

# Appendix 10. Land, Soils and Geology

10.1 Wuxi Biologics WwPTP Site  
Investigation Report' (Murphy Group, 2023)

10.2 Dundalk Bio-Pharmaceutical Facility  
Ground Investigation Report' (Ground  
Investigations Ireland, 2019)

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## 10.1 Wuxi Biologics WwPTP Site Investigation Report' (Murphy Group, 2023)

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Control our  
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Protect our  
health



Protect the  
Environment

## LINK TO PROCEDURE & PROCESS MAP

[Preparation and Issue of Method Statements and Setting to Work Procedure](#)

[Preparation and Issue of Method Statements and Setting to Work Process Map](#)

<b>CLIENT</b>	<b>Wuxi Biologics</b>
<b>CONTRACT TITLE</b>	<b>Wuxi Biologics Wastewater Pre-Treatment Plant</b>
<b>CONTRACT NUMBER</b>	<b>1011-000121</b>
<b>OPERATING UNIT</b>	<b>M6</b>

## METHOD STATEMENT

# Wuxi Biologics WwPTP Site Investigation Report

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24/11/23

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24/11/23

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Contracts Manager  
24/11/23

**Wuxi Biologics Ltd**  
Client / Consultant

AUTHOR	REVIEWER	ACCEPTED BY	ACCEPTED BY CLIENT (if applicable)
DOCUMENT No.	1011-000121_SI_Z_0001_Wuxi Biologics WwPTP Site Investigation		
CURRENT REVISION	CURRENT STATUS CODE	SECURITY CLASSIFICATION	
P01	S4	Official	

### REVISION HISTORY

REVISION	STATUS CODE	DATE	REVISION DESCRIPTION
P02	S4	24/11/23	Revised following internal review
P01	S4	23/11/23	Revised following internal review

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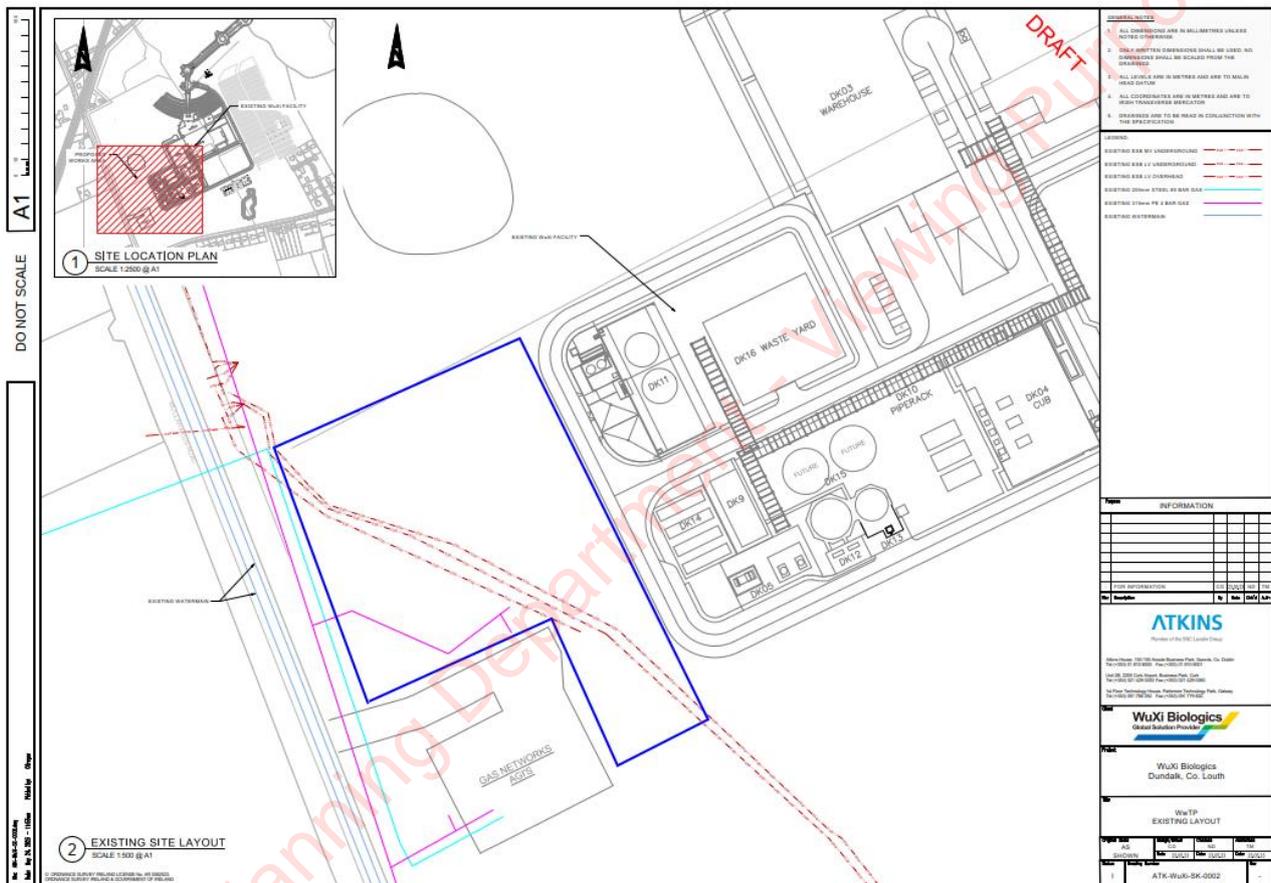
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**1 Introduction – Scope of Works**

This document sets out the results of the site investigation works at a greenfield site west of the Wuxi Biologics Plant in Dundalk Co Louth. A wastewater pre treatment facility is being proposed at this location.

