Walters Land (Rogerstone) Ltd

Jubilee Park - Plots LC1 and LC2

Drainage Strategy

Issue 2 | 10 May 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 229671

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1 Introduction

Walters Land (Rogerstone) Ltd have developed the Jubilee Park site at Rogerstone under an outline planning permission in 2013. The majority of development was for residential end use, but also incorporated a new primary school and some commercial development. The residential plots and school have now been built out, however the two commercial plots at the entrance of the site, called LC1 and LC2 have not been developed, as explained in more detail in the Planning Statement. An alternative site, along Tregwilym Road outside the original planning boundary, has subsequently been developed for commercial end use, this was subject to its own planning application. It is now proposed to develop plots LC1 and LC2 for housing, Newport Council have advised that since the proposed end use is different, a new planning application will need to be submitted.

As part of the original development, foul and surface water drainage networks were formed within the spine infrastructure to accommodate development within these plots. Pipe connection spurs were formed at the boundary of these plots to allow for future development. Since the development proposals within these two plots have changed and SABs regulation have been brought in, the drainage strategy has been revisited to accommodate these changes. This drainage strategy report describes the proposed drainage strategy for the proposed end-uses.

2 The Site

2.1 Site Location and Description

The LC1 and LC2 sites are located near to the northern entrance of the Jubilee Park development in Rogerstone, Newport, South Wales, see Figure 1 below.

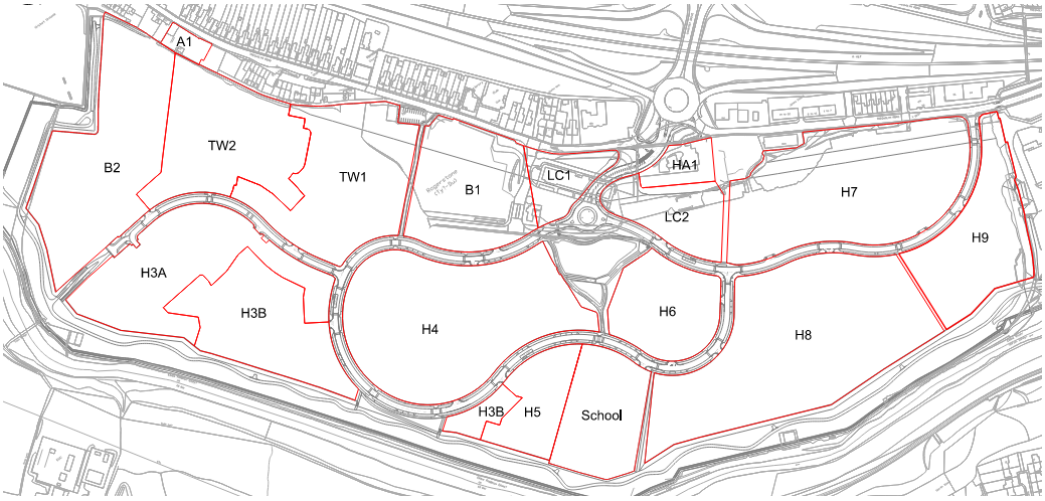

Figure 1 – Jubilee Park Development Plot Boundaries

The LC1 site is 0.5 hectares in size, the centre is approximately at Grid Reference 326942, 187892. The site is bounded to the south and east by Jubilee Way, to the north by Tregwilym Road and to the west by new housing development. The site is currently unused plot of land, it was remediated and prepared during the Jubilee Park site preparation works between 2014 and 2016. An access junction has been formed in the south-west, linking the plot to Jubilee Way. The site generally slopes from north to south; the current level is some 0.6m below the proposed ground level, which was previously defined for the whole Jubilee Park site as part of the flood mitigation works.

The LC2 site is 0.86 hectares in size, the centre is approximately at Grid Reference 327011, 187782. The site is bounded to the west by Jubilee Way, to the south by Castle Way, to the north by a slope fronting Mandrake House to the north, to the east by new housing development to the north by Tregwilym Road and to the west by a recently built housing development. The site is currently unused plot of land, it was remediated and prepared during the Jubilee Park site preparation works between 2014 and 2016. An access junction has been formed in the south-east, linking the plot to Jubilee Way. The site generally slopes from north to south; the current level is some 0.6m below the proposed ground level, which was previously defined for the whole Jubilee Park site as part of the flood mitigation works.

2.2 Proposed Development

The concept development proposals are illustrated in Figure 2, and include a mix of residential units, consisting of houses and apartments. The existing access roads onto the two plots will be utilised, a new drive access is also proposed for LC2 in the south-west. The proposed development layout incorporated areas for sustainable drainage, these will be described in subsequent sections. As indicated in the flood note, the site levels will adhere to the original proposed levels, the site levels will be uplifted by typically 0.6m to allow development to proceed.

Figure 2 – Concept Development Layout

3 Previous Drainage Strategy and Drainage Installed

As part of the previous Jubilee Park outline planning application, a drainage strategy was produced in 2012 and updated in 2013 for the whole Jubilee Park site, covering both surface water and foul drainage. The 2013 drainage strategy is presented in Appendix A.

Prior to that development, the site consisted of an aluminium works which discharged a flow of some 75l/s into the trunk sewer network running along the western side of the Jubilee Park site. The Jubilee Park development proposals at the time was for up to 1200 residential units, together with a school and retail/commercial development, generating a total peak flow of 33l/s. Since the flows were significantly below the previous flows discharged from the site, it was determined that the foul drainage could be connected into the trunk sewer present in the west. A foul drainage network was designed and built for the site to pick up foul flows from each plot; the drainage network was submitted to Dŵr Cymru Welsh Water (DCWW) for S104 adoption. This included 150mm diameter pipe spurs leading into both the LC1 and LC2 plots for future connection, recognising the fact that these two parcels were always intended to accommodate built development. The S104 construction drawings are presented in Appendix B.

The previous site was almost entirely impermeable and covered by concrete slabs, roads and car parks, associated with its previous use, with drainage discharging directly to the River Ebbw. Since the proposed site would include gardens and numerous areas of soft landscaping, the impermeable areas and surface water drainage flows were significantly reduced, and it was agreed that the drainage could connect into the River Ebbw without the need for attenuation. A surface water drainage network was designed and build for the site to pick up foul flows from each plot, the drainage network was submitted to DCWW for S104 adoption. This included 300mm diameter pipe spurs leading into both the LC1 and LC2 plots for future connection. The S104 construction drawings are also presented in Appendix B.

As part of the infrastructure works at Jubilee Park, an existing foul drain that crossed the LC1 site was diverted away from this area. A new 225mm diameter foul drain was installed along the western boundary of the LC1 plot, this drain was also subject to a Section 104/S185 adoption agreement. It’s location and easement are shown in the construction drawing presented in Appendix B.

4 Proposed Drainage

4.1 Foul Drainage

The previous strategy highlighted that a peak flow of 33l/s could be accommodated from the residential units, school and commercial units in the proposed development. The actual number of houses developed to date in Jubilee Park is 932 residential units. The primary school has been constructed but no commercial units have been built, with these having been delivered outside of Jubilee Park. Consequently, the total peak foul flow from the development as it currently stands is calculated as 25.3l/s. The additional flow from the proposed development is estimated to be a further 1.3l/s, therefore the total peak foul flow, at 26.6l/s, is well below the peak flows in the previous application and design.

It is proposed that a gravity drainage network will be installed within the two plots to pick up foul flows from the individual residential units and connect into the existing foul drainage network formed within Jubilee Way and Castle Way in the south; Drawing CG651 presented in Appendix C showing proposed drainage strategy. The drainage network will follow the proposed road layout, existing spurs will be used as much as possible, however there is a possibility that new connections will need to be made to the existing drainage network.

4.2 Storm Drainage

Schedule 3 of the Flood and Water Management Act 2010 establishes SuDS Approving Bodies (SABs) in local authorities in Wales. Since the 7th January 2019, developments greater than 100m^2 or developments containing more than one building will be required to submit a SAB application. This application requires developers to utilise Sustainable Drainage Systems (SuDS) in their surface water management for a development. As the area of proposed development is approximately 1.36ha, the development requires a SAB application.

SuDS aim to manage rainfall on site using methods that mimic natural processes, by making use of the landscape and vegetation to control the flow, volume and quality of the surface water runoff. In addition to this, SuDS also provide amenity and biodiversity benefits by providing aesthetically pleasing and natural landscapes, and biodiversity benefits by creating habitats for wildlife and vegetated areas.

The Welsh Government's (WG) "Statutory Standards for Sustainable Drainage Systems" contains six standards, which detail the requirements for any SuDS proposed. These sections are as follows:

S1. Runoff destination

S2. Hydraulic control

S3. Water quality

S4. Amenity

S5. Biodiversity

S6. Construction, operation and maintenance

These form a set of principles which must be considered in the design of the SuDS features in order to obtain approval by the SAB.

S1 - Runoff Destination

The WG's SuDS Standard S1 provides a discharge hierarchy for surface water from developments, as well as exemption criteria for each level that must be met before the next level can be considered. The discharge hierarchy is shown below:

- Level 1: Surface water runoff is collected for use;
- Level 2: Surface water runoff is infiltrated to ground;
- Level 3: Surface water runoff is discharged to a surface water body;
- Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;
- Level 5: Surface water runoff is discharged to a combined sewer.

The aim of this is to encourage developments to use runoff as a resource and ensure that runoff is sustainably managed to avoid any negative impacts from the development, such as increased flood risk.

Priority Level 1 – Runoff collected for use

Rainwater harvesting requires an overflow to a secondary outfall location, which must be designed to cater for the critical storm event, as the rainwater harvesting tank may be at full capacity prior to the storm event occurring. Additionally, rainwater harvesting does not provide benefits in terms of flow reduction during extreme events and as a result, rainwater harvesting is not proposed for this development.

Priority Level 2 – Runoff infiltrated to ground

Ground Investigation (GI) has been carried out by Integral Geotechnique (Wales) Ltd within the site, which included trial pits and soakaways, a report is presented in Appendix D. The GI in LC1 encountered in-situ gravels and shallow groundwater. In LC2, the in-situ gravels were not encountered in the trial pits due to the depth of the made ground. The infiltration tests undertaken showed that infiltration rates were poor. It is not anticipated that shallow infiltration to ground is a viable option, due to the poor infiltration rates, the presence of made ground, and high groundwater levels. As a result, infiltration to ground has not been considered further.

Priority Level 3 – Runoff discharged to surface water body

The closest watercourse to the site is the Ebbw River, located some 240m to the south of the southern corner of plot LC2. It is not considered feasible to install

another surface water network within the existing highways and outfall directly to the Ebbw River, this in effect is what has already been installed via the adopted drainage, therefore Priority Level 4 has been considered.

Priority Level 4 – Runoff discharged to a surface water sewer

As detailed in the previous Drainage Strategy Report in Appendix A and the S104 construction drawings in Appendix B, and surface water drainage network has been constructed within the highways adjacent to plots LC1 and LC2, which outfalls to the Ebbw River. It is proposed to utilise the spur connections provided during the previous development works where possible, as shown in Drawing CG650 in Appendix C.

Priority Level 5 – Surface water runoff is discharged to a combined sewer

Discharge of surface water to a combined sewer is not proposed for the scheme.

S2 - Hydraulic Control

Standard S2 requires that:

1. The first 5mm falling on the site is intercepted, therefore producing no runoff for small storm events.
2. The peak flow rate for the 1 in 1-year event for the development is controlled to mitigate negative impacts on the flood risk of the receiving water bodies.
3. The peak flow rates and runoff volume for the 1 in 100-year event for the development is controlled to mitigate negative impacts on the flood risk of the receiving watercourse, with a suitable allowance for climate change (assumed 40% at this stage).

To meet the interception requirements, appropriately sized SuDS features are required with sufficient retention time to allow the flow to be intercepted. To meet these requirements, different SuDS components are proposed within the development, see Drawing CG650 in Appendix C. These include the following:

- rain gardens / bioretention systems with storage cells beneath
- permeable paving with storage cells beneath
- dry attenuation ponds
- raised planters incorporating storage devices

To manage the peak surface water runoff generated from the proposed impermeable areas, the flows will need to be restricted and attenuated to agreed rates with the SAB. It is proposed that the attenuation features will provide storage for surface water runoff to be discharged at the mean annual flood flow (Q_{BAR}) for all storm events up to and including the 1 in 100-year return period including an allowance of 40% for climate change.

Using the illustrative masterplan in Figure 2 and superimposed on the drawings in Appendix C, approximate volumes of attenuation storage have been estimated for the two plots. At concept stage, this will be provided through a combination of the proposed SuDS components described above and illustrated on CG650 in Appendix C. The proposed techniques, volumes and position of treatment and attenuation will need to be reviewed in later design stages when the development layout is finalised.

S3 - Water Quality

The water quality standard, S3, requires treatment for surface water runoff to prevent negative impacts on the receiving waterbody in terms of its quality.

The proposed site will include residential roofs, individual property driveways and low traffic roads. The 'Simple Index Approach' (SIA) classifies these land uses as having 'very low' and 'low' pollution hazard levels. In accordance with the WG Standards, appropriate SuDS features will be selected to ensure anticipated pollutants from the development are sufficiently treated prior to discharge into the downstream receptor. These are shown indicatively in Appendix C and will likely consist of:

- raise planters
- bioretention features / raingardens
- dry retention pond
- permeable paving

The development proposals must ensure that such features / processes are achieved prior to discharge into existing surface water network, and subsequently the Ebbw River, where possible.

Permeable paving is proposed on residential driveways which will allow treatment of the rainfall to occur at source, removing suspended solids and hydrocarbons from the surface water prior to discharging to the rain gardens and retention pond, as illustrated in Drawing CG650 in Appendix C.

S4 – Amenity

The WG Standard S4 states that the surface water management systems should maximise amenity benefits.

