

City Airport Development Programme (CADP1)

Condition 84: Piling 3



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1. Introduction

- 1.1. The City Airport Development Programme (CADP1) planning application (13/01228/FUL) was granted planning permission by the Secretaries of State for Communities and Local Government and Transport in July 2016 following an appeal and public inquiry which was held in March/April 2016. Condition 84 of the CADP1 permission is as follows:

84. Piling 3

No impact piling shall take place until there has been submitted to and approved in writing by the local planning authority a piling method statement, detailing the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including measures to prevent and /or minimise the potential for damage to subsurface sewerage infrastructure, and the programme for the works. Any piling shall be undertaken in accordance with the terms of the approved piling method statement.

Reason: To ensure that the piling will not impact on local underground sewerage utility infrastructure, as it will be close to underground sewerage utility infrastructure.

- 1.2. This piling method statement has been prepared to discharge the above condition.

Piled foundations are required for the following parts of CADP1 development:

- West Terminal Extension (WTE);
- Western Energy Centre (WEC);
- New deck construction over the King George V Dock, plus some land based piles which together supports the Airfield Expansion, new East Pier and East Terminal Extension

- 1.3. This document should be read in conjunction with the following Drawings, which are included as Appendix A:

- A400-ATK-C-29-XXX-DR-XX-863-001-01 WESTERN SERVICE YARD PROPOSED PILING AND EXISTING THAMES WATER MAIN
- A400-ATK-C-29-XXX-DR-XX-864-001-02 WESTERN SERVICE YARD EXISTING SURFACE WATER SYSTEM LAYOUT
- A400-ATK-C-29-XXX-DR-XX-864-002-01 WESTERN SERVICE YARD PROPOSED SURFACE WATER DRAINAGE SYSTEM LAYOUT
- A400-TPS-C-00-XXX-DR-SK-800-008-04 DECK AND EASTERN TERMINAL EXTENSION BUILDING WORKS WITH STORM AND FOUL WATER NETWORKS
- A400-TPS-C-00-XXX-DR-SK-800-009-04 DECK AND EASTERN TERMINAL EXTENSION BUILDING WORKS & DRAINAGE NETWORKS LOCATION PLAN

2. Applying PCC 84 to CADP1

2.1. Requirements of Condition

- 2.1.1. The condition refers solely to impact piling of which none is proposed in the CADP1 development, where all piling is either bored, augered or vibrated. However, following consultation with Thames Water and the London Borough of Newham the scope of this document has been agreed.
- 2.1.2. Thames Water were consulted on 19th September 2016 (meeting minutes attached in Appendix B) and confirmed that their publication "Guidance for working near our assets" would be considered in assessing any piling method statement provided under condition 84. This publication applies to any piling method, not just impact piling, as well as to all Thames Water piped services, not just Sewerage.
- 2.1.3. The Guidance advises that Piling within 15m of Thames water pipes can cause damage to and subsequent failure of the asset(s), resulting in compromised levels of service to customers, flooding, damage to property and compromised safety of Thames operatives and third parties.
- 2.1.4. It states that where an asset cannot be diverted or relocated, either temporarily or permanently, to accommodate the works, an impact assessment will be needed to ensure that the consequences of the works will have as low as reasonably practicable (ALARP) risk to these assets. Additional Thames Water approvals are required, in order to build over or within 3m of their sewers and in any event no development or structure should be built within 5m of water transmission (trunk) mains or 3m of water distribution mains.
- 2.1.5. With regards sewers, where bored or augered piles are to be installed less than three metres or 1.5 times the diameter of the pile, whichever is greater, from the outside face of the Thames Water pipe the piling is deemed to pose a risk to the asset. For impact piling this dimension would increase to 15m.
- 2.1.6. For all identified risks the following documentation is to be submitted:
- Engineering Impact Assessments
 - Pre and post survey works
 - Results of monitoring (vibration, ground movement, strain etc) as appropriate during the course of the works
- 2.1.7. At a subsequent meeting with Thames Water on 11th November 2016 (minutes attached in Appendix B) their detailed requirements in respect of CADP1 were discussed and the following direction was given and agreed:
- in relation to water transmission and distribution mains, which are of particular importance: in addition to the limitation on piling within 5m of transmission pipes and 3m of distribution pipes a risk assessment is required in respect of the potable water pipe within the Service Yard that supplies the DLR;
 - the foul and surface water drains within the Western Service yard and Forecourt areas, serving both LCA and DLR, and historically maintained by LCA could remain under LCA ownership.
- 2.1.8. In summary, the only relevant Thames Water asset to be considered by PCC 84 is the potable water main shown on drawing A400-ATK-C-29-XXX-DR-XX-863-001-01. The requirement of this condition are covered by the scoping document attached as Appendix C.
- 2.1.9. Section 3 of this document provides an outline of the piling proposed and assesses the position of piling with respect to the Thames Water piped assets. Section 4 provides supporting documentation in relation to the Thames Water potable water main.
- 2.1.10. A draft of this submission was circulated to Thames Water Infrastructure Alliance, who have responded that their Strategic Planning and Assurance team are happy with the LCA proposed piling submission, which can now be submitted formally to the LA planning team, who will then consult with Thames Water to remove the appropriate condition. The e mail response is included as Appendix D.

3. Piling Method and Proximity to Thames Water Assets

- 3.1. This section provides a commentary on piling methods, pile type and the relative position to Thames Water assets for each part of CADP1 requiring piled foundations.
Should any sheet piling be required during construction works for supporting the sides to deep excavations that cannot be undertaken as open cut or using trench box supports, these will be vibrated into position.

3.2. Western Terminal Extension (WTE)

- 3.2.1. WTE columns are generally founded on a three pile cluster with pile cap. Where vertical column loads are smaller one and two pile caps are utilised. The ground conditions require 600mm diameter CFA piles to a depth of between 13m and 30m below existing ground level. The actual depth is determined at the start of construction through pile loading tests.
- 3.2.2. The pile caps support reinforced concrete (RC) beams typically running east-west which in turn support the ground floor slab. There is no basement construction.
- 3.2.3. At the 11th November meeting Thames Water agreed that there are no Thames Water sewers within 15m of the WTE piling. The Thames Water assets have been identified from tile TQ4280SW. Some assets that may potentially have been adopted by Thames Water and highlighted in beige on CADP1 services drawing A400-ATK-C-29-XXX-DR-XX-864-001-02, but historically maintained by LCA, remain under LCA ownership.
- 3.2.4. As indicated on this drawing, the footprint of the building lies over an existing surface water pipe and to mitigate the effect of the new construction on this beige highlighted LCA sewer, a diversion is proposed as shown on drawing A400-ATK-C-29-XXX-DR-XX-864-002-01.
- 3.2.5. The potable water main serving DLR is within 15m but further than 3m from the nearest WTE and WEC pile as shown on A400-ATK-C-29-XXX-DR-XX-863-001. To fully address the requirements of Thames Water a risk assessment and supporting documentation is provided in section 4 below