The proposed location is in a field with known Gas and Electric services. The ESB and GNI were contacted and the latest service drawings consulted. The area outlined in blue is where the proposed WwPTP. The red dashed lines below denote the ESB services and the pink and cyan solid lines, denote the Gas services. We also needed to find the gas main feeding the plant from the AGI side, we had no as built information of this pipeline.



The SI was carried commenced on the 15<sup>th</sup> of Nov 23 and took approximately 1 week to finish, this included mobilising to and demobilising from site.

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## 2 Results and Outcomes

We had a WuXi archaeologist observing our trial pits as they had some potential archaeological interest. No evidence or artifacts found. A GNI inspector was present for excavations on gas mains. We contacted the ESB prox work office each day before excavating near ESB cables and again at the end of the day. (to log on and off). Trial pits and slit trenches were excavated as follows

- 8 no trial pits to determine depth of bedrock and general soil condition.
- 13 no. Slit trenches to confirm location and depth of gas and ESB services

The drawing below shows all the confirmed locations of the services, measured and surveyed with a GPS unit. Individual trial hole sheets have been prepared for all the trial holes and slit trenches, and are attached in the Appendices.

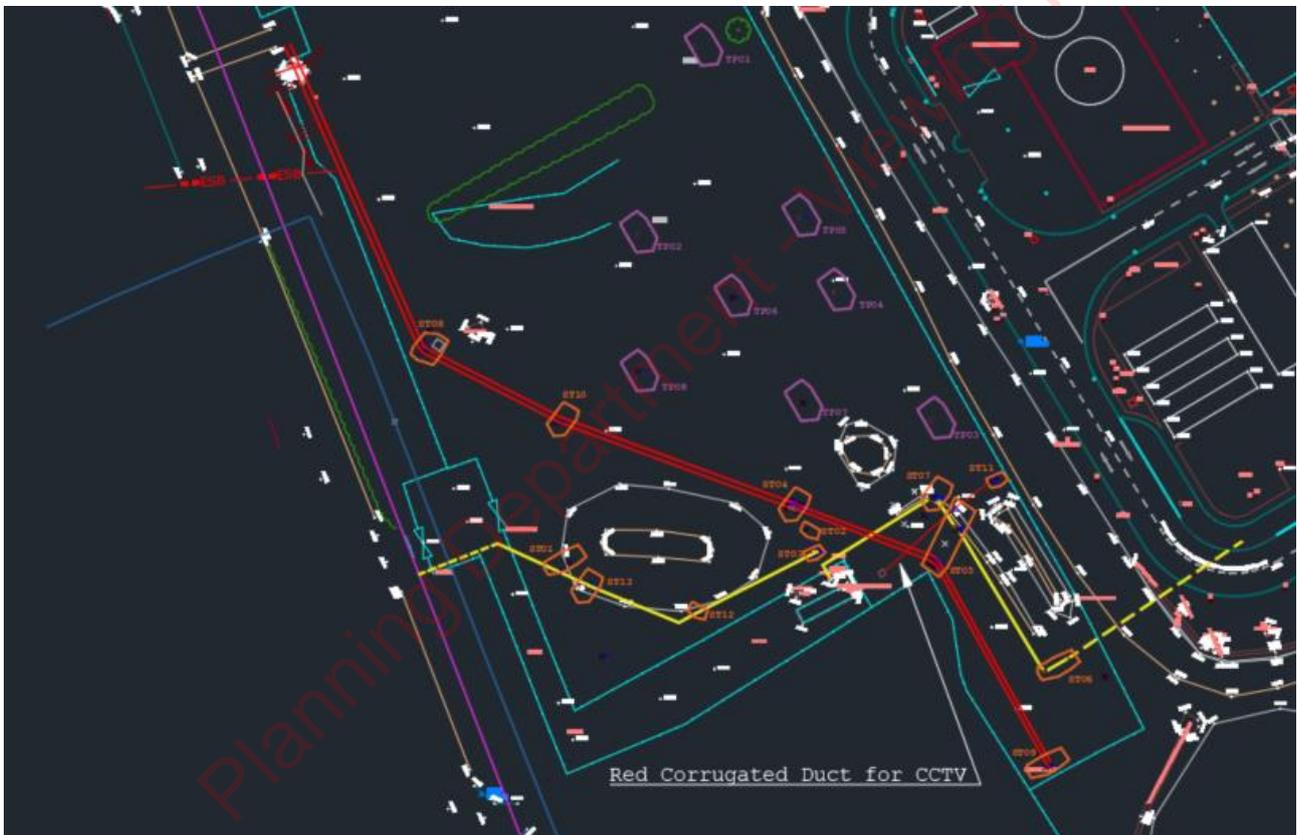


Fig 1: Site :Layout showing Cofirmed Service Locations and Site Investigation Excavations

## 3 Summary

1. Following discussions on site with Wuxi we were satisfied that we had traced and confirmed the ESB cables all the way as far as the substation. We have excavated down on the cables at 5 locations along their route and confirmed with the CAT that the cables were going into the substation.
2. The whole field between the fences was scanned with the CAT and Genny on Power/Radio/ Combined and Genny mode. We had 3 CSCS LUGS trained people on site who were involved in the tracing. The ESB cables were emitting very strong clear and distinct signals. The red corriduct with

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the CCTV cables was the only other signal we got using the CAT & Genny. There was no definable signal on the gas lines.

3. Regarding TP01, we reached a depth of 3.7m before we encountered a large boulder. The WuXi archaeologist directed that we couldn't widen the excavation to go deeper, due to its proximity to an area of archaeological value. TP01 had already been repositioned by the archaeologist to an adjacent location after we had taken the first scrape, It was the most sensitive location from an archaeological view.