The SuDS components proposed, such as bioretention systems, are well suited to providing significant amenity benefits through green, vegetated areas adjacent to the proposed development. This will be considered alongside the wider landscaping proposals at subsequent design stages to ensure that the amenity space can be maximised.

S5 - Biodiversity

The Standard S5 requires that surface water management systems also maximise biodiversity benefits.

Bioretention systems provide a significant contribution to biodiversity and quality habitats for wildlife. Proposed vegetation will be designed to support local diversity through liaison between landscape architects and horticultural/arboricultural experts where necessary.

S6 – Design for Construction, Operation and Maintenance

The proposed drainage will be subject to adoption by Newport City Council (NCC) and DCWW. Consequently, the management and maintenance of the drainage will be subject to their specific management and maintenance requirements, however they are likely to include the following:

- Manholes and Catchpits – Inspections and cleaning with vacuum pumps, or manual removal if required
- Pipelines – Inspections, jet washing if necessary
- Attenuation pond– Inspections, litter removal, grass cutting and shrub/weed management, sediment removal
- Bioretention systems - Inspections, litter removal, grass cutting and shrub/weed management, sediment removal
- Vortex flow control devices – Inspections and cleaning with vacuum pumps, or manual removal if required.
- Road gullies, channel drains, flow paths – Cleaning with vacuum pumps, litter/debris removal, sediment removal

All drainage should be inspected and maintained regularly during construction prior to final handover. During the first year of operation, regular monitoring of the system will be required to identify any changes, issues or modifications required to optimise the system. Inspection should also be undertaken immediately after a significant storm event. These reviews will help confirm the performance of the system, it will also identify potential system failures such as blockages, poor infiltration and poor water quality.

5 Summary

The Jubilee Park site in Rogerstone, Newport has been developed by Walters Land (Rogerstone). The previous proposal included two commercial plots at the site entrance, called LC1 and LC2 but the revised proposal is now to develop residential units on these plots, and a new planning application is required for this change of use. This report discusses the proposed drainage strategy for the residential development.

The previous drainage strategy was designed to accommodate commercial development on plots LC1 and LC2 and provided foul and surface water spur connections on each plot. It is proposed to utilise these existing connections where possible. The actual number of houses built to date on Jubilee Park is less than perceived, agreed and designed for previously. Therefore, there is sufficient capacity in the drainage network formed under the previous outline application and S104 agreement for foul flows generated from the 50 residential units proposed across the two plots.

Since the Jubilee Park site was developed, Schedule 3 of the Flood and Water Management Act has come into effect in Wales, requiring the proposed surface water drainage design to achieve SAB approval. A SABs Pre-application will be submitted to Newport County Council SABs. In accordance with the Welsh Government's 'Statutory Standards for Sustainable Drainage Systems', it is proposed to discharge runoff from the sites to the existing surface water sewers in Jubilee Way and Castle Way, which outfall to the Ebbw River. It is proposed to attenuate runoff from the sites to the Q_{BAR} runoff rate. Interception, treatment and attenuation of runoff is proposed through a combination of raised planters, permeable paving, bioretention systems, storage cells and attenuation ponds.

Appendix A

Drainage Strategy Report (2013)

Walters Land (Rogerstone) Ltd
Jubilee Park, Rogerstone
Drainage Strategy

12/8598

B | 20 December 2013

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Appendix A

1 Introduction

Walters Land (Rogerstone) Ltd has obtained outline planning permission for the redevelopment of the former aluminium factory at Rogerstone.

This outline planning application proposes the extensive regeneration of the site. It is anticipated the development will take place over a programme of works lasting 10 to 12 years. When complete the development will provide:

Up to 1000 new homes;

A green grid of new and improved open space;

A new primary school;

Revised access from the roundabout and a network of internal roads and paths;

A neighbourhood centre to include a small scale convenience store and other small scale uses and activities; and

The re-use of the existing 'Drill Hall' for community use.

The works include remediating the contamination on site and providing suitable infrastructure, including access roads, services and drainage to serve the proposed development.

A Drainage Strategy Report was prepared in August 2012 in support of the Planning Application. This report highlights the updates in the design and addresses the requirements of Condition 37 of the Consent.

Revision B of this report, prepared in December 2013, includes survey information undertaken on the Western valleys Trunk Sewer crossing the site and provides information requested by DCWW.

2 Existing Drainage

2.1 Foul Drainage

Figure 1 shows the location of existing public sewers crossing the site. The Western Valleys Trunk Sewer is located to the south of the site. This sewer consists of a single 54" pipe, connecting to dual 42" sewers which in places are located adjacent to a flood bund/wall within the site.

A secondary sewer drains areas to the north of Rogerstone and is located on the northern boundary of the site and then crosses the site in a southerly direction before connecting to the Trunk Sewer.

An extensive cleansing, level and CCTV surveys of the existing public sewers has been undertaken which has concluded that the sewer crossing the site is in a poor condition, with flat gradients, numerous fractures and breaks and extensive infiltration of ground water. Figure 2 shows the survey information gathered on the existing sewers.

A river edge park is proposed adjacent to the River Ebbw, some 25m wide, to retain an easement over the Trunk Sewers.

The foul flows discharged to the Western Valleys Trunk Sewer via two 9" drains and four 6" drains. Connections are also indicated from the factory to the 9" public sewer entering the site from a northerly direction, crossing the site and connecting to the trunk sewer.

An area of external hard standing discharges surface water runoff to the trunk sewer. This area was formerly used as an effluent storage area and is still visible on site.

The production works at the factory included the discharge of trade effluent to the trunk sewer for which three licences were held and are still valid.

CCTV surveys of the drains in the former effluent storage area have shown that the surface water runoff from the former effluent storage area still discharges to the public sewer.

The extent of the treatment area and its associated drainage discharging to the trunk sewer is approximately 3765 m^2.

The flows discharging to the trunk sewer from the site can be summarised as follows:

1. Surface water from the paved area for a 1 in 1 year event has been assessed using Microdrainage software package as **43 l/s**.
2. Total allowable flow from three Trade Effluent Discharge Consents (see Appendix A) is 2750 m^3/day, equivalent to **32 l/s**.
3. It is assumed that as the factory complex is now demolished and that no domestic foul flows are being discharged to the trunk sewer.
4. The CCTV survey shows that extensive infiltration of ground water is entering the sewers on site. This has not been included in the above calculated figures.

Total flow discharging to the trunk sewer at present is therefore assessed to be **75 l/s.**

2.2 Surface Water Drainage

The drainage layout of the former factory complex was primarily a separate system. The surface water drainage system from the site discharged to River Ebbw via four outfalls and to on site culverts.

The existing site is almost entirely impermeable and covered by concrete slabs, roads and car parks. The discharges from the former factory complex discharged to the River Ebbw without any form of attenuation.

3 Proposed Drainage

3.1 Foul Drainage

It is anticipated that the development will provide up to 1,000 residential units as well as a primary school for 250 pupils and up to 1,000 m^2 of retail/commercial development. The previous report assumed that up to 1200 residential units could be constructed.

Based on occupancy of 2.39 persons per house (Newport City Council 2001 census), daily consumption of 180 l/person and a peaking factor of 6, the peak flow generated from the residential development is assessed to be **30 l/s**.

The retail and school sites would generate a further **3 l/s**, resulting in the total peak flow of **33 l/s.** This represents a reduction in peak flows of 56%.

A Foul Drainage Strategy Report (Ref : 12/8434), dated 4 May 2012 was submitted to Dwr Cymru Welsh Water (DCWW) which concluded that:

"Once the remediation of the site has been completed, the trade effluent discharge licences will no longer be required and the surface water discharge to the trunk sewer will be removed.

Substitution of the existing flows with the proposed foul flows would result in a decrease in discharge rate to the trunk sewer. Furthermore, the development will be phased over several years and the initial flows to the trunk sewer will be substantially less.

It is therefore recommended that the proposed foul flows should be discharged to the trunk sewer without the need for further modelling, investigation of the trunk sewer and onsite drains."

Subsequently DCWW visited the site to verify the findings of the Foul Drainage Strategy Report and confirmed in their email dated 1st June 2012 their acceptance of the conclusions of the Report.

The remaining public sewers crossing the site will be diverted under a Section 185 Agreement. Figure 3 shows the proposed public sewer diversions. This will eliminate the substantial infiltration into the public sewer observed at present.

Foul drains will be constructed within the proposed highways and public open spaces to receive flows from the future development plots. The location and the invert levels of the drains have been strategically designed to enable gravity discharge from the plots. Figure 3 shows the indicative foul drainage phasing layout for the development.

The foul drains will be constructed in compliance with the Welsh Ministers Standards and Sewers for Adoption 7th Edition and be offered for phased adoption under a Section 104 Agreement to DCWW.

3.2 Surface Water Drainage

The use of SUDS systems for the disposal of surface water runoff from the site has been investigated. The water table is some 2m below the ground the even after the remediation of contamination has been completed, some contaminants are

likely to remain at depth. For this reason the use of any form of infiltration system for the disposal of surface water has been ruled out.

As mentioned in Section 2.2, the existing site is almost entirely impermeable and covered by concrete slabs, roads and car parks. The discharges from the former factory complex discharged to the River Ebbw without any form of attenuation.

The proposed development will include areas of public open space as well as private gardens. The impermeable area will therefore be substantially reduced, resulting in a reduced rate of surface water runoff. It is therefore proposed to discharge surface water runoff into River Ebbw without attenuation.

This principal has been agreed with Natural Resources Wales (NRW).

It is proposed to abandon the existing surface water outfalls from the site and construct a single outfall sufficiently downstream of the site to ensure that at times of extreme flood in the River Ebbw it will still be possible to maintain a gravity outfall from the development and the development will not be flood locked.

The surface water drains will be constructed within the proposed highways and public open spaces to receive flows from the future development plots. The location and the invert levels of the drains have been strategically designed to enable gravity discharge from the plots. Figure 4 shows the indicative surface water drainage phasing layout for the development.

The surface water drains will be constructed in compliance with Sewers for Adoption 7th Edition and offered for phased adoption under a Section 104 Agreement to DCWW.

4 Highway Drainage

Restrictions imposed by the flooding considerations have resulted in a relatively flat development plateau and flat highway gradients. Kerb drainage in the form of Marshalls Beany blocks or Aco KerbDrain would be the most appropriate means of draining the roads in this instance.

The connections from the highway drainage will discharge to the surface water drainage system in the roads. Petrol Interceptors will be installed within the commercial plots if car parks or loading areas are required.

Off site highway drainage which previously connected to the pond will be intercepted and diverted to River Ebbw.

5 The Pond

A pond is located to the north of the site. It is believed to receive flows from ground water and discharges to a culvert which crosses the site in a westerly direction.

It is proposed to retain the pond as an amenity feature and to enhance the surrounding areas. The outfall from the pond will be diverted in the future phases of the development connecting directly to River Ebbw or to soakaways. The outfall will not be connected to the onsite drainage system.

6 Western Valley Trunk Sewer

6.1 Existing and Proposed Connections

Seven connections have been identified from the Novelis site to the WVTS. These are shown in Figure 2.

Following discussions with DCWW it was agreed that where possible the existing connections should be used to connect the S104 sewers from the Jubilee Park development to the trunk sewer.

The connections have been level and CCTV surveyed to determine their diameter, line, level and condition and the information has been submitted to DCWW. Figure 5 shows the location and treatment of the existing and proposed connections and table 1 summarises the information.

MH Ref	Existing Connection	Proposed Connection	Comments
ST26883101		150mm	Construct new connection to existing MH.
-	C1		MH C1 demolished and connection to WVTS to be abandoned and plugged.
ST26874901	C2	150mm	Connection extended terminating at new MH, provided new connection to WVTS. If not required pipe to be plugged.
ST26875801	C3	150mm	Connection extended terminating at new MH. If not required to be plugged.
ST26876701	C4	150mm	Connection extended to new MH.
ST26818761	225mm Dia	150 or 225mm	Connection rebuilt for future connection from school.
CO3359 (CSO)	225mm Dia.	150 or 225mm	Connection extended and new MH constructed.
ST27208748		300mm	New 300mm Dia internal backdrop connection.

Table 1 - Connections to the WVTS

6.2 Cover Treatment

Where the WVTS is located within the flood channel, the cover depth over the sewer will be reduced by some 2.0m.

Table 2 shows the manholes cover treatment on the WVTS.

MH Ref	EXISTING				PROPOSED		Cover Loss (m)
	Cover level	Invert level	DIA	Cover Depth	Cover level	Cover Depth	
ST26884203	31.835	25.345	1400	5.090	As Existing		
ST26883101	28.565	23.965	1400	3.200	As Existing		
ST27058749	26.929	20.179	1100	5.650	24.838	3.559	2.091
ST27208748	25.200	19.550	1100	4.550	24.563	3.913	0.637
ST27872403	24.779	19.429	1100	4.250	24.350	3.821	0.429
ST27872401	25.870	19.470	1100	5.300	24.350	3.780	1.520
ST26808757	26.220	22.720	225	3.275	25.316	2.371	0.904

Table 2 – MH cover treatment on the WVTS

Where the cover depth over the sewer is less than 1.5m, the sewer will be protected with a gabion mattress protective layer.

7 Conclusions

The existing public sewers crossing the site will be diverted to maintain their continuity. This will eliminate the defects and the large quantities of infiltration entering the public sewers. The existing sewers will be diverted under a S185 Agreement.

It is proposed to discharge the proposed foul flows to the public sewers on site. Substitution of the existing flows discharging to the trunk sewer with the proposed foul flows would result in a decrease in discharge rate to the trunk sewer. This principal has been agreed with DCWW.

The use of SUDS for the disposal surface water runoff has been considered and found to be impractical.

The development will result in a substantially reduced impermeable area and a reduced rate of surface water runoff. It is therefore proposed to discharge surface water runoff to River Ebbw without attenuation. This principal has been agreed with NRW.

Petrol Interceptors will be installed within the commercial plots if car parks or loading areas are required.