3.3. Western Energy Centre (WEC)

- 3.3.1. The WEC has a single storey part-plan basement formed by a secant pile retaining wall with an in-situ RC lining wall and RC capping beam. The excavation to form the basement will be in the order of 5.5m below ground level. The basement is founded on 600mm diameter CFA piles installed to a depth of between 13m and 20m below ground level. The actual depth will be confirmed at the time of construction through pile loading tests.
- 3.3.2. The ground floor slab above the basement is supported on RC beams spanning between the capping beam and internal columns. The remaining ground floor slab is founded on upstand ground bearing beams (not piled).
- 3.3.3. **The basement construction will be sequenced as follows:**
- Install secant bored-pile to create a box
 - Install RC capping beam to piles
 - Install temporary waling beams and struts at top of box walls
 - Bulk excavation within box
 - Temporary dewatering
 - Cut down internal piles to underside of basement raft
 - Construct basement raft
 - Install RC lining to box walls
 - Construct basement columns
 - Build suspended ground floor slab / downstand beams
- 3.3.4. At the 11th November meeting Thames Water agreed that there are no Thames Water sewers within 15m of the WEC piling. The Thames Water assets have been identified from tile TQ4280SW. Some assets that may

potentially have been adopted by Thames Water and highlighted in beige on CADP1 services drawing A400-ATK-C-29-XXX-DR-XX-864-001-02, but historically maintained by LCA, remain under LCA ownership.

- 3.3.5. As indicated on this drawing, the footprint of the building lies over an existing surface water pipe and to mitigate the effect of the new construction on this beige highlighted LCA sewer, a diversion is proposed as shown on drawing A400-ATK-C-29-XXX-DR-XX-864-002-01.
- 3.3.6. The potable water main serving DLR is within 15m but further than 3m from the nearest WEC pile. To fully address the requirement of Thames Water a risk assessment and supporting documentation is provided in section 4 below.

3.4. Deck Structure above King George V Dock

- 3.4.1. The deck structure is supported on bored piles, with a permanent (but non-structural) steel casing vibrated to the required depth. Additionally there are some land based bored piles within the curtilage of the development, which together supports the Airfield Expansion, new East Pier and East Terminal Extension.
- 3.4.2. The pile layout is to a variable grid up to a maximum spacing of 10m x 10m.
- 3.4.3. Pile diameters for the deck structure will vary between 450mm and 1500mm but typically are expected to be 1200mm in size. Pile lengths will vary depending on site conditions encountered during pile testing and construction. It is currently expected that pile toe levels will be in the region of -14m OD to -19m OD. Therefore piles will be between 19m and 24m long.
- 3.4.4. The Thames Water assets in the vicinity of the Deck Structure have been identified from records on tiles TQ4280SW and TQ4380SW.
- 3.4.5. The surface water drainage service highlighted in yellow on drawings A400-TPS-C-00-XXX-DR-SK-800-008-03 and A400-TPS-C-00-XXX-DR-SK-800-009-03, which is routed along the south eastern end of the Main Terminal Building and connects in Thames water manhole 3201 was discussed at the 11th November meeting with Thames Water and agreement reached that this is an LCA asset.
- 3.4.6. It can therefore be confirmed that there are no Thames Water sewers or Thames Water potable water mains within 15m of the Deck structure piling. Hence the piling is outside of the area related to the Thames Water publication "Guidance for working near our assets" and Thames Water do not require any further information on the proposed Deck structure piling.

4. Supporting Documentation for TW Potable Main

4.1. Risk Assessment - WTE Zone and WEC Zone (and Basement) Piling

- 4.1.1. The potable water pipeline is 90mm diameter, of MDPE material and has an expected cover to crown of between 0.9 to 1.2m. The Phase 2: Environmental Site Investigation (HLEI24974/001 R Rev 2) shows that soils within the area, down to a borehole depth of 5m BGL, are generally Made Ground. The Made Ground appears to be highly variable, varying from sands, to gravels to clays. The level of the groundwater table is predicted to be between 3m to 4m below ground level.
- 4.1.2. The proposed building footprint for the Western Energy Centre is more than 6.5m from the location of the existing pipeline as shown on Thames Water tile TQ4280SW. Similarly, the Proposed West Terminal Extension footprint is more than 6m from the pipeline. Excavation works will be more than 3m from the existing pipeline, so it is not expected that the works would disturb nor adversely affect the existing pipeline. Thames Water guidance states that “No development or structure should be built within....3m of water distribution mains.” The proposed building works, at more than 6m, are outside of this requirement and so not expected to affect the pipeline. Further, since the pipeline is of MDPE material, there is no concern of disturbing pipe joints or existing thrust blocks that may be a concern with pressurised Ductile Iron or Cast Iron pipelines.
- 4.1.3. Continuous flight auger (CFA) piled foundations, 600mm in diameter, have been proposed to support the new basement slab and ground floor slabs associated with the Proposed West Terminal Extension and Proposed Western Energy Centre. The basement floor slab will be approximately 5.5m below ground level. CFA piled foundations will extend to 13 to 20m deep. As the piling operation is CFA no significant vibration is expected from these works and no adverse effect on the existing pipeline is expected.
- 4.1.4. Construction traffic, including cranes and piling rigs, will enter the site via a road that traverses the existing pipeline. It is not expected that these abnormal loads will cause undue strain (compression) on the existing pipeline and no pipeline failure is expected as a result.
- 4.1.5. The following recommendations are made to ensure the integrity of the pipeline during the piling works:
- No diversion (either temporary or permanent) of the existing pipeline is considered necessary to accommodate these works
 - Piling and basement construction contractor to carry out a Pre-Construction Survey to:
 - o Locate and mark the pipeline route on site and ensure excavation does not occur above or within 3m of the pipeline (for investigation works excavation by hand dig)
 - o Positively identify the pipe material as MDPE
 - o Verify the cover to the pipeline (e.g. 0.9m)
 - Ensure that the pipeline is not excavated or otherwise disturbed during works (a 3m clearance is indicated in TW guidance document referenced above and in this case this should prove more than adequate)
 - Contractor to carry out a Post Construction Survey to ensure no leakage from or other damage to the pipeline or any associated valves or chambers
- 4.1.6. A low vibration method of piling has been selected. However, there is little data on the vibrations actually generated by such piling, and associated operations, being dependant both on the ground conditions and distance to the asset. Nevertheless, a preliminary target of 10mm/sec for intermittent vibration and 5mm/sec for continuous is appropriate for use on this site. These limits are selected from BS5228: Part 4 as limits to prevent even cosmetic damage to buildings.
- 4.1.7. The CFA piling technique will include instrumentation to manage the process of installation. To maintain the highest standard of pile construction, computerised equipment will be used to monitor, control and record the CFA pile installation. A computer, positioned in the operator's cab displays the boring and concreting parameters. During the drilling phase, this includes the depth of the auger, speed of rotation and penetration rate. During the concreting phase a continuous record of concrete pressure and rate of pumping is shown; the display is

presented in a manner that highlights undersupply and over-supply of concrete, compared with the target value. On completion of a pile, a printout can be generated for viewing.

- 4.1.8. Vibration monitoring of the piling and associated plant movements will be undertaken during the installation of the piles closest to the Thames Water Asset on site to ensure compliance with requirements provided by Thames Water.