## 4 Appendices

### 4.1 Appendix A – Trial Pits 1-8

### 4.2 Appendix B – Slit Trenches 1-13

### 4.3 Appendix C - Sketch showing SI Locations

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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	C ÓTuairisg	<b>DATE</b>	15/11/23
<b>WEATHER CONDITIONS</b>	Dry Bright Cold	<b>CO-ORDINATES</b>	704099.725, 803010.537
<b>TRIAL PIT NO.</b>	TP01	<b>Sheet of</b>	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		Ground level 23.056 mOD		
0 - 0.6m		Wide grading bucket. Archae advised previous trench so moved north by 1m.		
0.6m – 1.3m		Narrow bucket. Brown clay soil, with small to medium shale pieces		
2.7m		Large boulder across the trial hole, moves slightly		
3.7m		Can go to 3.7m beside boulder, no bedrock encountered		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

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Before excavation

Spoil heap

All excavated faces

Location/context

Base of excavation

After reinstatement



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

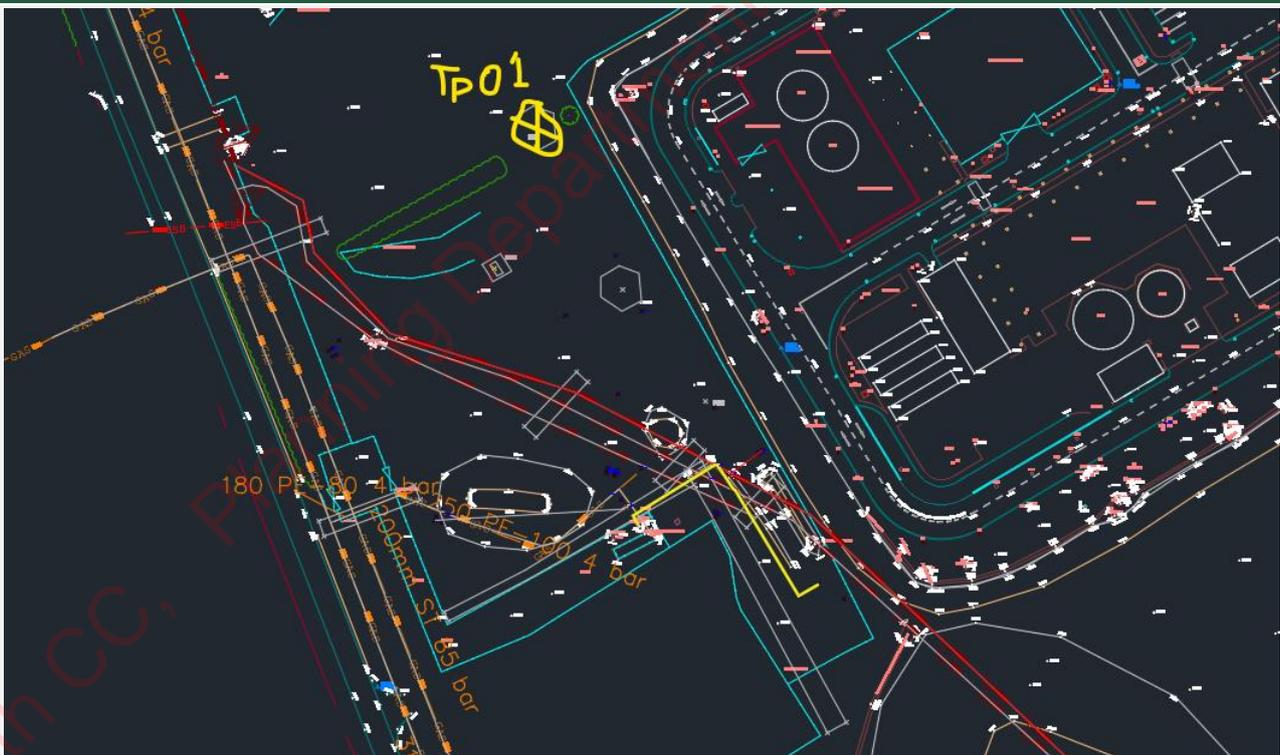
GL 23.056 mOD Brown Clay soil with blue shale angular small to medium boulders.

2.8 mBGL large boulder encountered, could move it slightly with the bucket and blue flakes of shale were broken off with the bucket.

3.7m depth beside the boulder, no bedrock encountered. Could dig no deeper without widening excavation.

Soils ample taken, Archaeologist in attendance.

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	15/11/23
<b>WEATHER CONDITIONS</b>	Dry Bright Cold	<b>CO-ORDINATES</b>	704090.235, 802979.212
<b>TRIAL PIT NO.</b>	TP02	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.831mOD	
0 - 1.3m		Dig with wide grading bucket – brown clay-soil	
1.3m – 2.8m		Continue with narrow bucket – angular shale	
2.8m		Large shale boulders, need to widen the dig to go deeper	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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Only