The foul and surface water drainage has been designed within the proposed highways and public open spaces to receive flows from the future development plots. The location and the invert levels of the drains have been strategically designed to enable gravity discharge from the plots.

The foul and surface water drainage system will be offered for adoption to DCWW under a Section 104 Agreement.

The treatment of the existing and proposed connections to the WVTS and the manholes cover treatment have been discussed with DCWW and the proposals have been agreed in principal.

Figures

Figure 1 Existing Public Sewers
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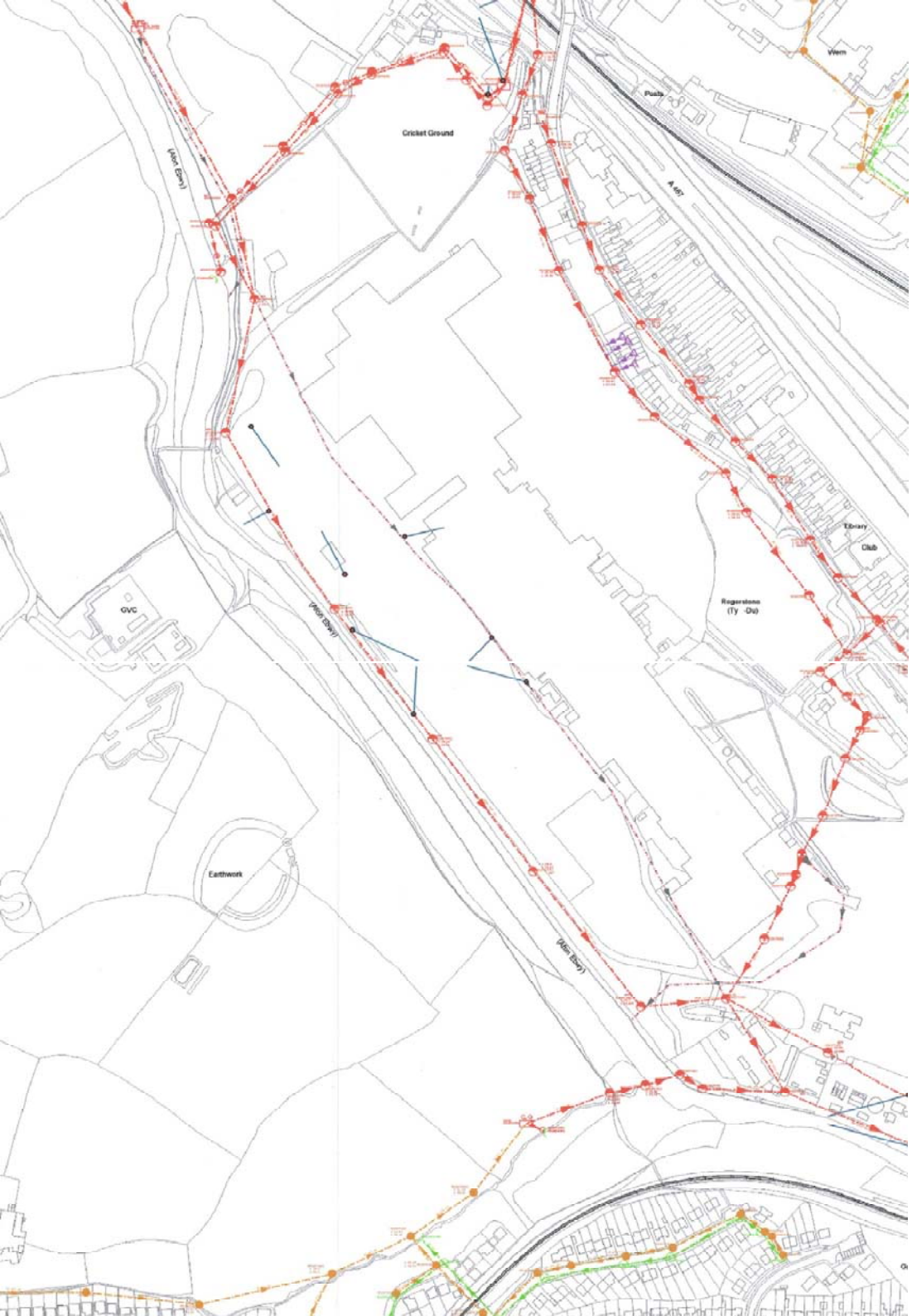
Figure 5 WVTS



Dwr Cymru Welsh Water
Asset Records
Data Services (OAC)
Linna, Pontran Road
St Mellons
Cardiff
CF3 0LT

Tel No: 02920 740315
Fax No: 02920 740470
Email: NRSWA.Enquiries@dwrcymru.com

Dwr Cymru Welsh Water
Cofnodion Eiddo
Gwasanaethau Data (OAC)
Linna, Ffordd Pontran
Llanisiwg
Caerdydd
CF3 0LT

Tel No: 02920 740315
Fax No: 02920 740470

GRM ENVIROG
MR ANDREW OWEN DAVIES
GRM ENVIROG
10 TY-NANT COURT
MORGANSTOWN
CARDIFF
CF15 8LW

F.A.O.:- MR ANDREW OWEN DAVIES

Your Ref / Fich Cyf:

Date:-

Telephone
Ffôn cyswllt

Direct Line
(Office Hours)

Our Ref / Fich Cyf:

HEALTH AND SAFETY AT WORK ACT 1974 - HS (G) 47
NEW ROAD & STREET WORKS ACT NOTICES 1991 Section 79 (3)

DEDDF IECHYD A DIOGELWCH GWAITH 1974 - HS (G) 47
HYSBYSIADAU DEDDF FFYRDD NEWYDD A GWAITH STRYDOEDD 1991 Adran 79 (3)

Re: / Ynglŷn a: NOVELIS CASTLE WORKS ROGERSTONE

I acknowledge reciept of your communication relating to the above and attached is a copy of the Company's water and sewerage apparatus records.

Dwr Cymru Cyfyngedig (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best info[illegible] corrections [illegible] works made [illegible] onus of locati[illegible] excavations [illegible] hereby by the [illegible] requirements [illegible] 1991 based [illegible] without proje[illegible] noted that the [illegible] disclose the [illegible] 1 September [illegible] their position [illegible] understood th[illegible] prejudice to [illegible] 1991 and the Company's right to be compensated for any damage to its apparatus.

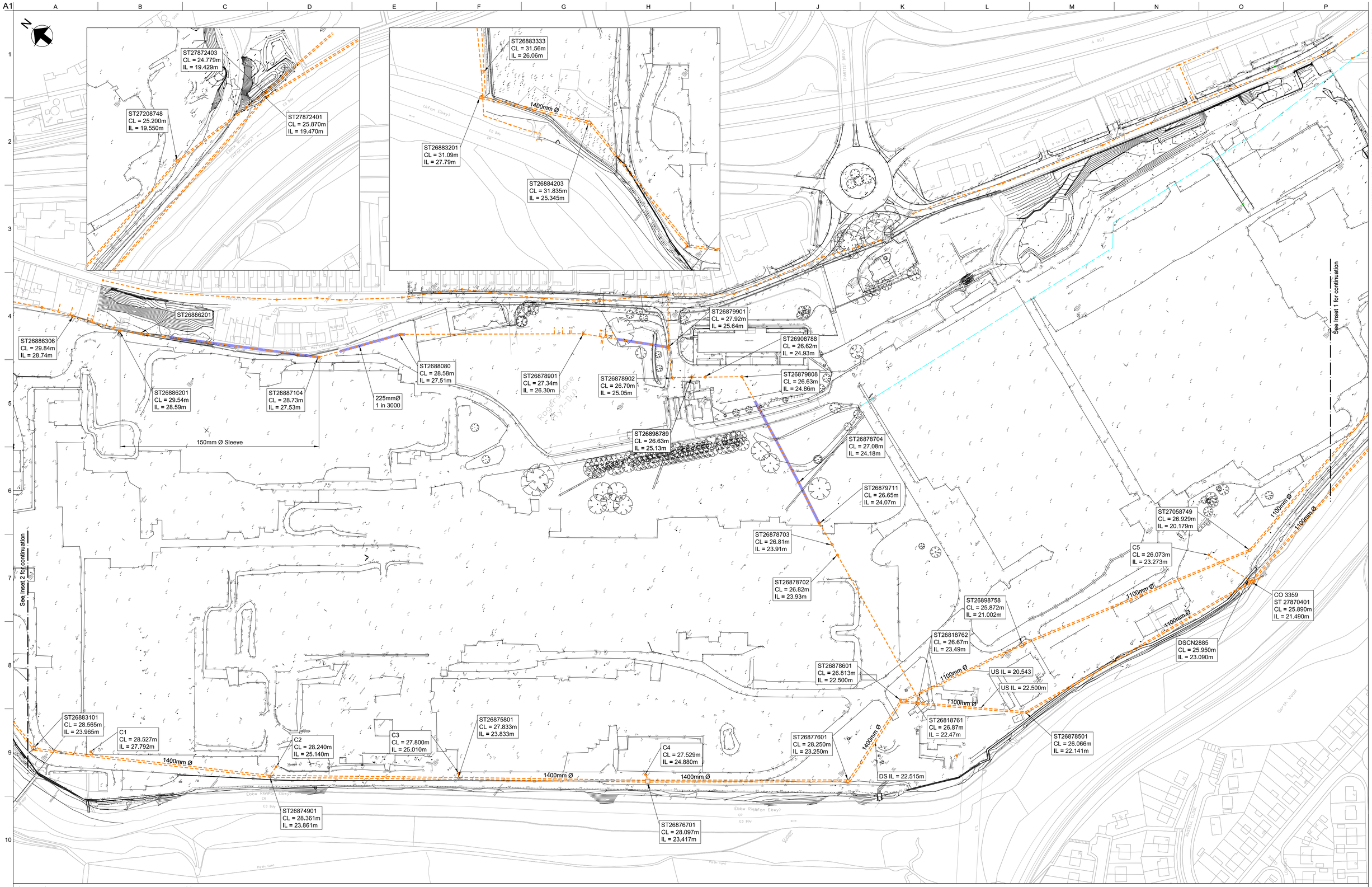
For a site visit by a local sewerage operative, general advice or assistance in an emergency, please telephone 0800 085 3968

Yours sincerely
Yn gywir

Dioch am eich gohebiaeth [illegible] ynghylch hysbysiad ei gyfeiriwyd [illegible] cyffredinol yn unig ac ar y d[illegible] sello ar y wybodaeth orau [illegible] ei bod yn gywir os gwnei g[illegible] ngrybwllwyd uchod y [illegible] mae'r cyfarpar cyn gwneud [illegible] Bwyr amoch chi, Caff y wyb[illegible] Cymru ei rhoi yn unol a gof[illegible] Ddeddf y Diwydiant Dwr 19[illegible] ac, yn neilltuol, ond heb am[illegible] medi ei bod yn bosibl na fyd[illegible] dalgylch bobloleth drawn, o[illegible] coodwyd cyn 1 Medi 1989, [illegible] manylion, yn cynnwys eu l[illegible] chaid deall y rhoddir y wybo[illegible] ddarpariaeth (eadd Hyrod [illegible] Cymru i gael ei ddigolledu [illegible]

Os hoffech gael ymweliad [illegible] neu gael cymorth mewn a[illegible]

Figure 1



Legend

- Existing public sewers
- Existing Culvert
- Unable to CCTV survey

Notes

1. All levels are in metres above ordinance datum unless stated otherwise.

2. Cover levels (CL) and Invert levels (IL) of existing DCWW sewer from Drainage Survey undertaken by Egan Waste and received July 2013.

3. Cover levels (CL) and Invert levels (IL) of existing DCWW WVTS sewer from Drainage Survey undertaken by Walters and received November 2013.

Issue	Date	By	Chkd	Appd
A1	10/12/13	DS	DO	JS
Drawing Updated				
A0	06/09/13	DS	DL	JS
Issued for Comment				

Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park
Section 104

Scale at A1 1:1250

Discipline Civils

ARUP

4 Pierhead St. Capital Waterside
Cardiff. CF10 4QP
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www.arup.com

Drawing Title
Existing Drainage

Drawing Status
Approval

Figure 2

Job No
229671

Do not scale

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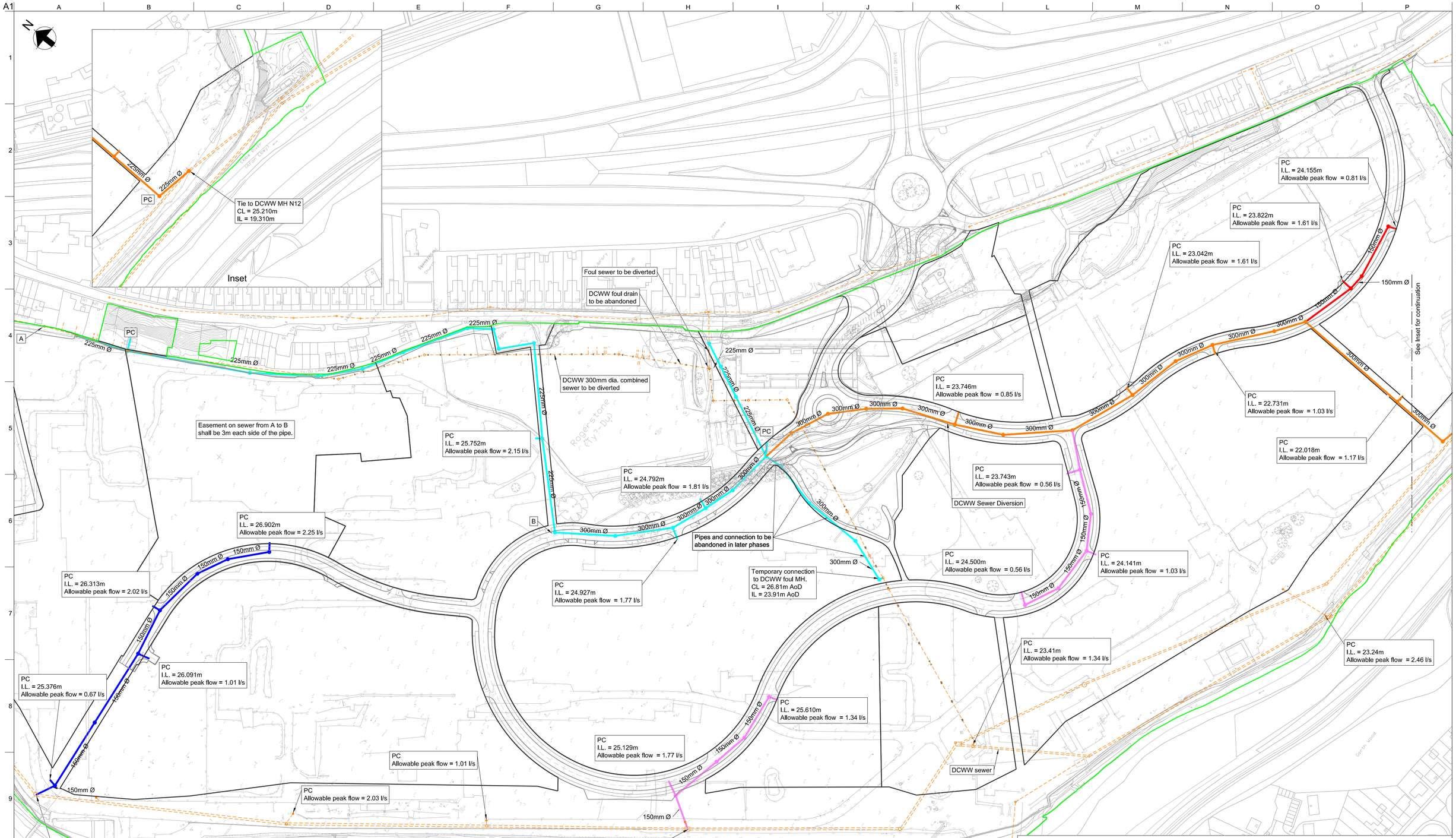
J:\229000\229671-004 Internal Project Data\4-30 Drawings\4-31 Issue drawings\Section 104\GI\250.dgn



Notes

1. Location of and IL of DCWW sewers are based on MH cover location surveys undertaken by Walters and Egan drains, received July 2013.

2. Foul water spurs to be 150mm diameter unles sstated otherwise.

3. Allowable peak flow based on 180L/ person / day, 2.39 persons / household, peak flow of 6 x DWF and 15 units per acre. In accordance with drainage strategy report submitted to DCWW and Ecohomes code level 3 requirements.

5. The invert levels shown on this plan are those of the spurs entering the chambers.

6. Drainage from each plot to be designed by individual plot developer.

7. The details shown on this drawing are based on design for approval. The details shown may be reviewed and revised during subsequent stages.

8. All levels are in metres above ordinance datum unless stated otherwise.

Legend

- Existing Foul / Combined Drainage
- Existing Foul drainage to be abandoned
- PC Potential Plot Connection
- Plot Boundary
- Site Boundary
- S185 Phase 1
- S185 Phase 2
- S104 Phase 1
- S104 Phase 2
- S104 Phase 3

Issue	Date	By	Chkd	Appd
A1	10/12/13	DS	DO	JS
Drawing Updated				
A0	07/11/13	DS	KA	KA
Issued for Approval				

Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park
Section 104

Scale at A1 1:1250

Discipline Civils

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Drawing Title
Foul Water Adoption Phasing

Drawing Status
Approval

Figure 3

Job No
229671

Do not scale

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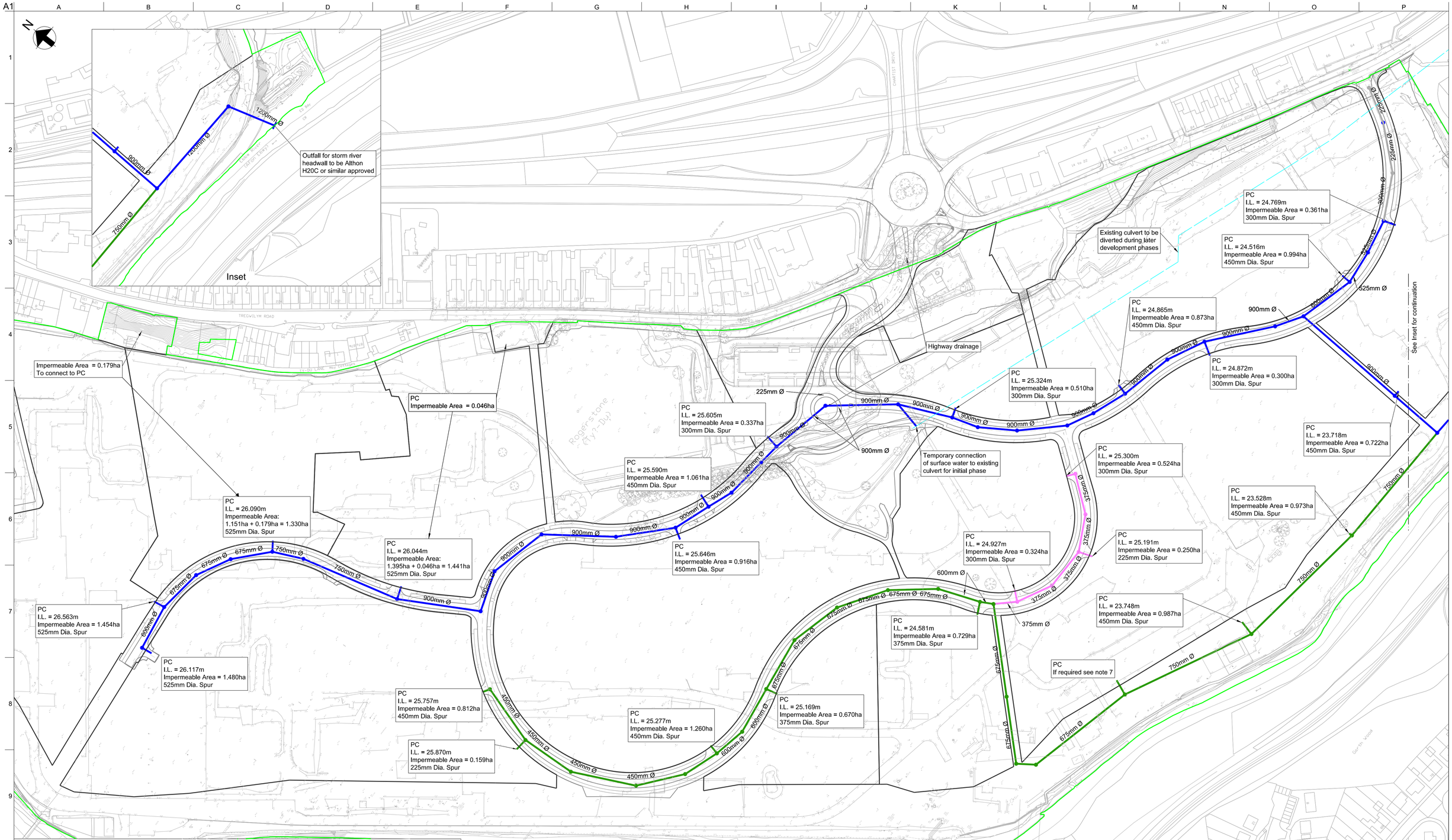

Notes

1. Road surface water drainage via kerb drains, gullies and connections not shown on this drawing.

2. Spur diameters have been calculated using impermeable area of 60% and storm intensity of 50mm / hour.

3. The invert levels shown on this plan are those of the spurs entering the chambers.

4. Drainage from each plot to be designed by individual plot developer.

5. The details shown on this drawing are based on design for approval. The details shown may be reviewed and revised during subsequent stages.

6. All levels are in metres above ordinance datum unless stated otherwise.

7. If plot connection is used at these locations the design may need to be ammended to accommodate the additional flow.

Legend

- PC — Potential Plot Connection
- Existing Culvert
- Plot Boundary
- Site Boundary
- S104 Phase 1
- S104 Phase 2
- S104 Phase 3

Issue	Date	By	Chkd	Appd
A1	10/12/13	DS	DO	JS
Drawing Updated				
A0	07/11/13	DS	KA	KA
Issued for Approval				

Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park
Section 104

Scale at A1 1:1250

Discipline Civils

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Drawing Title
Surface Water Adoption Phasing

Drawing Status
Approval

Figure 4

Job No
229671

Do not scale

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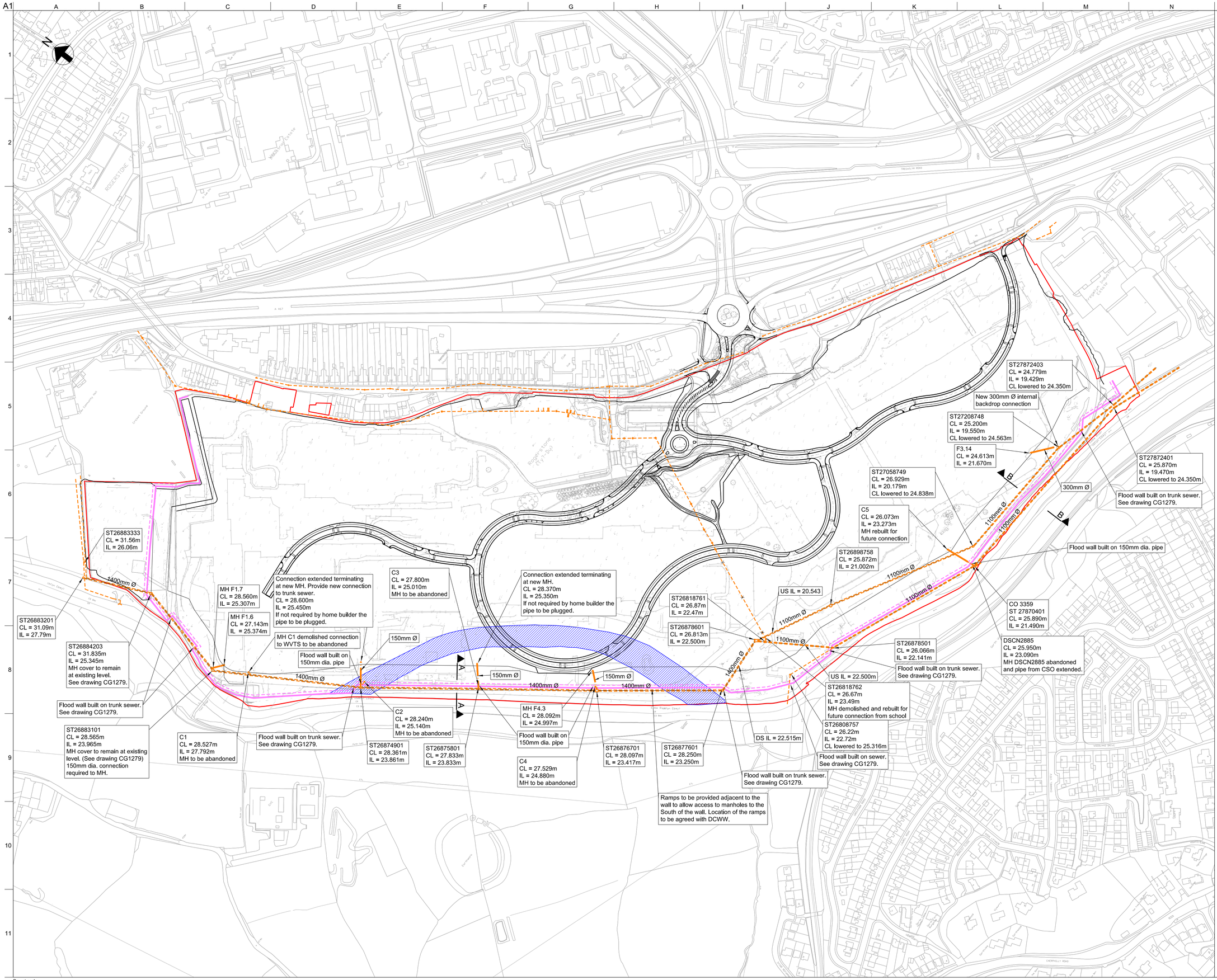
A1



Legend

- Site Boundary
- Approx. extent of previous river bed

Notes

1. For section A - A and B - B see drawing CG1279.

Issue	Date	By	Chkd	Appd
A0	18/12/13	DS	KA	JS
Issued for Information				

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Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park
Section 104

Drawing Title
WVTS Alteration

Scale at A1 1:2000

Discipline Civils

Drawing Status Figure 5

Job No 229671

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Do not scale

© Arup

Appendix A

Company

Alcan Rolled Products UK
Castle Works
Rogerstone
Newport
NP1 9YA

Consent No. TE 589A

Receiving Works Cardiff East/W.V.T.S.

Council Area Newport

Sample Point No. 46003

Nature of Discharge Chlorine Scrubber

Date Consent Issued May 20th 1983

Status Active

Current Consent Conditions	**Maximum Permissible Value**
pH	Between 6 and 11
Flow Max	150 m3/day
Total Suspended Solids	2000 mg/l
Oil and Grease	20 mg/l
Copper	0.5 mg/l
Zinc	1.0 mg/l
Chromium	0.4 mg/l
Nickel	0.5 mg/l
Cyanide	10 mg/l
Sulphate	1000 mg/l as SO4
Settled COD	1000 mg/l

Company

Alcan Rolled Products UK
Castle Works
Rogerstone
Newport
NP1 9YA

Consent No. TE 589B

Receiving Works Cardiff East/W.V.T.S.