4.2. Outline CFA piling method statement

- 4.2.1. This provides a high level description of the approach to be adopted by the contractor. A detailed method statement must be provided by the contractor undertaking the construction works once they have been appointed. The principal contractor is to supervise the piling works to ensure that the works comply with this outline method statement and any subsequent detailed statement. They must also provide access to enable an LCA-appointed inspector to witness the works in progress.

4.2.2. Equipment

The plant and equipment to be used may include some or all of:

- CFA piling rig
- Jetwash bowser
- Diesel bowser
- Static concrete pump and hoses
- Static concrete agitator drum
- MEWPS for working at height
- 360 track mounted excavator
- compressor and airlines

All plant and equipment will be used and maintained in accordance with the manufacturer's instructions and standard procedures.

4.2.3. Working in proximity to Thames Water assets

When working in the vicinity of Thames Water assets, to prevent damage in accordance with Thames Water guidance, the piling contractor is to:

- Physically identify the depth and location of Thames Water assets.
- Position any significant loads (including piling rigs and other heavy equipment) such that they do not bear directly upon Thames Water assets by:
 - Ensuring load bearing supports are positioned outside an area defined by drawing a 45 degree line upward from any pipe, or
 - Bridging or piling to carry the loads on ground beneath or to the side of the apparatus

Where it is not possible to keep loads outside the zone of influence then methods to calculate the impact will be required (refer to Thames Water guidance for further details).

- Provide access and attendance to enable Thames Water to monitor the internal condition of inspection chambers and sewers during the piling works.

4.2.4. Preparation

The piles will be bored from a platform prepared and maintained by the piling contractor. All pile locations shall be cleared of obstructions, services, etc. and suitably backfilled by the principal contractor in advance of the piling works.

The piles will be set out by the piling contractor by means of steel pins driven into the ground with numbered caps.

4.2.5. Methodology

The construction methodology of CFA piles, as shown in Figure 4-1, is detailed step by step below:

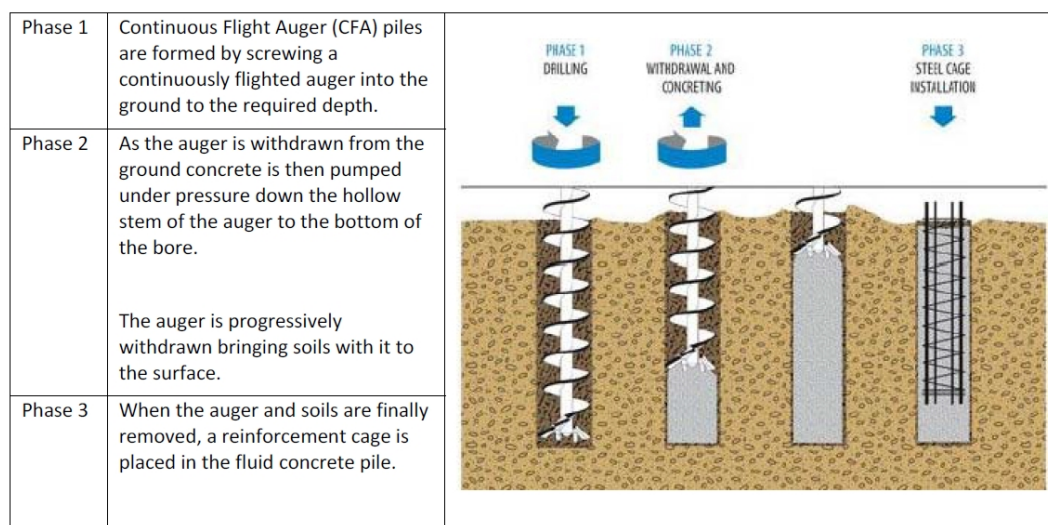


Figure 4-1 CFA pile construction method

1. The augers are rotated and advanced into the ground in a manner suitable to the ground conditions, a Kelly bar may be engaged to extend the stroke of the augers if required.
2. Once the drill augers have reached the design depth, the auger will be lifted by up to 100mm to release the bung prior to pre-charging the auger stem with concrete.
3. Concrete is pumped, under pressure and at a sufficient rate to ensure a continuous and monolithic shaft, to the bottom of the auger through its hollow stem. When extracting the auger, bore spoil on the auger is cleared using the auger cleaner on the piling rig assisted, if necessary, by the attendant 360 excavator. Cleaning of the auger by hand may be necessary when working close to other operations or avoid excessive splashing.
4. The auger is withdrawn at a controlled rate of extraction, such that the volume of concrete placed is slightly greater than the theoretical volume of the pile shaft. The extraction rate is not necessarily constant and may be adjusted to allow for local variations in soil conditions. The extraction rate is checked against "real time" parameters with the aid of a CFA pile monitor system fitted to the rig. The CFA pile monitor comprises transducers fitted on the piling rig. These are connected to a portable computer console with keypad and graphics display in the operators cab. The system facilitates computer-aided construction of the CFA piles to a template of predefined construction parameters.
5. On completion of the pile the system checks the monitored construction parameters against the template and alerts the operator to any discrepancies via a status system. Should the pile contain non-conformities identified to be "driver error" they will be corrected by re boring whilst the concrete remains plastic. Nonconformities (accepting the known limitations of the system) will be brought to the site management's attention for review.
6. Should a blockage occur the auger is extracted by rotating anti-clockwise to leave as much soil supporting the hole as possible. Once the blockage is cleared the hole is re-drilled to a founding level slightly deeper than originally achieved.
7. Bore spoil arising's and concrete over break from boring and construction is removed from the pile head by a full time attendant 360 excavator.
8. The concrete pile is cast to ground/working platform level. Pile shaft concrete cannot be left below the existing piling platform. A minimum distance of 500mm is recommended from piling platform level down to pile cut off level to ensure sound concrete at the pile head.

9. The remaining arising's and concrete overbreak from the bore is removed by the full time attendant 360 excavator and the top of the concrete checked for contamination.

4.3. Mitigation Measures

- 4.3.1. In accordance with Thames Water guidance, the following mitigation measures are to be adopted to minimise the risk of any damage to Thames Water assets.
1. Impact piling is not permitted and rotary bored CFA piles only are to be used.
 2. All boring operations are to be controlled to ensure that the minimum of vibration is transmitted to the apparatus. A peak particle velocity (PPV) of 10mm/s is the maximum that should be recorded at the face of the apparatus.
 3. Piles adjacent to a pipe are to be founded at a level not less than 1.5 m below the underside of it. Any frictional resistance of the pile above a line drawn upwards at 45 degrees from the underside of the pipe will be ignored when calculating the load carrying capacity of the pile.
 4. The measures detailed in Section 4.2 are to be implemented to prevent damage to Thames Water assets from construction loads.
 5. Pre and post work surveys will be undertaken where new piles are to be constructed within 3m of sewers to confirm that they have not been compromised as a result of the piling works.
 6. Ground movement analysis shall be undertaken to determine the potential ground movement associated with construction of the WEC basement. The analysis should include profiles of the pipe movements, strains and joint rotations within the zone of influence of the construction works.
 7. Temporary support is to be provided to ensure ground movements during excavation of the WEC basement are within the limits agreed with Thames Water. Ground movement and groundwater monitoring will be implemented to ensure ground movement, and groundwater levels do not exceed allowable limits throughout construction.
 8. This document is to be provided as part of the tender information. The contractor is to provide a detailed method statement for submission to Thames Water prior to commencement of the works. The principal contractor must also:
 - Obtain agreement of method statement with Thames Water.
 - Supervise the piling works to ensure that the works comply with the method statement.
 - Provide access and attendance to enable an LCA appointed inspector to witness the works in progress.
 - Provide access and attendance to enable Thames Water to monitor the internal condition of inspection chambers and sewers during the piling works.