All excavated faces

Location/context

Base of excavation

After reinstatement



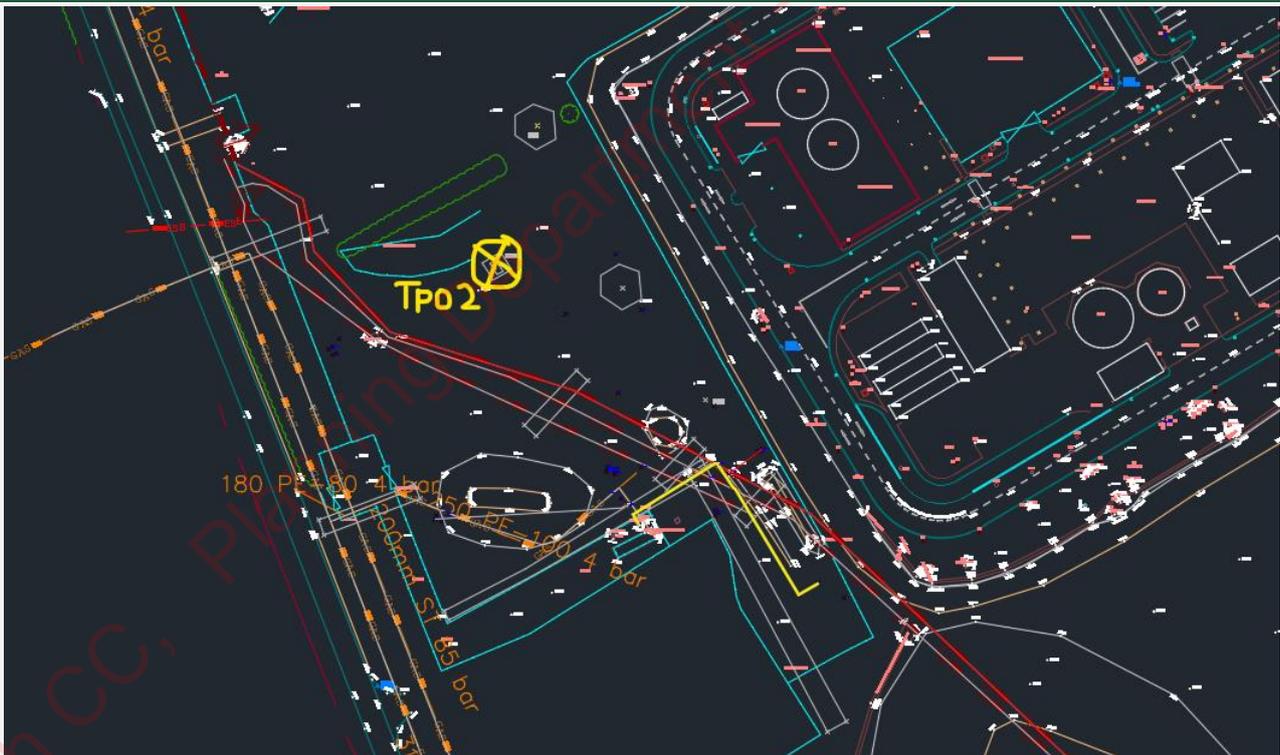
**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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Large Shale boulders encountered at 2.8m BGL so approx. 21.000 mOD. Angular rock that smokes and breaks easily when pulled with the machine bucket. Flakes of blue shale

Soil sample taken, Archaeologist in attendance

**Sketches/Additional Notes**



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<b>WEATHER CONDITIONS</b>	Dry Bright Cold	<b>CO-ORDINATES</b>	E: 704138.573 N: 802948.375
<b>TRIAL PIT NO.</b>	TP03	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.447mOD	
0 - 1.4m		Dig with wide grading bucket – brown clay-soil	
1.4m – 1.8m		Continue with narrow bucket – angular shale breaking when pulled	
1.8m		Bedrock, shale (blue/grey)	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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All excavated faces

Location/context

Base of excavation

After reinstatement



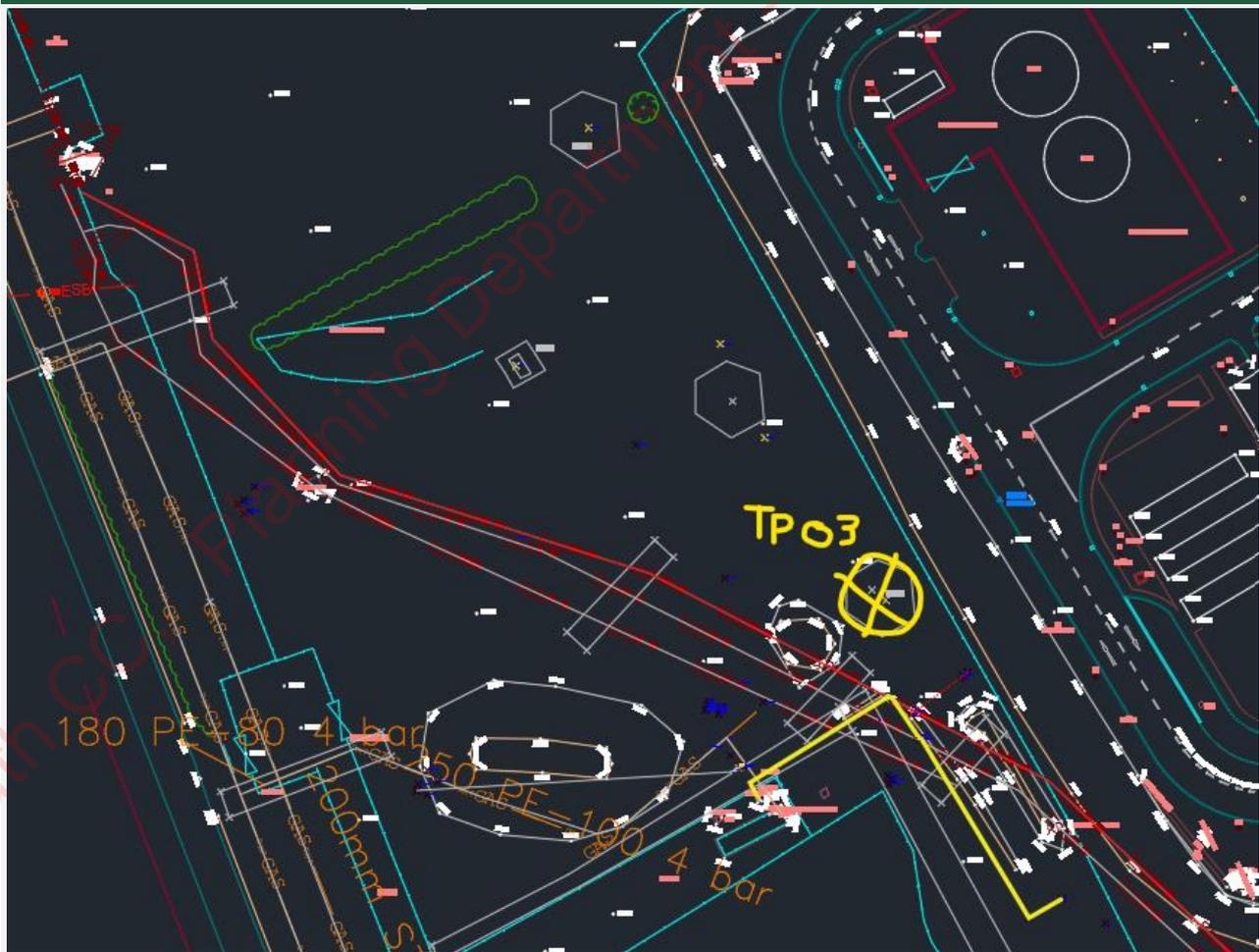
**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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Shale bedrock encountered at 1.8m BGL so approx. 21.650 mOD. Angular rock that smokes and breaks when pulled with the machine bucket.