Council Area Newport

Sample Point No. 322624

Nature of Discharge Effluent Plant

Date Consent Issued October 11th 1983

Status Active

Current Consent Conditions	**Maximum Permissible Value**
pH	Between 5 and 12
Flow Max	600 m3/day
Total Suspended Solids	1000 mg/l
Oil and Grease	500 mg/l
Copper	1.0 mg/l
Zinc	1.0 mg/l
Chromium	1.0 mg/l
Nickel	1.0 mg/l
Phenols	10 mg/l
Sulphate	1000 mg/l as SO4
Settled COD	1000 mg/l

Company

Alcan Rolled Products UK
Castle Works
Rogerstone
Newport
NP1 9YA

Consent No. TE 589C

Receiving Works Cardiff East/W.V.T.S.

Council Area Newport

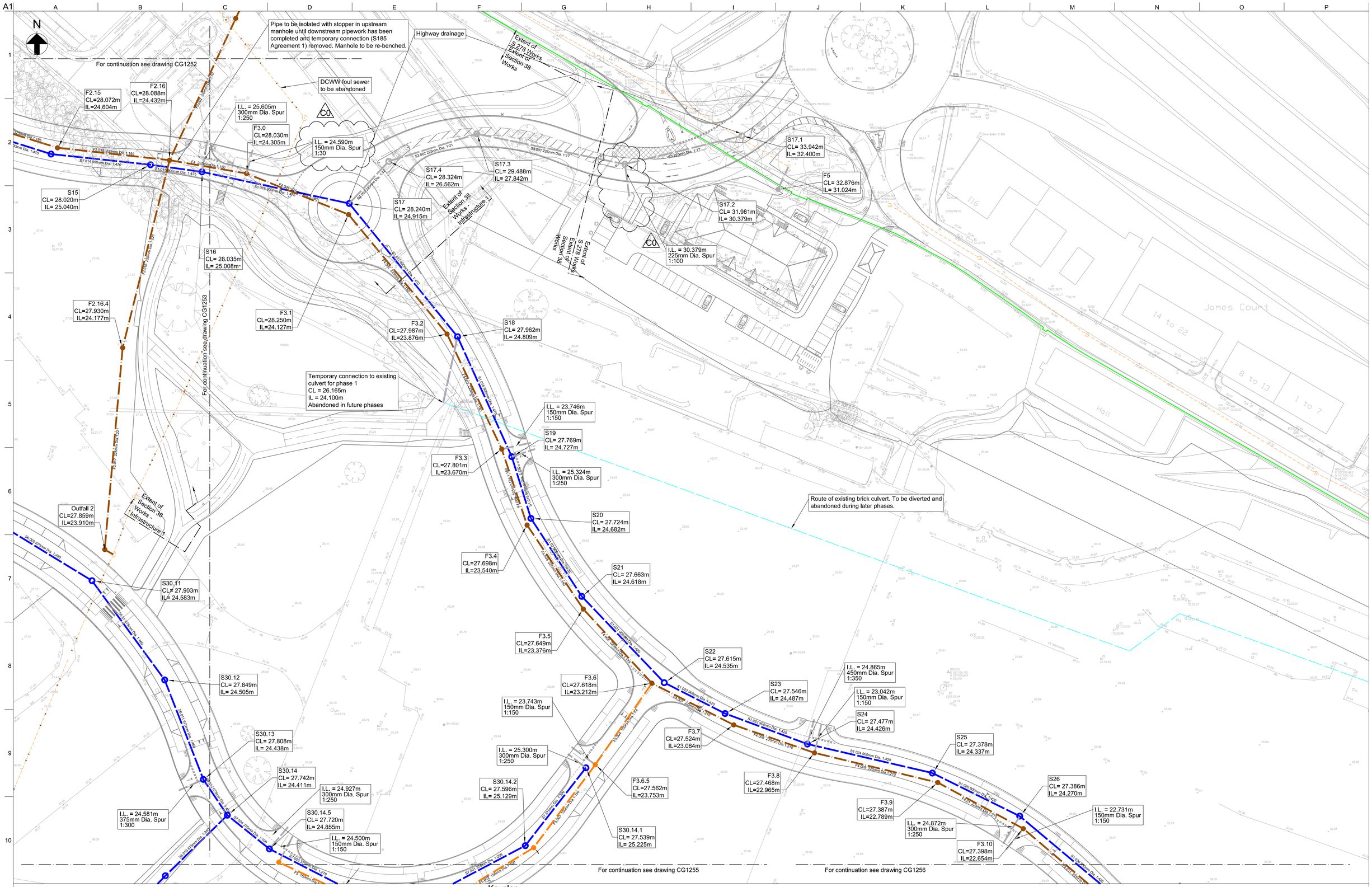
Sample Point No. 200006

Nature of Discharge	Emergency Discharge
Date Consent Issued	June 14th 1983
Date Direction 1 issued	12th March 1987
Date Direction 2 issued	11th October 1983
Status	Active

Current Consent Conditions	**Maximum Permissible Value**
pH	Between 5 and 12
Flow Max	2000 m3/day
Flow per Hour	125 m3/hr
Total Suspended Solids	1000 mg/l
Oil and Grease	500 mg/l
Copper	1.0 mg/l
Zinc	1.0 mg/l
Chromium	1.0 mg/l
Nickel	1.0 mg/l
Lead	1.0 mg/l
Phenols	10 mg/l
Sulphate	1000 mg/l as SO4

Appendix B

S104 Construction Drawings



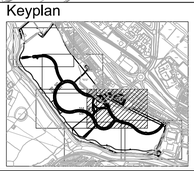
Legend

- Site Boundary
- Foul Drainage - S 104
- Foul Drainage - S 185
- Storm Drainage
- Existing Combined Drainage
- Existing Culvert
- Abandoned Sewer

Notes

1. The details shown on this drawing are based on design for approval. The details shown may be reviewed and revised during subsequent stages.
2. All levels are in metres above ordinance datum unless stated otherwise.
3. Cover levels (CL) and Invert levels (IL) of existing DCWW sewer from Drainage Survey undertaken by Egan Waste and received July 2013.
4. Road surface water drainage via kerb drains, gullies and connections not shown on this drawing.
5. Drainage from each plot to be designed by individual plot developer.
6. Spur invert levels shown are at the point entering the chamber unless stated otherwise.
7. Drainage design and construction is in accordance with Sewers for Adoption 7th edition and the requirements of the statutory undertaker.

Keyplan



Issue	Date	By	Chkd	Appd
C0	29/04/14	DS	DO	JS
As shown				
A4	29/01/14	DS	DO	JS
Note added and spur labels amended				
A3	27/01/14	DS	DO	JS
Spur added as shown				

Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park

Scale at A1 1:500

Discipline Civils

ARUP
4 Pierhead St, Capital Waterside
Cardiff, CF10 4QP
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Drawing Title
Proposed Drainage
Sheet 4 of 6

Drawing Status
Construction

Job No	Drawing No	Issue
229671	CG1254	C0

J:\229000\229671-004 Internal Project Data\4-30 Drawings\4-31 Issue drawings\Section 104\CG1254.dgn

Do not scale

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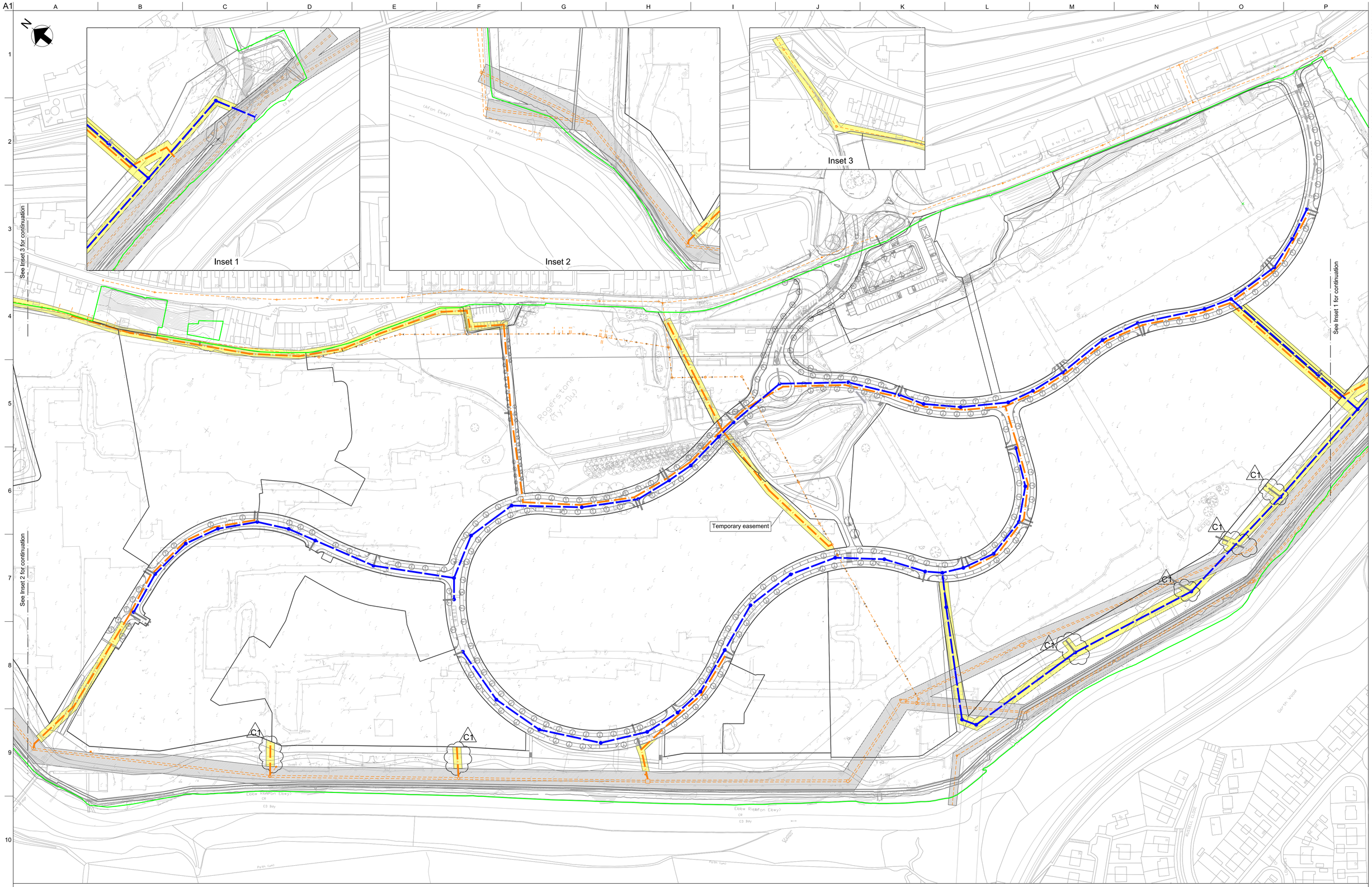

Legend

- Existing Foul / Combined Drainage
- Proposed Foul Drainage
- Existing Foul drainage to be abandoned
- Proposed Storm Drainage
- Easement (Outside of adoptable highways)
- Site Boundary
- Plot Boundary
- Existing Easement

Notes

1. Road surface water drainage via kerb drains, gullies and connections not shown on this drawing.

2. Location of and IL of DCWW sewers are based on MH cover location surveys undertaken by Walters and Egan drains, received July 2013.

3. Easements based upon Sewers for adoption 7th edition.

4. Drainage from each plot to be designed by individual plot developer.

5. The details shown on this drawing are based on design for approval. The details shown may be reviewed and revised during subsequent stages.

6. Drainage design and construction is in accordance with Sewers for Adoption 7th edition and the requirements of the statutory undertaker.

Issue	Date	By	Chkd	Appd
C1	12/05/15	DS	JS	JS
Easements revised as shown				
C0	29/04/14	DS	DO	JS
Easement revised as shown				
A5	17/02/14	DS	DO	JS
As Shown				

Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park

Scale at A1 1:1250

Discipline Civils

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Drawing Title
Proposed Easements

Drawing Status
Construction

Job No	Drawing No	Issue
229671	CG1259	C1

Do not scale

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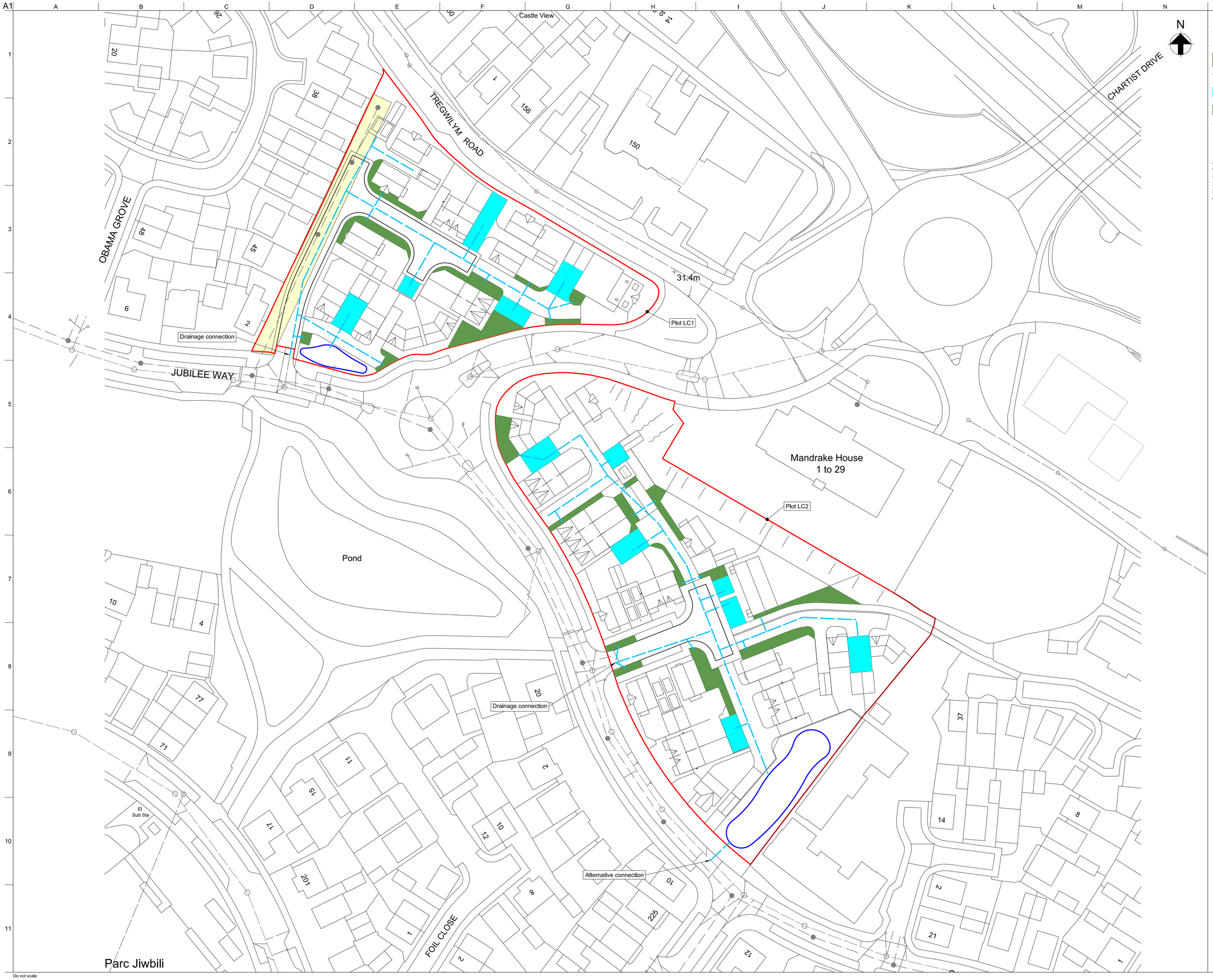
Appendix C