Appendix A Drawings

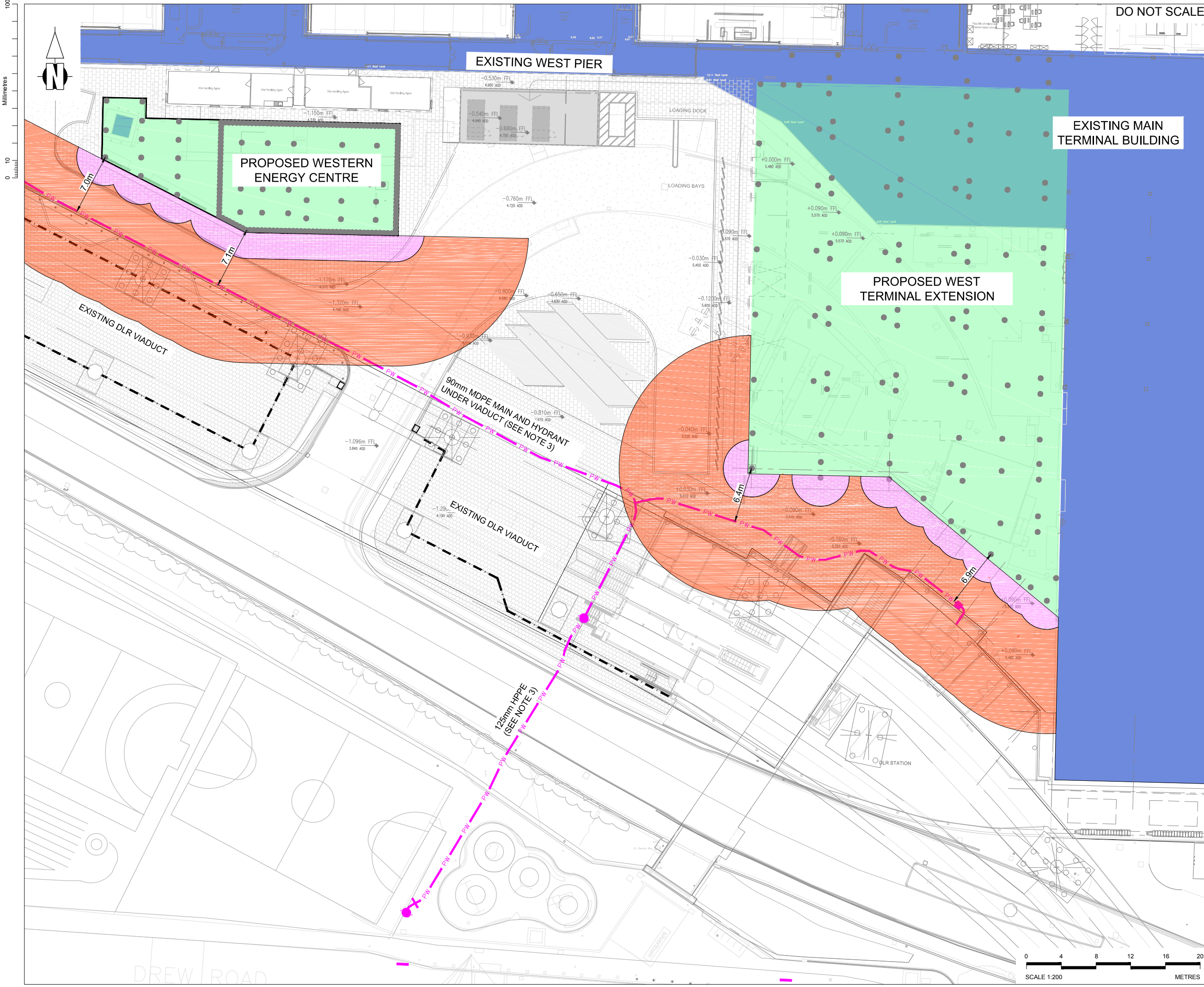
A400-ATK-C-29-XXX-DR-XX-863-001-01: WESTERN SERVICE YARD PROPOSED PILING AND EXISTING THAMES WATER MAIN

A400-ATK-C-29-XXX-DR-XX-864-001-02: WESTERN SERVICE YARD EXISTING SURFACE WATER SYSTEM LAYOUT

A400-ATK-C-29-XXX-DR-XX-864-002-01: WESTERN SERVICE YARD PROPOSED SURFACE WATER DRAINAGE SYSTEM LAYOUT

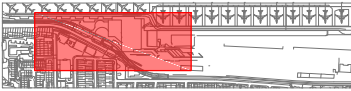
A400-TPS-C-00-XXX-DR-SK-800-008-04: DECK AND EASTERN TERMINAL EXTENSION BUILDING WORKS WITH STORM AND FOUL WATER NETWORKS