Soil sample taken

**Sketches/Additional Notes**



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<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	15/11/23
<b>WEATHER CONDITIONS</b>	Dry Bright Cold	<b>CO-ORDINATES</b>	E: 704122.715 N: 802969
<b>TRIAL PIT NO.</b>	TP04	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		22.773 mOD	
0 – 0.9m		Dig with wide grading bucket – brown clay-soil	
0.9m – 2.9m		Continue with narrow bucket – angular shale	
2.9m (avg)		Bedrock (slopes upward north to south)	
2.8m – 3.0m			

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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All excavated faces

Location/context

Base of excavation

After reinstatement



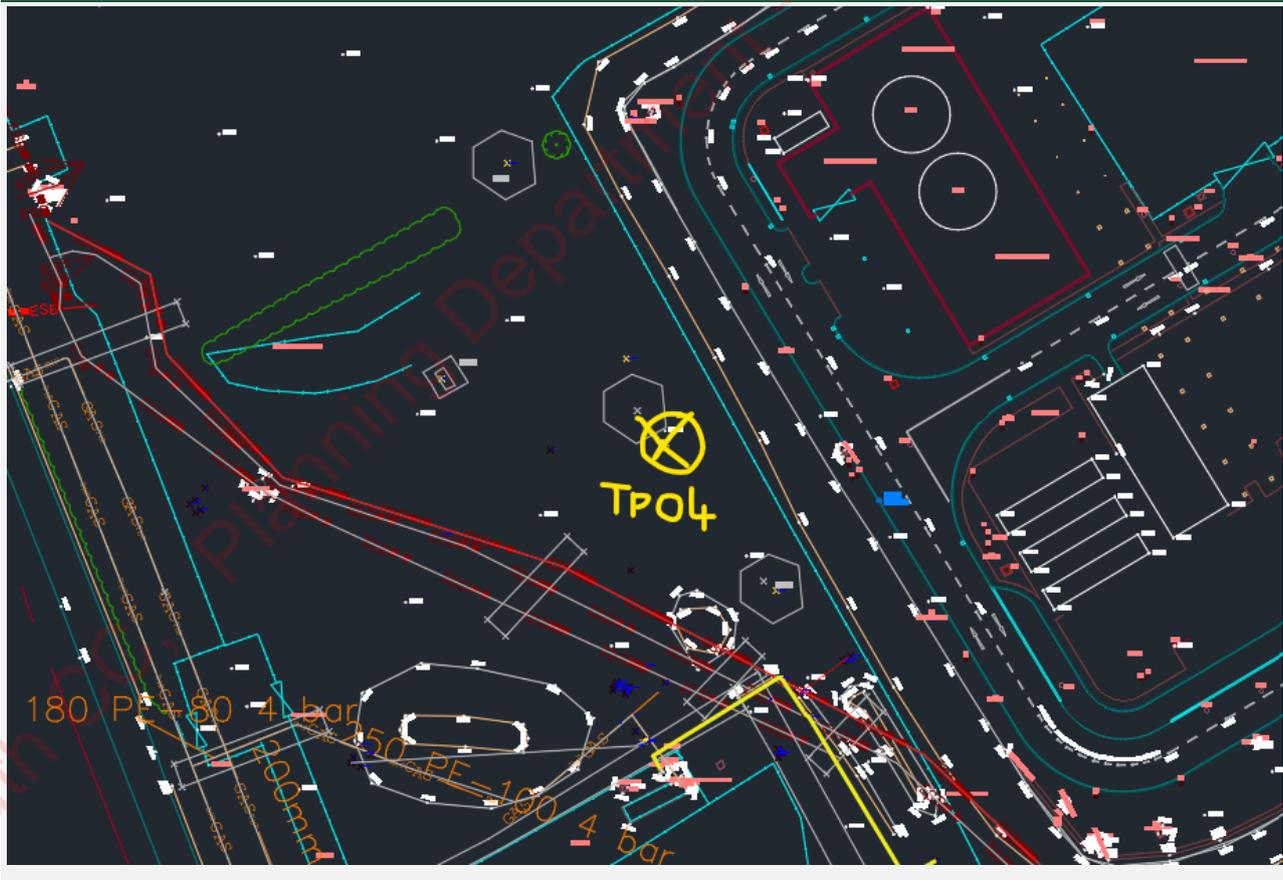
**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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Shale Bedrock encountered at 2.9 mBGL so approx. 20.900 mOD. Bedrock slopes upward from north to south approx. 200mm 2.8m – 3.0m BGL