Proposed Drainage Strategy Drawings



Legend

- Existing Foul Drainage
- Existing Storm Drainage
- Drainage Easement
- Proposed Drainage Collection Pipe
- Proposed Permeable Paving and Storage Cell
- Proposed Bioretention Device/Rain Garden
- Proposed Attenuation Pond

Notes

1. This drawing was prepared at concept design stage as part of the outline planning application. The details will be subject to design development during subsequent design stages.
2. Ponds, rain gardens and storage cells shown indicatively, location and area to be confirmed at detailed design stage.

Issue	Date	By	Chkd	Appd
P1	07/05/21	CB	JS	JS
Discontinued Pipes Removed				
P0	04/05/21	CB	JS	JS
Concept Design Issue				

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Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park

Drawing Title
LC1 and LC2
Storm Drainage Strategy

Scale at A1 1:500

Discipline Civil

Drawing Status
Concept Design

Job No	Drawing No	Issue
229671	CG650	P1

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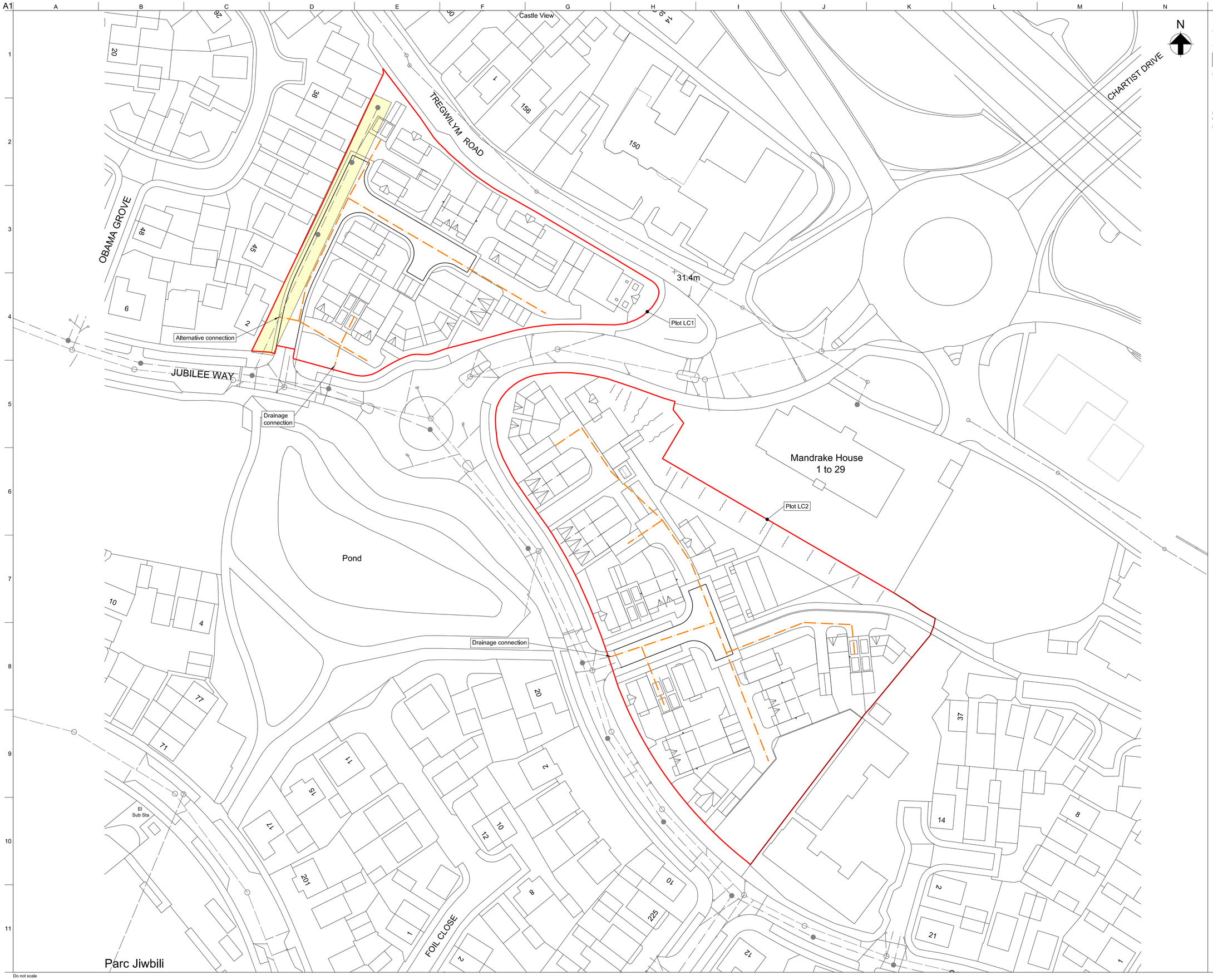

Legend

- Existing Foul Drainage
- Existing Storm Drainage
- Drainage Easement
- Proposed Drainage Collection Pipe

Notes

1. This drawing was prepared at concept design stage as part of the outline planning application. The details will be subject to design development during subsequent design stages.

Issue	Date	By	Chkd	Appd
P1	07/05/21	CB	JS	JS
Discontinued Pipes Removed				
P0	04/05/21	CB	JS	JS
Concept Design Issue				

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www.arup.com

Client
Walters Land (Rogerstone) Ltd.

Job Title
Jubilee Park

Drawing Title
LC1 and LC2
Foul Drainage Strategy

Scale at A1 1:500

Discipline Civil

Drawing Status
Concept Design

Job No	Drawing No	Issue
229671	CG651	P1

J:\229000\229671-00\4 Internal Project Data\4-30 Drawings\4-31 Issue drawings\CG651.dgn

Do not scale

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Appendix D

Integral Geotechnique GI Report

Intégral Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 20807991
mail@integralgeotec.com

12845/RAH

Walters Land (Rogerstone) Limited
Hirwaun House 13th Avenue
Hirwaun Industrial Estate Hirwaun
Aberdare
CF44 9UL

19 April 2021

For the attention of Mr Vahe Zarifian

Dear Sirs,

LC1 and LC2, Jubilee Park– Soil Infiltration Testing Report

Further to your recent instruction, we have completed the soil infiltration testing at the above site and enclose for your attention a copy of the results.

This report (including all appendices to it and any subsequent addendums or correspondence) has been prepared for the sole benefit, use and information of Walters Land (Rogerstone) Ltd and no third party is entitled or permitted to rely on it. This report may not be used, reproduced or circulated (in whole or part) for any purpose without the written consent of Intégral Géotechnique (Wales) Limited. Intégral Géotechnique (Wales) Limited shall not be liable to any third party who does not have such express written permission to rely on the report for any losses they may suffer.

Background

An ongoing residential development site referred to as Jubilee Park is located in Rogerstone, Newport. Within the Jubilee Park site, land parcels referred to as LC1 and LC2 are located to the north and south of Jubilee Way respectively. This investigation was limited to LC1 at a National Grid reference of approximately 326937, 187888 and LC2 at a National Grid reference of 327017, 187778. See Figure 1 for a Site Location plan.

The Jubilee Park site has been the subject of several phases of site investigation and supplementary investigation followed by comprehensive site wide reclamation and remediation earthworks comprising the excavation and recompaction of the upper 2m of ground. The majority of the site has either already been developed, or is in the process of being developed, for a residential end use. Land parcels LC1 and LC2 were originally planned for commercial development but are now being considered for residential development. As a result of this, soakaway testing is required within the locations of the proposed attenuation ponds.

Scope of Works

The investigation scope was to undertake soil infiltration testing within two trial pit locations in accordance with BRE 365. The test locations were specified by Walters Land (Rogerstone) Ltd and were positioned to target the locations of proposed attenuation ponds within the land parcels.

Fieldworks

Intégral Géotechnique attended site on 8th April 2021 to undertake soakaway testing at 2 No. locations in the position of proposed attenuation ponds in land parcels LC1 and LC2. SA101 was located in the south-east of LC2 and SA102 was located in the south-west of LC1. In addition, two additional trial pits (TP01 and TP02) were undertaken in the south-east of LC2 in order provide information on the ground conditions in this area of the site.

At each testing location, a single trial pit was excavated using a wheeled CAT 432f backhoe excavator. The trial pits were excavated to depths of between 2.7m and 3.7mbgl using the 3ft toothed bucket. Excavation was unable to progress in locations SA101 and TP01 due to obstruction(s) at the base of the trial pits, further detail is provided in the trial pit logs included in Appendix A.

Locations SA101 and SA102 were filled with clean water via a water bowser and the water level was monitored for a period of time to assess the infiltration rate of the strata. Following the monitoring period all trial pits were backfilled with arisings.

The approximate locations of the trial pits/soakaway tests are shown in Figure 2.

Ground Conditions

Geology

The BGS geology maps indicate that the site is underlain by Raglan Mudstone Formation comprising interbedded mudstone and sandstone deposited during the Silurian Period. Beneath the north-eastern portion of both land parcels superficial deposits of Glacial Till (diamicton) are indicated to overlie the bedrock, generally comprising variable soils including clay, silt, sand and gravel. Beneath the south-western portion of both land parcels superficial deposits of Alluvium are indicated to overlie the bedrock, comprising clay, silt, sand and gravel.

A cover of made ground would be anticipated beneath the site owing to the site’s former uses as well as the reclamation scheme undertaken on the wider Jubilee Park site.

LC1

In SA102 made ground was encountered to a depth of 3.0mbgl. The made ground comprised a thin veneer of limestone gravel, underlain by stiff red brown gravelly clay to 0.7mbgl, underlain by grey brown silty sandy gravel of sandstone, quartz, brick and concrete with cobbles and occasional timber fragments, metal wire, and clay pipe fragments. Beneath the gravel, made ground comprising reworked natural soils was encountered to 3.0mbgl, with frequent areas of black staining and occasional metal wire and brick fragments.

The underlying natural ground comprised firm to stiff sandy gravelly clay becoming medium dense sandy gravel with cobbles below 3.4mbgl.

At the transition from clay to granular soils at 3.4mbgl a slow groundwater strike was encountered. Localised minor seepages were observed in the made ground between 2.1mbgl and 3.0mbgl.

LC2

In SA101, made ground was encountered to greater than 2.7mbgl and was unable to be penetrated below this depth due to a suspected concrete obstruction. The made ground comprised a thin veneer of limestone gravel at ground level, underlain by dark grey to black, locally ashy, very sandy gravel with cobbles and occasional anthropogenic materials including ceramic fragments, whole bricks, plastic fragments, plastic wrap, metal wire and timber fragments. Gravel and cobbles typically comprised a combination of sandstone, brick, concrete and slag.

Similar conditions were encountered in trial pits TP01, TP02 also excavated in the south-east of LC2. In all three locations, bands or lenses of reworked soils were locally encountered, typically described as stiff brown/grey sandy gravelly clay. TP01 was terminated at 3.3mbgl due to a concrete boulder precluding further excavation and TP02 was terminated at 3.4mbgl.

The made ground was not penetrated in any of the three trial pits. However, the conditions at the base of TP01 were noted to transition to brown sandy gravel which may represent natural ground, although this could not be proven.

Groundwater seepages were recorded around 1.5m and 1.8mbgl in the trial pits, and medium groundwater ingress was encountered in TP02 at 3.2mbgl, considered to be perched water.

The trial pit logs are enclosed in Appendix A.

Soil Infiltration Test Results

Soil infiltration testing was undertaken in SA101 and SA102 with base depths of 2.7m and 3.7mbgl respectively.

The first test cycle was initiated in both locations and after a period of 45minutes to 1 hour no infiltration was observed in either location. Accordingly, the tests were ceased and an infiltration rate could not be calculated. In accordance with BRE365, these findings indicate that the tests failed the first test cycle.

Full copies of the soil infiltration test results and calculation sheets are included as Appendix B.

Note that the soakaway test results are specific to the locations and depths of the tests undertaken.

Conclusion

Soil infiltration testing in LC1 and LC2 indicates no infiltration, therefore infiltration rates were unable to be calculated.

Trial pits in the south-east of LC2 indicate made ground of thicknesses greater than 2.7m and 3.4mbgl. Made ground was encountered to 3.0mbgl in the south-west of LC1. It is recommended that soakaways are not implemented within made ground soils due to their inherent variability and the potential for leachate generation.