A400-TPS-C-00-XXX-DR-SK-800-009-04: DECK AND EASTERN TERMINAL EXTENSION BUILDING WORKS & DRAINAGE NETWORKS LOCATION PLAN

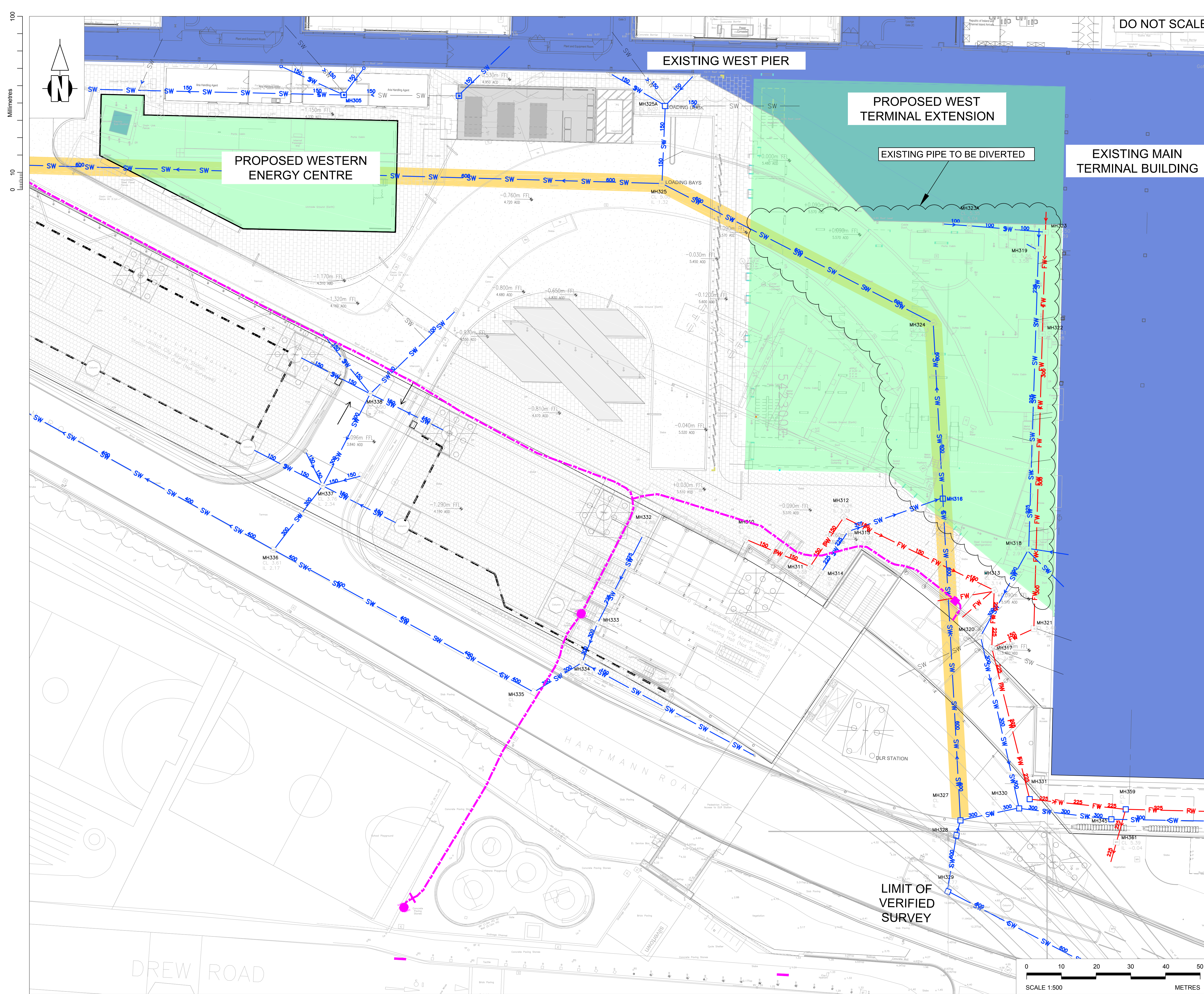


- NOTES:
1. ZONES OF INFLUENCE BASED ON THAMES WATER'S 'GUIDANCE FOR WORKING NEAR OUR ASSETS' DOCUMENT.
 2. EXACT LOCATION OF WATER MAIN TO BE CONFIRMED BY SURVEY.
 3. PIPE SIZE AND MATERIAL BASED ON THAMES WATER ASSET LOCATION SEARCH MAP - ALS/ALS STANDARD 2016_341 0297 TILE TQ4280SW. (SEE NOTE 2)

- LEGEND:
- EXISTING THAMES WATER MAIN - BASED ON THAMES WATER ASSET LOCATION SEARCH MAP - ALS/ALS STANDARD 2016_341 0297 TILE TQ4280SW. (SEE NOTE 2)
 - PROPOSED BUILDING
 - EXISTING BUILDING
 - PROPOSED 600mmØ PILES
 - 3 METRE ZONE OF INFLUENCE (SEE NOTE 1)
 - 15 METRE ZONE OF INFLUENCE (SEE NOTE 1)



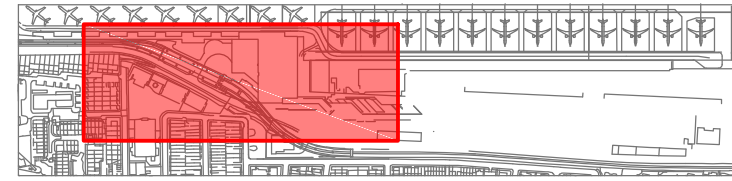
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Copyright © Atkins Limited (2016) Tel: Fax: www.atkinsglobal.com						
Client						
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Project Title						
LONDON CITY AIRPORT CADP 1 WESTERN SERVICE YARD						
Drawing Title						
PROPOSED PILING AND EXISTING THAMES WATER MAIN						
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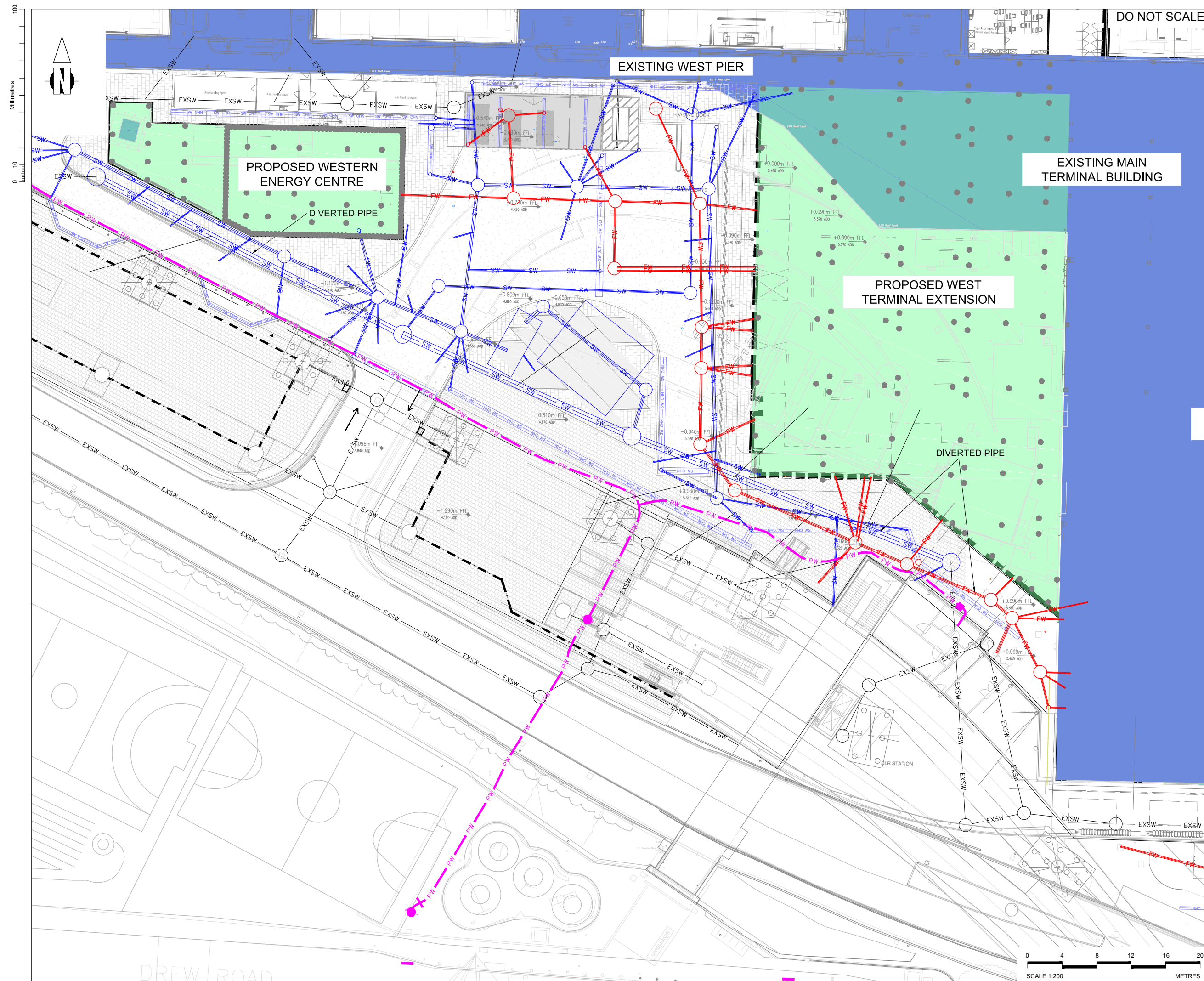
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NOTES:
1. EXISTING DRAINAGE INFORMATION SHOWN BASED ON MSA DRAINAGE SURVEY 2014/15 (REF. 4046-D)

