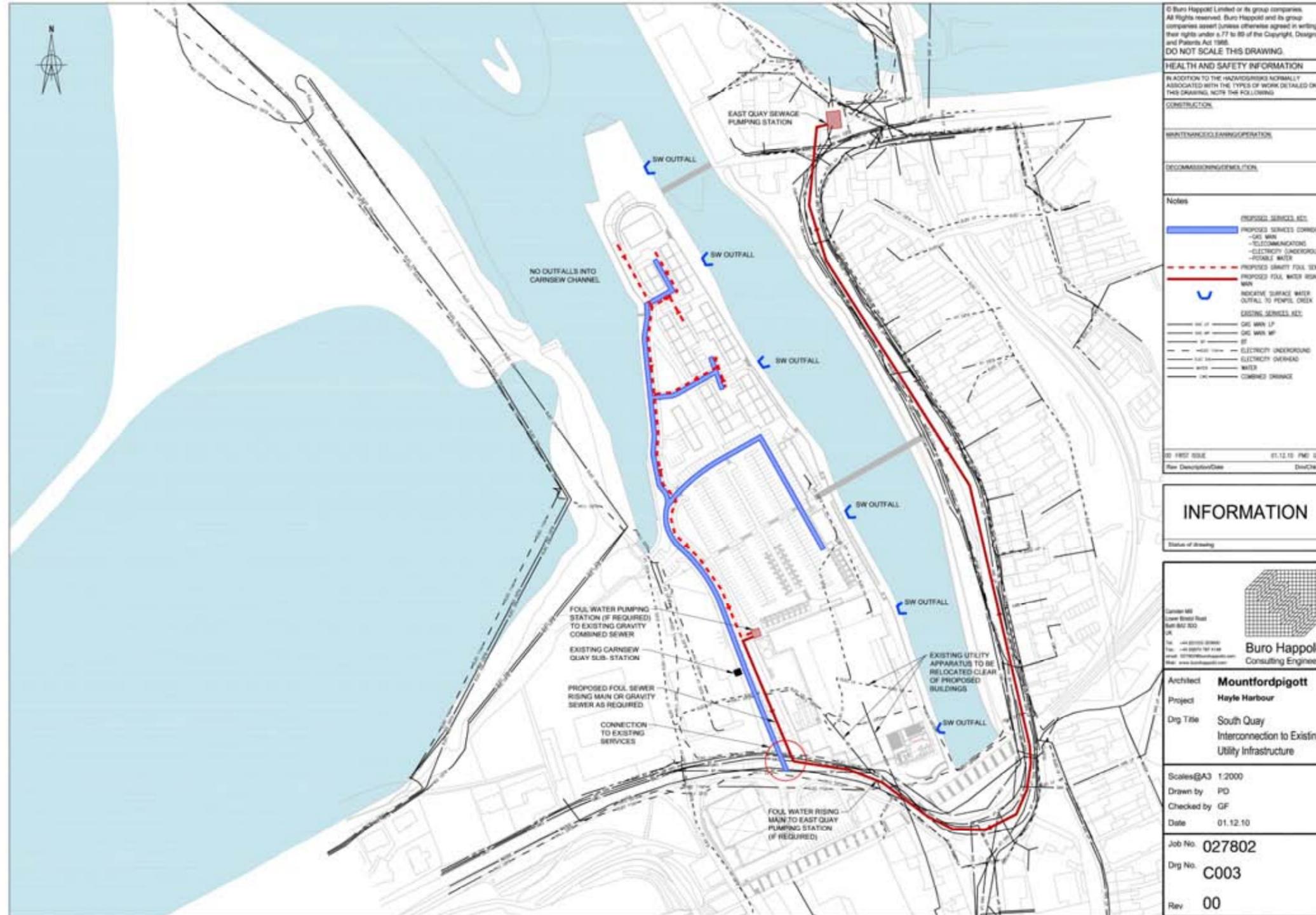
The Western Power Distribution (WPD) network surrounding the proposed development area is shown in Figure 3. It can be seen that the Carnsew Quay site is in close proximity to a number of other local distribution substations, notably Foundry Hale (WPD substation 41/0977) and Foundry Farm (WPD substation 41/5774). Initial (off-record) conversation with the local WPD network planner indicate that providing an additional 500 to 800 kVA load to a new development in the area should not overly stress the local network. It was suggested (informally) that in the event that the Carnsew Quay site could not support the load from the new development then new circuits could be extended from the Foundry Hale substation.

It is expected that a new 11kV circuit from Foundry Hale Substation could supply a new 1,000kVA substation within the development.

Figure 3 – Western Power Distribution Drawing Records Indicating Local WPD Network



Appendix A – Existing and Proposed Utilities Drawing



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CONSTRUCTION
 MAINTENANCE/CLEANING/OPERATION
 DECOMMISSIONING/DEMOLITION

Notes

PROPOSED SERVICES KEY:
 - GAS MAIN
 - TELECOMMUNICATIONS
 - ELECTRICITY (UNDERGROUND)
 - POTABLE WATER
 - PROPOSED SHIMMY FOUL SEWER
 - PROPOSED FOUL WATER RISING MAIN
 - INDICATE SURFACE WATER OUTFALL TO PENPOL CREEK

EXISTING SERVICES KEY:
 - GAS MAIN LP
 - GAS MAIN MP
 - ST
 - ELECTRICITY UNDERGROUND
 - ELECTRICITY OVERHEAD
 - WATER
 - COMBINED DRAINAGE

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