Based on the above, the ground conditions indicate that shallow soakaways or soil infiltration drainage solutions are unlikely to be suitable in these areas.

We trust the above and enclosed are to your satisfaction. However, if you have any queries or require any further information, please do not hesitate to contact us.

Yours faithfully,

Rebecca Hitt
For
Intégral Géotechnique (Wales) Limited
Encl.

Figure 1	*Site Location Plan*
Figure 2	*Site Plan*
Appendix A	*Trial Pit Logs*
Appendix B	*Soil Infiltration Test Results*

Appendix A

Trial Pit Logs

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Project Name:	Project No.:	Trial Pit No.:
Jubilee Park LC1 and LC2	**12845**	**SA101** Sheet 1 of 1

Location:	Client:	Logged By:	Scale
Rogerstone	Walters Land	RAH	1:25

Equipment: CAT 432F	Coordinates:	**Dimensions** 5.00m
Date Excavated: 08/04/2021	Level:	Depth : 2.70m, 1.20m

Samples & In-situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
						MADE GROUND: Compact brown slightly sandy GRAVEL of fine to medium sub-angular to angular limestone with occasional brick fragments, ceramic fragments and plastic strapping.
			0.30			MADE GROUND: (Medium dense) dark grey to black and dark brown slightly silty very sandy GRAVEL with medium cobble content. Locally ashy. Gravel comprises fine to coarse sub-rounded to angular sandstone, quartzite and slag/clinker with frequent brick and concrete fragments. Cobbles are sub-angular to rounded sandstone, brick, concrete and slag. Contains occasional ceramic fragments, whole bricks, plastic fragments, plastic wrap, metal wire and timber fragments. ...Damp becoming wet below 1.5mbgl. Anthropogenic materials are less frequent below 1.5mbgl.
			1.80			MADE GROUND: Stiff dark blue grey and grey brown slightly gravelly sandy silty CLAY tending to clayey sand. Gravel comprises fine to coarse sub-angular to sub-rounded sandstone. *Frequent minor seepages.*
			2.10			MADE GROUND: (Medium dense) dark grey to black and dark brown ashy slightly silty very sandy GRAVEL with medium cobble content. Gravel comprises fine to coarse sub-rounded to angular sandstone, quartzite and slag/clinker with frequent brick and concrete fragments. Cobbles are sub-angular to rounded sandstone, brick, concrete and slag. Contains occasional metal wire.
			2.70 2.70			Scratching at base on suspected reinforced concrete. Reinforcing wire occasionally recovered and visible at base of trial pit. End of Trialpit at 2.70 m

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Remarks:
1. Trial pit excavation terminated at 2.7mbgl. Scratching at base on suspected concrete.
2. Soakaway test undertaken.

Groundwater: Minor seepages frequently encountered around 1.8mbgl.

Stability: Some spalling observed.

Key:
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Project Name:	Project No.:	Trial Pit No.:
Jubilee Park LC1 and LC2	**12845**	**SA102** Sheet 1 of 1

Location:	Client:	Logged By:	Scale
Rogerstone	Walters Land	RAH	1:25

Equipment: CAT 432F	Coordinates:	**Dimensions** 3.00m
Date Excavated: 08/04/2021	Level:	Depth : 3.70m, 1.20m

Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Very compact brown slightly silty sandy GRAVEL of sub-angular to angular limestone.
			0.20			MADE GROUND: Compact dark blue grey sandy GRAVEL of fine to coarse sub-angular slag cement.
			0.30			MADE GROUND: Stiff red brown and brown slightly sandy slightly gravelly to gravelly silty CLAY. Gravel comprises fine to coarse sub-angular to angular sandstone and mudstone.
			0.70			MADE GROUND: (Medium dense) grey brown silty sandy GRAVEL with medium cobble content. Gravel comprises fine to coarse sub-angular to rounded sandstone, quartz, brick and concrete. Cobbles are of sub-angular to rounded brick and concrete. Contains occasional timber fragments, metal wire and clay pipe fragments. Damp. ...Below 1.8mbgl is damp to wet.
			2.10			MADE GROUND: Firm and firm to stiff mottled brown and grey, frequently stained black, sandy gravelly silty CLAY and clayey sandy GRAVEL with low cobble content. Gravel and cobbles comprise fine to coarse sub-angular to rounded sandstone. Contains occasional metal wire and brick fragments. Varies between clay and gravel. *Localised minor seeepages observed.*
			3.00			Firm to stiff mottled brown and grey sandy gravelly silty CLAY. Gravel comprises fine to coarse sub-angular to sub-rounded sandstone.
			3.40			(Medium dense) brown slightly silty sandy GRAVEL with medium cobble content. Gravel and cobbles comprises fine to coarse sub-rounded to rounded sandstone. *Slow groundwater ingress at 3.4mbgl.*
			3.70			End of Trialpit at 3.70 m

Remarks:
1. Trial pit excavation terminated at 3.7mbgl for infiltration testing.

Groundwater: Localised water seepages between 2.1m and 3.0mbgl. Groundwater ingress (slow) at approximately 3.4mbgl.

Stability: Some spalling observed.

Key:
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Project Name:	Project No.:	Trial Pit No.:
Jubilee Park LC1 and LC2	**12845**	**TP01** Sheet 1 of 1

Location:	Client:	Logged By:	Scale
Rogerstone	Walters Land	RAH	1:25

Equipment: CAT 432F	Coordinates:	**Dimensions** 5.00m
Date Excavated: 08/04/2021	Level:	Depth : 3.30m; 1.40m

Samples & In-situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
						MADE GROUND: Compact pinkish brown slightly sandy GRAVEL of predominantly fine, up to medium, sub-angular limestone with occasional brick fragments, geotextile (terram) fragments and plastic wrap.
			0.40			MADE GROUND: (Medium dense) dark grey slightly silty very sandy GRAVEL with medium cobble content. Locally ashy. Gravel comprises fine to coarse sub-rounded to angular sandstone, quartzite and slag/clinker with frequent brick and concrete fragments. Cobbles are sub-angular brick, concrete and occasional sandstone. Contains occasional plastic fragments, clay pipe fragments and timber fragments. Damp. Very occasional lenses of stiff brown sandy clay. *Frequent minor seepages.*
			2.00			MADE GROUND: (Medium dense) dark grey and grey brown slightly silty sandy GRAVEL with medium cobble content. Gravel comprises predominantly fine to coarse sub-rounded to angular sandstone with brick, concrete and occasional slag. Cobbles are of sub-angular to sub-rounded sandstone brick and concrete. Contains occasional reinforcing wire. Frequent lenses of firm brown and grey sandy clay. ...Below 3.0mbgl is generally brown sandy gravel with frequent concrete cobbles and boulders recovered. *Large concrete boulder in NE end of TP from 2.8m to 3.3mbgl, cannot remove or progress.*
			3.30			*3.25m to 3.30mbgl: Brown slightly silty sandy GRAVEL of fine to coarse sub-rounded to sub-angular sandstone. (Possible Natural Ground)* End of Trialpit at 3.30 m

1 2 3 4 5

Remarks:
1. Trial pit excavation terminated at 3.3mbgl. Unable to progress.

Groundwater: Minor seepages around 1.5mbgl. Groundwater rising from base at 3.3mbgl.

Stability: Some spalling observed.

Key:
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

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Project Name:	Project No.:	Trial Pit No.:
Jubilee Park LC1 and LC2	**12845**	**TP02** Sheet 1 of 1

Location:	Client:	Logged By:	Scale
Rogerstone	Walters Land	RAH	1:25

Equipment: CAT 432F	Coordinates:	**Dimensions** 3.00m
Date Excavated: 08/04/2021	Level:	Depth : 3.40m, 1.20m

Samples & In-situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
						MADE GROUND: Compact brown/pinkish brown slightly silty sandy GRAVEL of predominantly fine to medium sub-angular to angular limestone with occasional brick fragments and plastics.
			0.30			MADE GROUND: (Medium dense) dark grey to black slightly silty very sandy GRAVEL with low to medium cobble content. Locally ashy. Gravel comprises fine to coarse sub-rounded to angular sandstone with brick, concrete and slag. Cobbles comprise sub-rounded to angular brick, concrete and sandstone. Contains occasional small timber fragments, cloth and reinforcing wire. Damp. ...Becoming damp to wet below 1.8mbgl.
			1.80			MADE GROUND: Stiff dark grey and brownish grey sandy gravelly silty CLAY. Gravel comprises fine to coarse sub-angular sandstone and brick.
			2.30			MADE GROUND: (Loose to medium dense) dark grey to black ashy gravelly SAND with medium cobble content. Gravel comprises fine to coarse sub-rounded to angular slag, sandstone and concrete with occasional brick fragments. Cobbles are of brick, concrete and sandstone. Damp to wet.
			3.20			MADE GROUND: (Loose to medium dense) black ashy silty sandy GRAVEL of sub-rounded to angular orange brown and black slag, concrete and brick. *Medium groundwater ingress.*
			3.40			End of Trialpit at 3.40 m

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Remarks:
1. Trial pit excavation terminated at 3.4mbgl due to groundwater and target depth achieved.

Groundwater: Groundwater ingress (medium) at approximately 3.2mbgl.

Stability: Some spalling observed.

Key:
D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
W - Water sample

AGS

Appendix B

Soil Infiltration Test Results

BRE365 SOIL INFILTRATION RATE TEST - SA101

12845 Jubilee Way Land Parcels

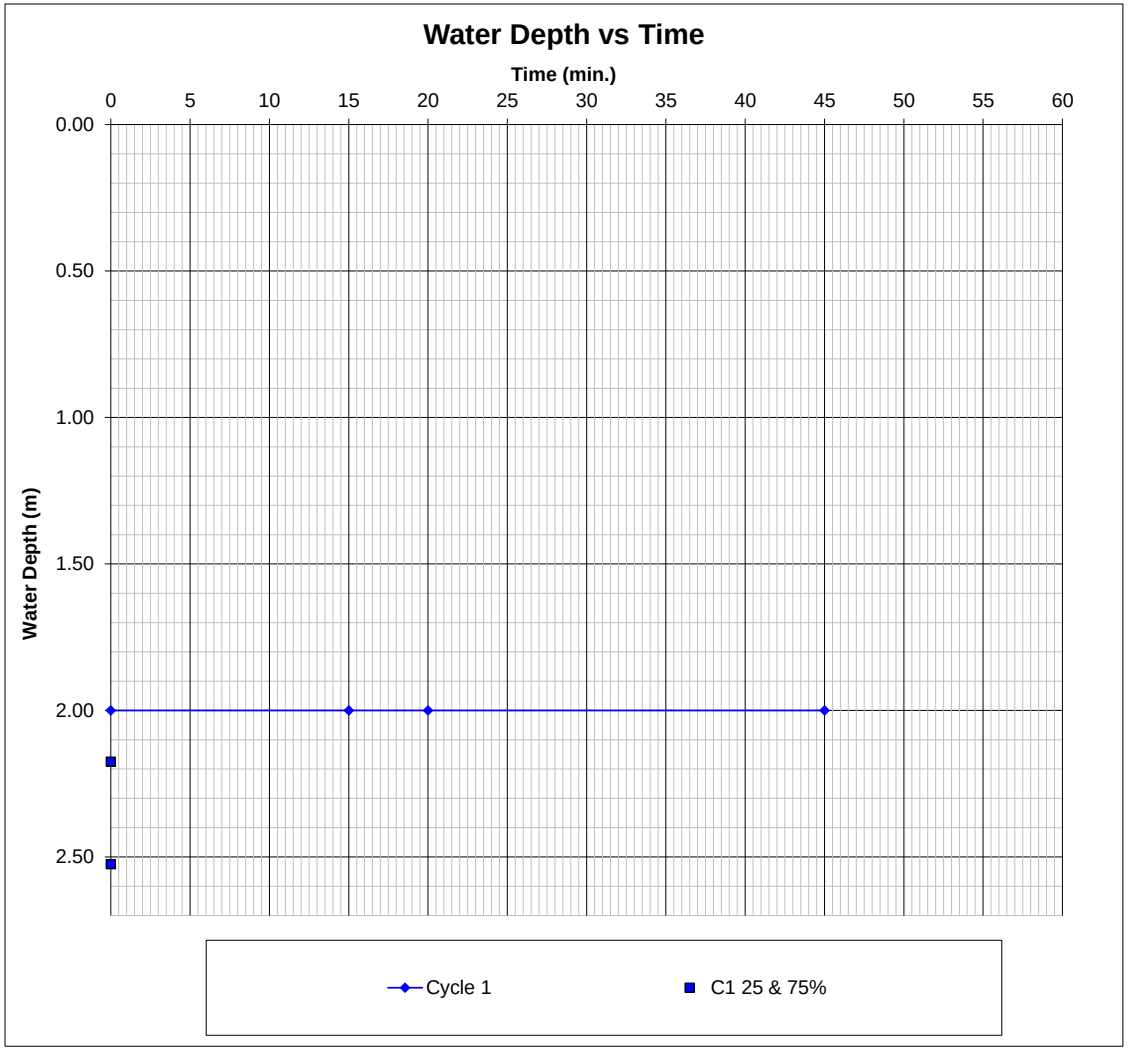
Trial Pit Information	
Length (m)	4.00
Width (m)	1.20
Depth (m)	2.70
Groundwater	Seepages
Weather Conditions	Fair
Date	08-Apr-21

Remarks

No infiltration observed - Test failed first cycle.