- LEGEND:
- SW — EXISTING SURFACE WATER
 - FW — EXISTING FOUL WATER
 - THAMES WATER POTABLE WATER - BASED ON THAMES WATER ASSET LOCATION SEARCH WATER MAP - ALS/ALS STANDARD/2016-3410297 TILE TQ4280SW
 - SW — MAIN SW CARRIER DRAIN TO BE DIVERTED
 - PROPOSED BUILDING
 - EXISTING BUILDING
 - PROPOSED PILES

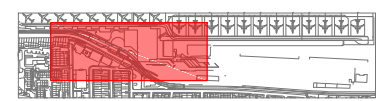


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Drawing Status					Suitability
INFORMATION					S0
ATKINS					
Copyright © Atkins Limited (2016) Tel: www.atkinsglobal.com Fax:					
Client London City Airport Get closer.					
Project Title LONDON CITY AIRPORT CADP WESTERN SERVICE YARD					
Drawing Title EXISTING SURFACE WATER DRAINAGE SYSTEM LAYOUT					
Scale 1:200@A1	Designed	Drawn	Checked	Authorised	
Original Size A1	Date 17.10.16	Date 26.10.16	Date 01.12.16	Date	
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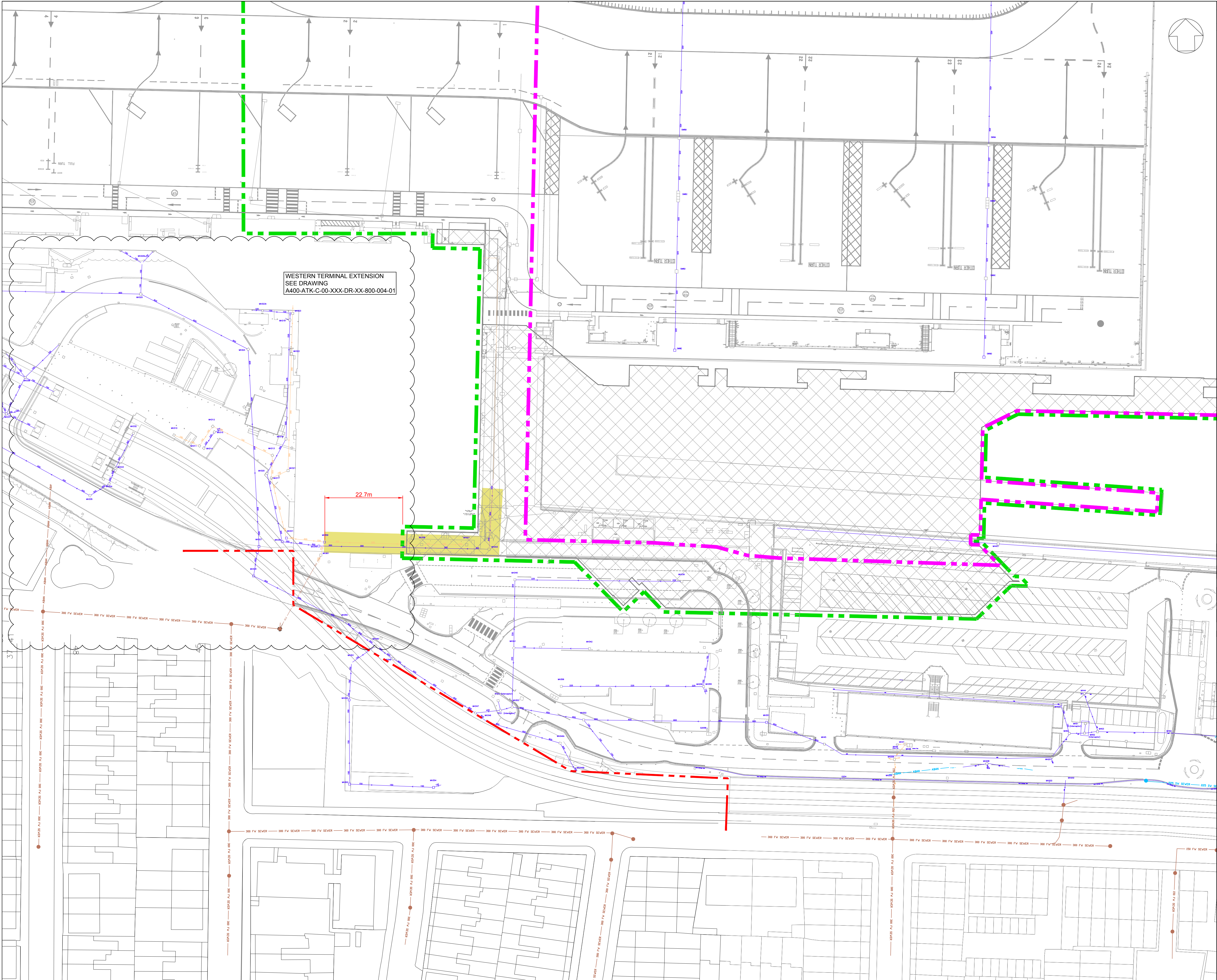


NOTES:
1. PROPOSED DRAINAGE SHOWN INDICATIVELY

- LEGEND:
- EXSW — EXISTING SURFACE WATER
 - SW — PROPOSED SURFACE WATER
 - SW ST — PROPOSED SURFACE WATER SLOT DRAIN
 - SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
 - FW — PROPOSED FOUL WATER
 - THAMES WATER POTABLE WATER - BASED ON THAMES WATER ASSET LOCATION SEARCH WATER MAP - ALS/ALS STANDARD/2016-3410297 TILE TQ4280SW
 - PW — PROPOSED BUILDING
 - EXISTING BUILDING
 - PROPOSED 600mmØ PILES



01	01/12/16	FOR INFORMATION					HD	AB	MDS
Rev.	Date	Description					By	Chkd	App'd
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INFORMATION							S0		
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Client									
									
Project Title									
LONDON CITY AIRPORT CADP WESTERN SERVICE YARD									
Drawing Title									
PROPOSED SURFACE WATER DRAINAGE SYSTEM LAYOUT									
Scale	Designed	Drawn	Checked	Authorised					
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Drawing Number									
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A400-ATK-C-00-XXX-DR-XX-864-002-01-S0									



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NOTES

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- FOR LOCATION PLAN SEE SKETCH A400-TPS-C-00-XXX-DR-SK-800-009.