Soil sample taken

**Sketches/Additional Notes**



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<b>WEATHER CONDITIONS</b>	Dry Bright Cold	<b>CO-ORDINATES</b>	E: 704116.926 N: 802982.087
<b>TRIAL PIT NO.</b>	TP05	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		22.403 mOD	
0 – 1.2m		Dig with wide grading bucket – brown clay-soil	
1.2 m – 4.3m		Continue with narrow bucket – medium boulders	
4.3m		Bottom of dig, no bedrock encountered, cant dig further without widening excavation.	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

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Before excavation

Spoil heap

All excavated faces

Location/context

Base of excavation

After reinstatement



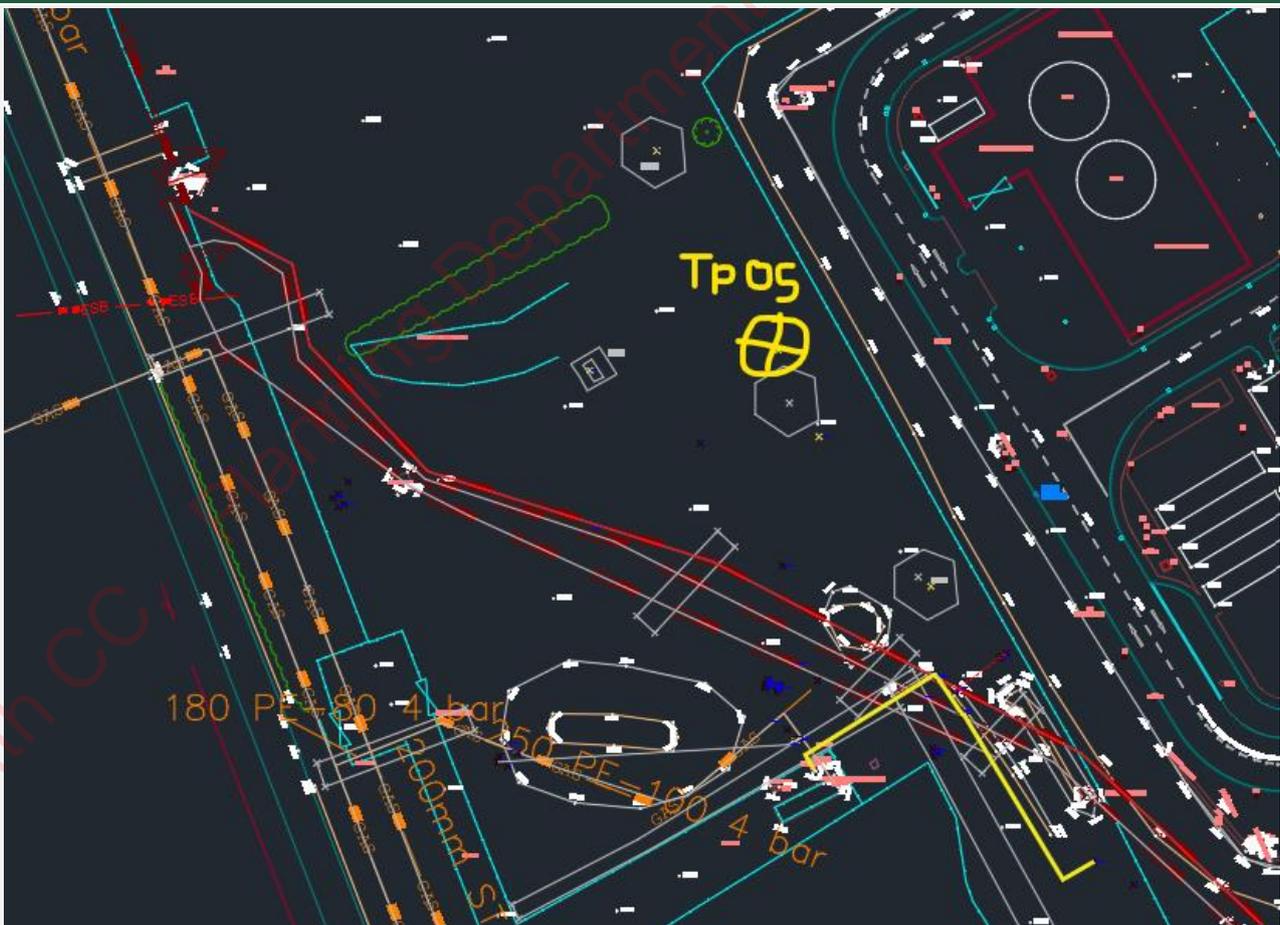
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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

No Bedrock encountered at 4.3 mBGL so approx. 18.100 mOD. Medium brown clay soil with small to medium boulders.

Soil sample taken

**Sketches/Additional Notes**



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<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704105.905 N: 802968.803
<b>TRIAL PIT NO.</b>	TP06	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.339 mOD	
0 – 0.7m		Dig with wide grading bucket – brown clay-soil	
0.7 m – 3.8 m		Continue with narrow bucket – medium boulders	
3.8m		Bedrock encountered at 3.8m	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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All excavated faces