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	2.00				
15	2.00				
20	2.00				
45	2.00				

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	2.70		
Water Depths (m)			
Water depth at start of test	2.00		
Water depth at end of test	2.00		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	0.70		
Effective storage depth (75%)	0.53		
Effective storage depth (50%)	0.35		
Effective storage depth (25%)	0.18		
Outflow Time (min)			
Time for measured outflow	45		
Time for 100% outflow	-		
Time for 75-25% outflow	-		
Volume of Outflow (m^3)			
Over measured effective depth	0.00		
Over 100% effective depth	3.36		
From 75% - 25% effective depth	1.68		
Surface Area (m^2)			
For 100% effective storage	12.08		
For 50% effective storage	8.44		
Over measured depth	4.80		
Soil Infiltration Rate (m/s)	**Cycle 1**	**Cycle 2**	**Cycle 3**
Over 100% effective depth	N/A		
Over measured depth	0.0E+00		
Over 75% - 25% effective depth	**N/A**		



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BRE365 SOIL INFILTRATION RATE TEST - SA102

12845 Jubilee Way Land Parcels

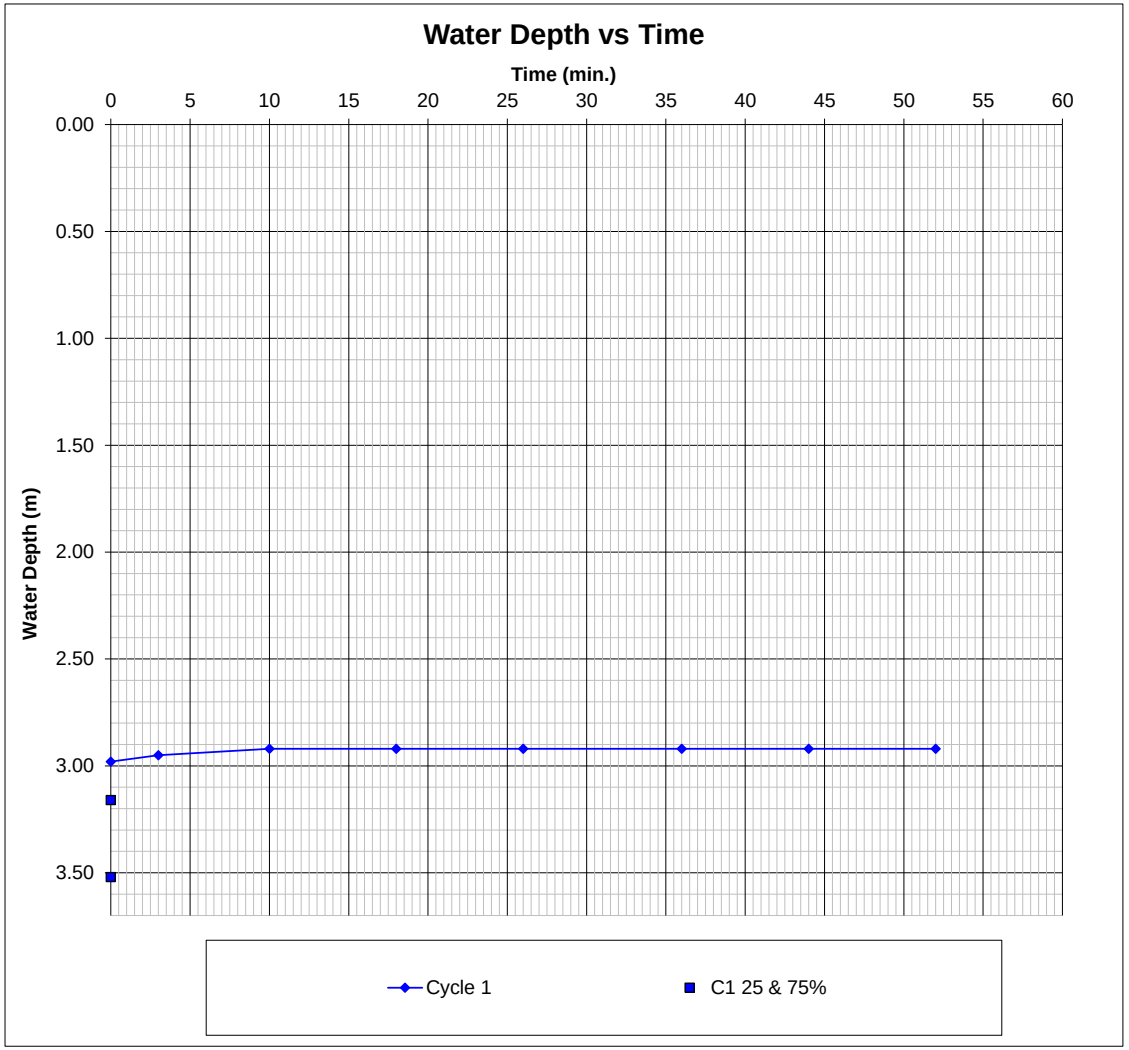
Trial Pit Information	
Length (m)	3.00
Width (m)	1.20
Depth (m)	3.70
Groundwater	3.4
Weather Conditions	Fair
Date	08-Apr-21

Remarks

Water level at 3.4mbgl pre-testing.
No infiltration observed - Test failed first cycle.

Cycle 1		Cycle 2		Cycle 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
0	2.98				
3	2.95				
10	2.92				
18	2.92				
26	2.92				
36	2.92				
44	2.92				
52	2.92				

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	3.70		
Water Depths (m)			
Water depth at start of test	2.98		
Water depth at end of test	2.98		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	0.72		
Effective storage depth (75%)	0.54		
Effective storage depth (50%)	0.36		
Effective storage depth (25%)	0.18		
Outflow Time (min)			
Time for measured outflow	52		
Time for 100% outflow	-		
Time for 75-25% outflow	-		
Volume of Outflow (m^3)			
Over measured effective depth	0.00		
Over 100% effective depth	2.59		
From 75% - 25% effective depth	1.30		
Surface Area (m^2)			
For 100% effective storage	9.65		
For 50% effective storage	6.62		
Over measured depth	3.60		
Soil Infiltration Rate (m/s)	**Cycle 1**	**Cycle 2**	**Cycle 3**
Over 100% effective depth	N/A		
Over measured depth	0.0E+00		
Over 75% - 25% effective depth	**N/A**		



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Figures

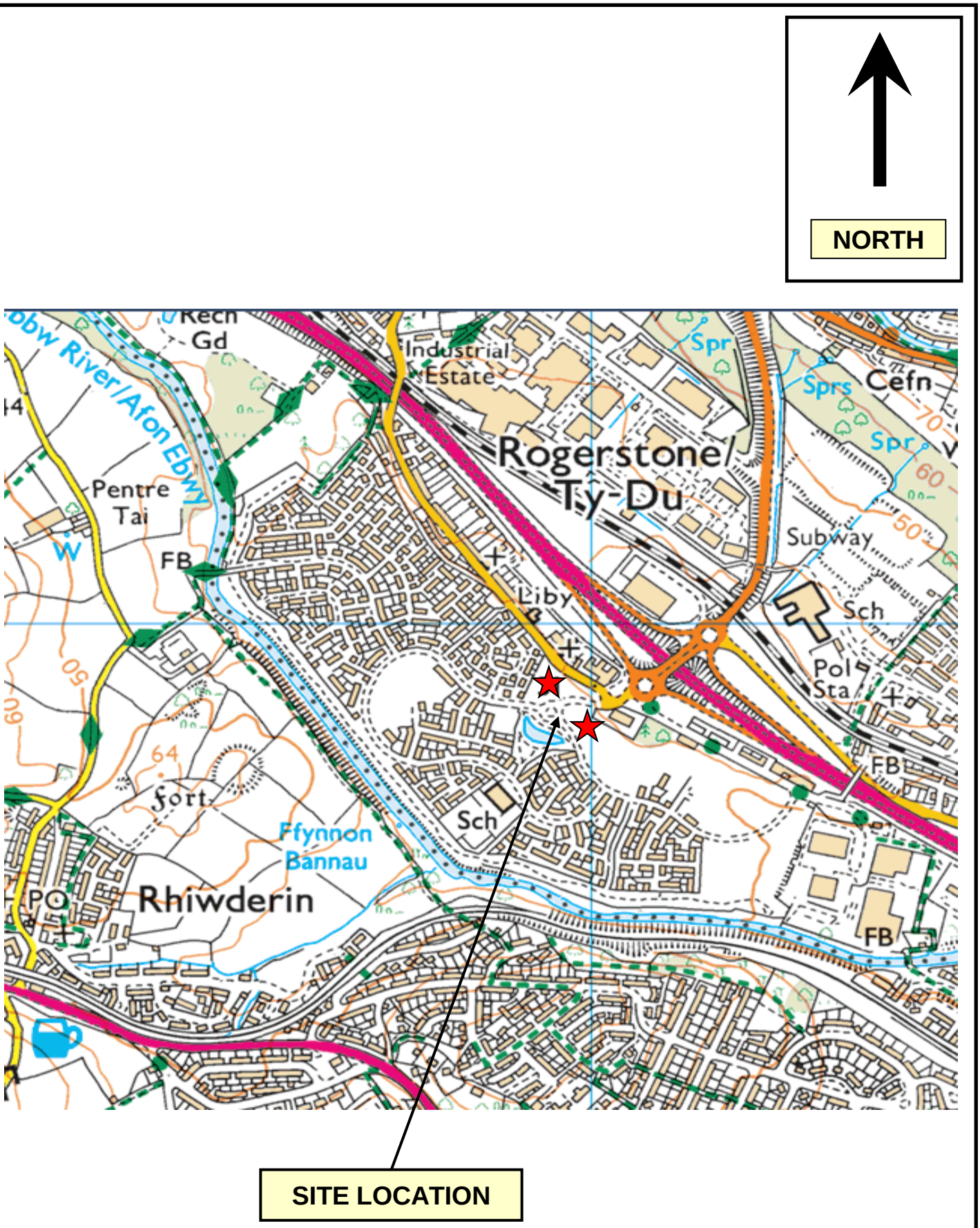

Figure 1 - Site Location

12845 - LC1 and LC2, Jubliee Park

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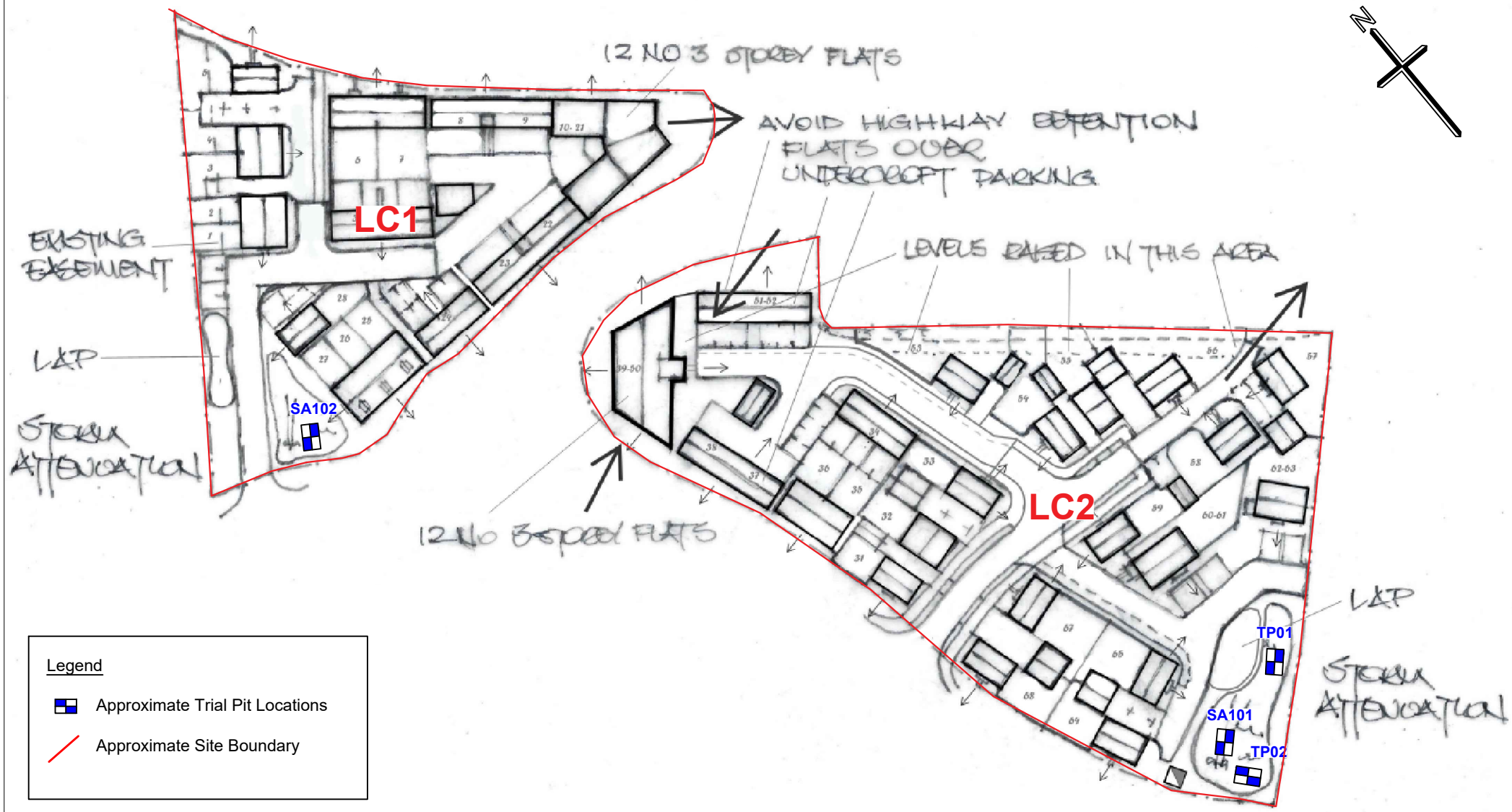

Figure 2: Site Plan

Project: LC1 and LC2, Jubilee Park	Job No.: 12845	Intégral Géotechnique	Integral House, 7 Beddau Way, Castlegate Business Park, Caerphilly, CF83 2AX. Tel: 029 2080 7991
Client: Walters Land (Rogerstone) Ltd	Scale: NTS		