LEGEND

- COMPLETED WORKS PILING ZONE FOR EASTERN TERMINAL AND AIRFIELD DECK EXTENSION. NOMINAL 1-2m PILING DIAMETER
- INTERIM WORKS PILING ZONE FOR EASTERN TERMINAL AND AIRFIELD DECK EXTENSION. NOMINAL 1-2m PILING DIAMETER
- LIMIT OF SURVEY 4064-D-RevB
- STORM WATER NETWORK (FROM SURVEY 4064-D-RevB) PRIVATE DRAIN UNLESS NOTED OTHERWISE
- FOUL WATER NETWORK (FROM SURVEY 4064-D-RevB) PRIVATE DRAIN UNLESS NOTED OTHERWISE
- STORM WATER NETWORK FROM LCY RECORDS. THAMES WATER DRAIN UNLESS NOTED OTHERWISE
- FOUL WATER NETWORK FROM LCY RECORDS. THAMES WATER DRAIN UNLESS NOTED OTHERWISE
- SEWER SHOWN ON THAMES WATER (TW) RECORD TILE TQ4280SW AND SUBSEQUENTLY AGREED WITH TW ON 11/11/2016 AS LCA PRIVATE DRAIN

04	W. HELLER	25/11/2016	G. PRICKETT	25/11/2016
Updated following agreement with TW				
03	W. HELLER	24/10/2016	W. HELLER	24/10/2016
Updated with interim works boundary				
02	W. HELLER	13/10/2016	W. HELLER	13/10/2016
Updated with Atkins comments				
01	W. HELLER	10/10/2016	W. HELLER	10/10/2016
Issued for information				
Rev	Revised By	Date	Checked By	Date

London City Airport
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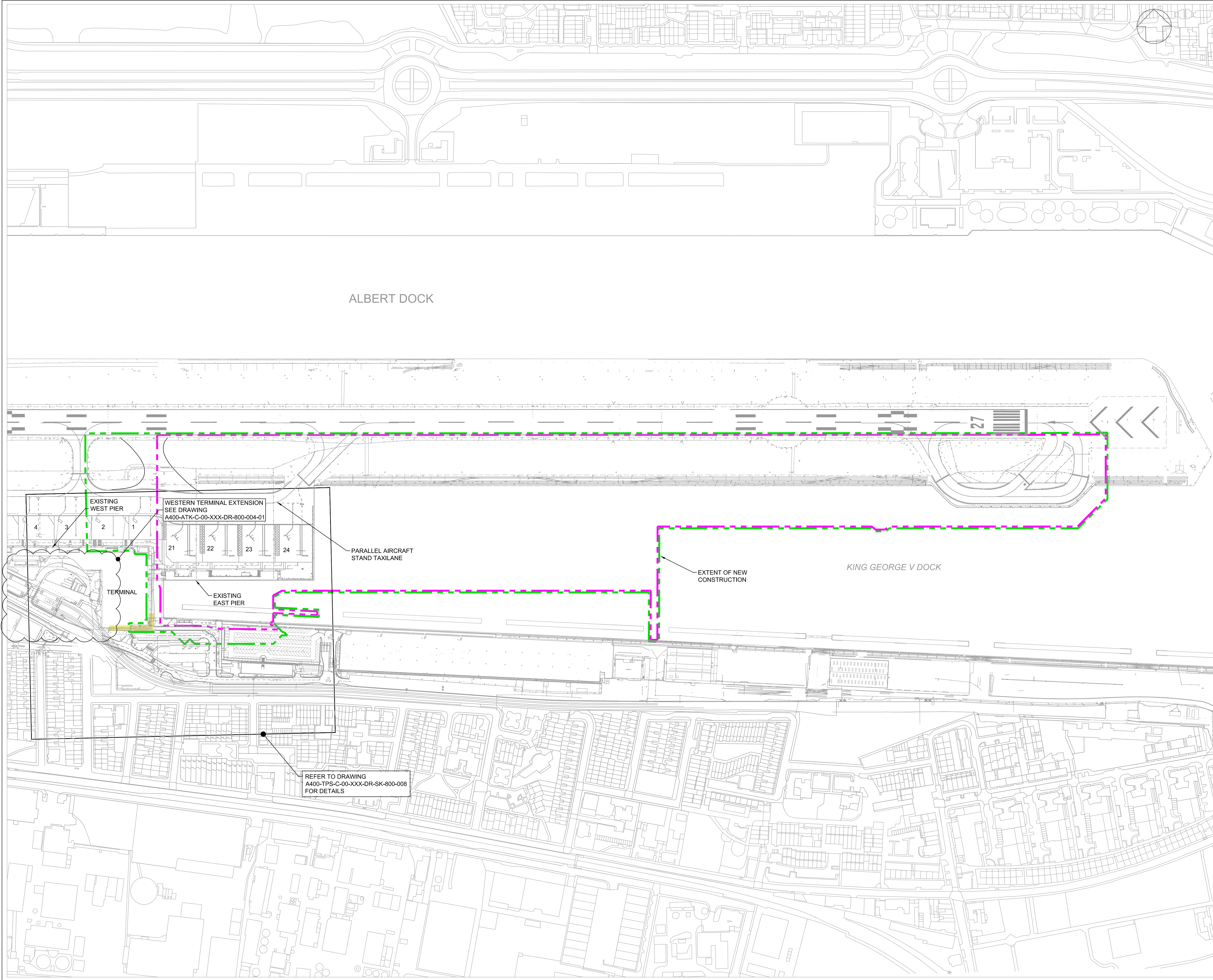
Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
DECK AND EASTERN TERMINAL EXTENSION
BUILDING WORKS WITH
STORM AND FOUL WATER NETWORKS

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TPS Job Manager W.HELLER
QA System - Checks Signature Date
Drawn By: R. RYAN 06/10/2016
Checked: W. HELLER 06/10/2016
Authorised: G. PRICKETT 25/11/2016
TPS Project No. 112931 Drawing Status INFORMATION Scale (at A1) 1:500 (at A3)
Project No. Orig. Disc. Zone Level Type Sub Type Series Sht. No. Rev.

A400-TPS-C-00-XXX-DR-SK-800-008 04



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NOTES

1.

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2.

FOR EXTENT OF BUILDING WORKS AND DRAINAGE NETWORKS SEE SKETCH A400-TPS-C-00-XXX-DR-SK-800-008.