Location/context

Base of excavation

After reinstatement



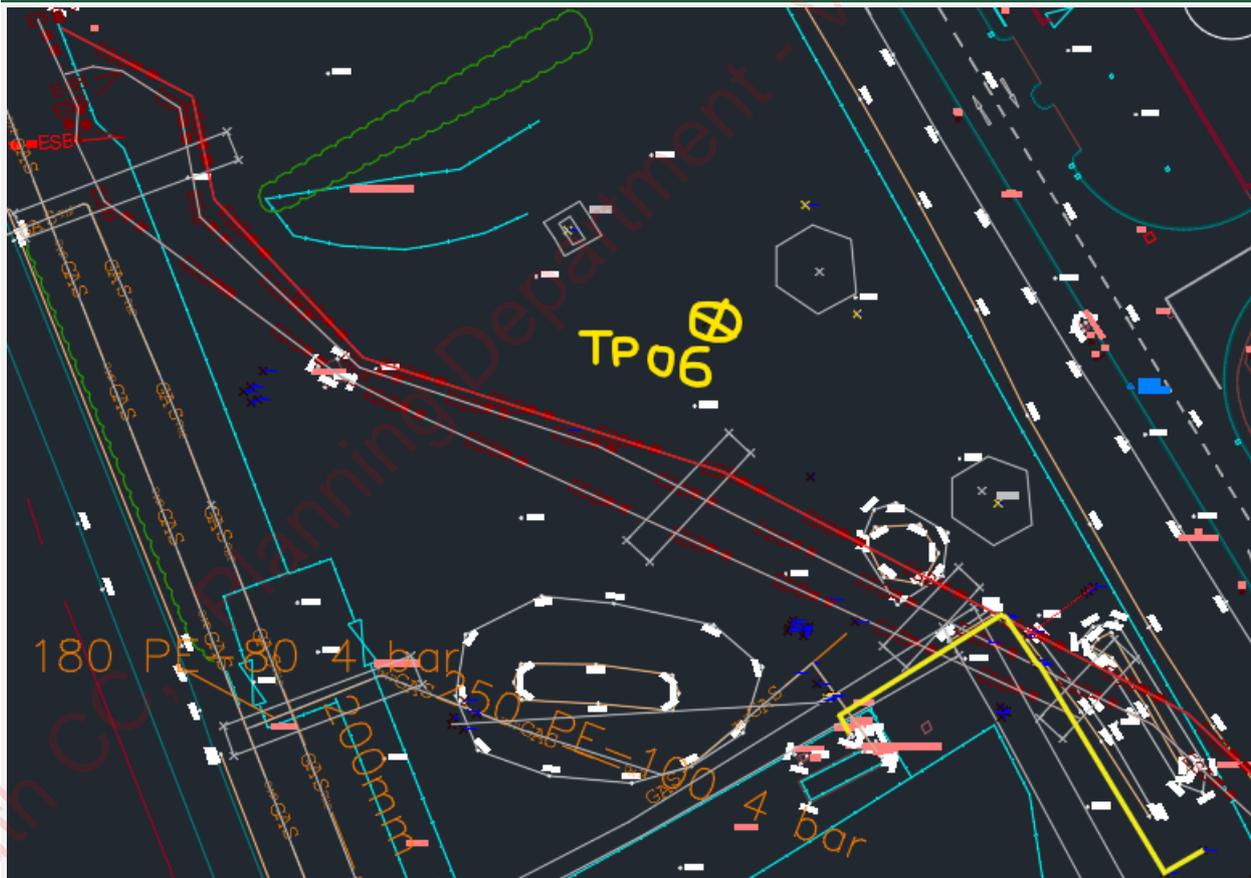
**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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Bedrock encountered at 3.8 mBGL so approx. 19.540 mOD. Medium brown clay soil with small to medium boulders.

Soil sample taken

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	16/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704117.495 N: 802951.309
<b>TRIAL PIT NO.</b>	TP07	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.869 mOD	
0 – 0.8m		Dig with wide grading bucket – brown clay-soil	
0.8 m – 4.0 m		Continue with narrow bucket sloped bedrock from 3m to 4m BGL	
3.0m – 4.0m		Bedrock sloping upward north to south	
Avg 3.5m			

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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Planned Processes Only