LEGEND

COMPLETED WORKS PILING ZONE FOR EASTERN TERMINAL AND AIRFIELD DECK EXTENSION. NOMINAL 1-2m PILING DIAMETER

INTERIM WORKS PILING ZONE FOR EASTERN TERMINAL AND AIRFIELD DECK EXTENSION. NOMINAL 1-2m PILING DIAMETER

SEWER SHOWN ON THAMES WATER (TW) RECORD TILE TQ4280SW AND SUBSEQUENTLY AGREED WITH TW ON 11/11/2016 AS LCA PRIVATE DRAIN

04	W. HELLIER	25/11/2016	G. PRICKETT	25/11/2016
Updated following agreement with TW				
03	W. HELLIER	24/10/2016	W. HELLIER	24/10/2016
Updated with interim works boundary				
02	W. HELLIER	13/10/2016	W. HELLIER	13/10/2016
Updated with Atkins comments				
01	W. HELLIER	07/10/2016	W. HELLIER	07/10/2016
Issued for information				
Rev	Revised By	Date	Checked By	Date



Project

CITY AIRPORT DEVELOPMENT PROGRAMME

Drawing Title

DECK AND EASTERN TERMINAL EXTENSION BUILDING WORKS & DRAINAGE NETWORKS LOCATION PLAN

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TPS

Birmingham Croydon Edinburgh Sheffield Wolverhampton

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QA System - Checks			
Drawn By: R. RYAN			06/10/2016
Checked: W.HELLIER			06/10/2016
Authorised: G. PRICKETT			25/11/2016
TPS Project No. 112931	Drawing Status INFORMATION	Scale (at A1) 1:2000	(at A3)
Project No.	Orig	Disc	Zone
	Level	Type	Sub Type
	Series	Sht. No.	Rev.

Appendix B Minutes of Meetings with Thames Water

Meeting of 19th September 2016 (Condition 84 section)

CADP – Pre-Commencement Condition Meeting between LCY and Thames Water (TW)
Monday 19 September 2016

Attendees:

Nick Ayling (NA) – Thames Water
James Shearman (JS) – LCA
Tim Halley (TH) – LCA
Will Hellyer (WH) – TPS
Allan Bangura (AB) – Atkins

CONDITION 84 – Piling

- WH explained approach to discharging requirements of condition 84. NA stated that TW would wish to understand impacts of any piling (impact or otherwise) occurring within 15m of TW assets (as per 'Guidance - working near our assets'). Any building within 3m of a TW asset will require a 'near to' assessment.
- NA to provide a copy of the 'Guidance - working near our assets' document
- NA noted that it would be preferable to include details of all piling with reference to the 'Guidance – working near our assets'. NA confirmed that little information would be required for areas at a significant distance from the TW asset, for example the dock piling. However, LCY to review information for the West Terminal Extension and West Energy Centre and provide a draft to NA to review 07/10/2016.
- NA confirmed he will also be the main point of contact for Potable Water and Foul Water connections.

Meeting Minutes of 11th November 2016

Date:

Friday 11th November 2016 at LCY CAH

Attendees:

Nick Ayling (NA) – Thames Water

Tim Halley (TH) – London City Airport (LCY)

James Shearman (JS) – LCY

Will Hellyer (WH) – TPS

Allan Bangura (AB) – Atkins

Meeting Notes:

Ownership of Drainage Infrastructure

AB explained that there were drainage pipes (Foul and Storm Water) that served both the DLR and LCY within the Western Service Yard and Forecourt areas. LCY have historically assumed responsibility for these pipes and propose to continue with this approach.

NA confirmed that given the airport were willing to continue owning and maintaining the pipes they could remain under LCY ownership.

AB stated that there was also a pipe - MH2302 to MH2203 on tile TQ4280SW - that was shown of the on the Thames Water Assets plans in the Western Service Yard that no longer exists, based on survey information and DLR record information. NA agreed that pipe no longer exists. *[ACTION: Agreed that TW will update records to delete pipe]*

NA previously requested understanding of the ownership of surface water drainage. WH noted that the drainage run that is routed along the western end of the Main Terminal Building and connects in Thames Water MH 3201 on tile TQ4280SW should be private as it only serves LCY properties and is within LCY land. NA agreed *[ACTION: Agreed that TW will update records accordingly]*

PCC 84 - Piling 3

AB confirmed that there is a Thames Water potable water main within the Service Yard that supplies the DLR. NA confirmed that TW would not require piling details for other infrastructure, only the potable water main. As this main is within 15m, but further than 3m, from the piling locations for the proposed Western Energy Centre and West Terminal Extension NA requested that the details include a Risk Assessment covering the implications of this activity as well as an assessment of vibration and displacement. *[Action: LCY to include details in draft submission]*

Scope of condition agreed with NA.

[ACTION – LCY to share a draft of the PCC84 submission with NA for comment prior to formal submission]

Appendix C Condition 84 Scope

Title of condition	84. Piling 3
Responsibility	TPS / Contractor
Description of condition	No impact piling shall take place until a piling method statement (detailing the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including measures to prevent and/or minimise the potential for damage to subsurface sewerage infrastructure, and the programme for the works) has been submitted to and approved in writing by the Local Planning Authority. Any piling shall be undertaken in accordance with the terms of the approved piling method statement. Reason: The proposed works will be close to underground sewerage utility infrastructure. Piling has the potential to impact on local underground sewerage utility infrastructure. The applicant is advised to contact Thames Water Developer Services on 0845 850 2777 to discuss the details of the piling method statement.
Interpretation of what the condition requires/ scope of works to be undertaken	Agreed with Thames Water (Nick Ayling) Piling method statement required for all piling works not just impact piling where this occurs in proximity to Thames Water Assets. Details required are set out in TW publication: 'Guidance – Working Near our Assets' Confirmed that there is only one relevant Thames Water asset to provide details for – a potable water main within the Western Service Yard that supplies the DLR. Agreed that TW would not require piling details for other infrastructure - details to include a Risk Assessment covering the implications of piling activity as well as an assessment of vibration and displacement. The submission to address the requirements of PCC 84 - Piling 3 will include: 1. drawings showing pile positions relative to Thames Asset (potable water main) and details of the proposed piling method; 2. Identify any TW services that are at risk: for water mains (5m of transmission and 3m distribution mains) and surface water (worse case of 3m or 1.5 x pile diameter); 3. Prepare outline documentation including a Risk Assessment as per Thames requirement for the potable water main serving DLR and any TW sewers identified as at risk. 4. Identify affected services, associated piles and Thames requirements within tender documentation to be issued to Piling contractors

Appendix D Thames Water Feedback on Condition 84 Draft Submission

Text of e mail from Thames Water Infrastructure Alliance dated 25th January 2017:

From: Nick Ayling [mailto:nick.ayling@thameswater.co.uk]
Sent: 25 January 2017 16:20
To: Tim Halley <Tim.Halley@londoncityairport.com>
Cc: James Shearman <James.Shearman@londoncityairport.com>; Andrew Quinn <Andrew.Quinn@londoncityairport.com>; David Thomson <thomsond@rpsgroup.com>; Bangura, Allan <Allan.Bangura@atkinsglobal.com>
Subject: RE: London City Airport - CADP1 Permission - Draft Drainage Scheme for Comment

Tim

I have had confirmation from our Strategic Planning and Assurance team that they are happy with your proposed drainage strategy and piling submission, and that you can now submit formally to the LA planning team who will then consult with us to remove the appropriate conditions.

Regards,
Nick

Nick Ayling I.Eng MCIWEM

Senior Project Manager - London Opportunity Areas

Strategic Partnering

Thames Water Infrastructure Alliance

Planning for and enabling growth

Clearwater Court, Vastern Road, Reading, RG1 8DB

M: 07747 640601

E: nick.ayling@thameswater.co.uk



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