All excavated faces

Location/context

Base of excavation

After reinstatement

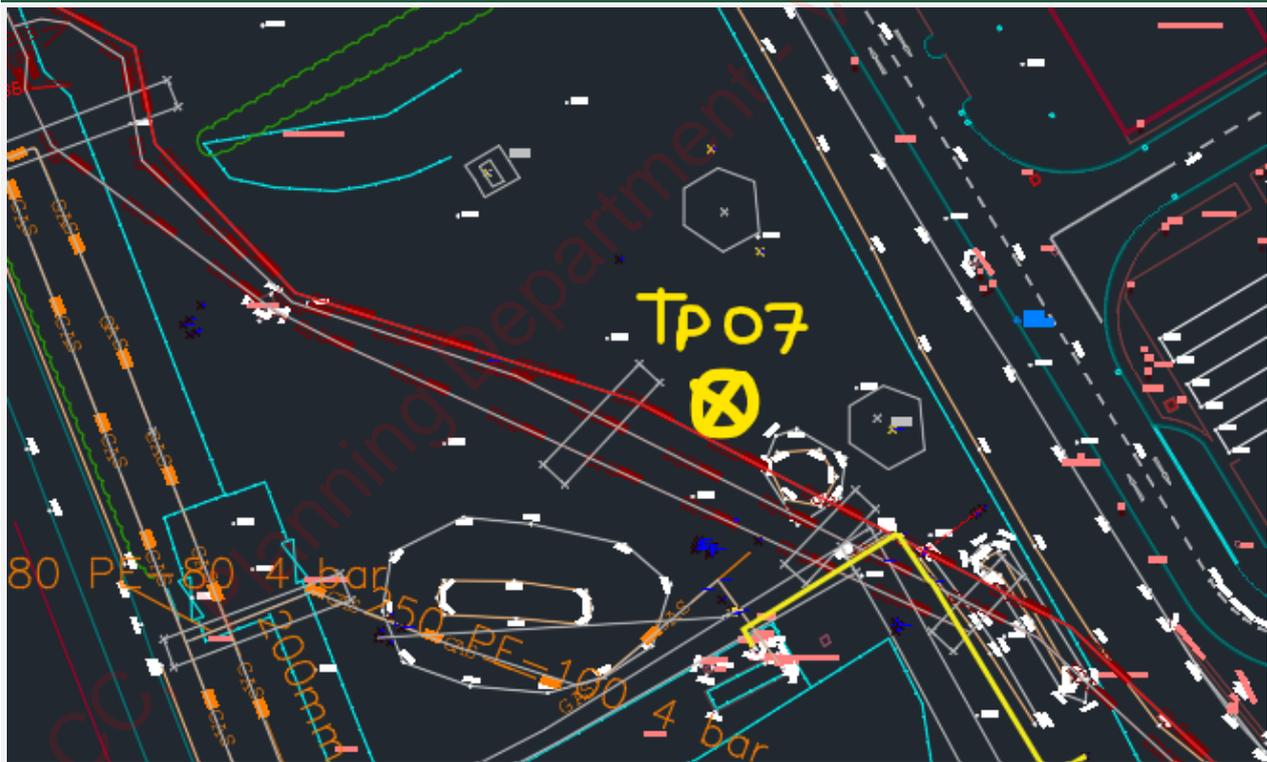


**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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Sloped Bedrock encountered at 3.0 – 4.0 mBGL so taking average of 3.5m, the bedrock is encountered at approx. 20.370 mOD. Medium brown clay soil with small to medium boulders.

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	16/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704090.162 N: 802956.603
<b>TRIAL PIT NO.</b>	TP08	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		24.295 mOD	
0 – 01.0m		Dig with wide grading bucket – brown clay-soil	
1.0 m – 2.3 m		Continue with narrow bucket - bedrock at 2.3m BGL	
2.3m		Blue grey bedrock	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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All excavated faces

Location/context

Base of excavation

After reinstatement

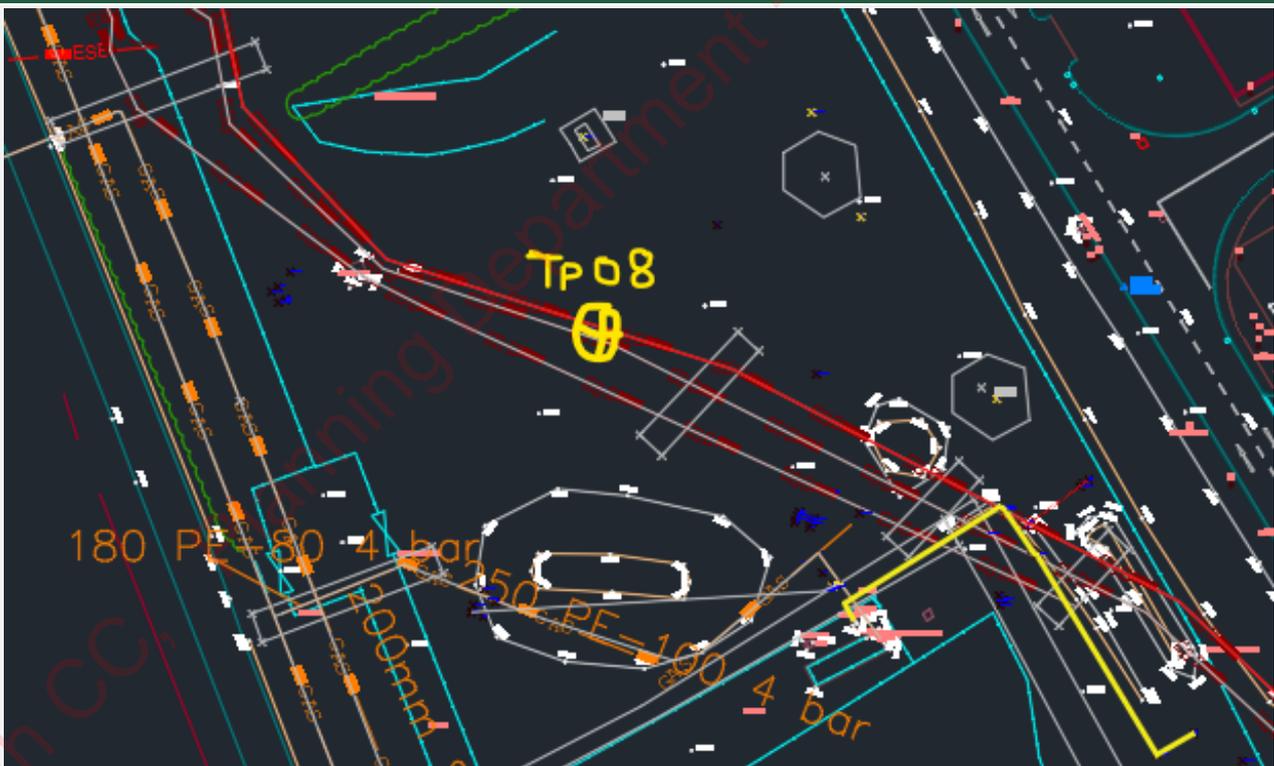


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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Bedrock encountered at 2.3 mBGL , approx. 21.000 mOD. Blue grey Shale

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	16/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704078.886 N: 802924.843
<b>ST01</b>	ST01	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		25.356 mOD	
0 – 0.8m		Dig with wide grading bucket – brown clay-soil	
0.8 m – 1.3 m		We encountered grey grit, typical of gas pipe surround material – hand dig with insulated spade	
1.3m		We encountered PE Gas distribution main, with warning tape (yellow brown striped main 315mm Dia according to Brendan, the GNI inspector	
		Top of pipe 24.068 mOD – Approx 1.3m below ground level	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation

Spoil heap

All excavated faces

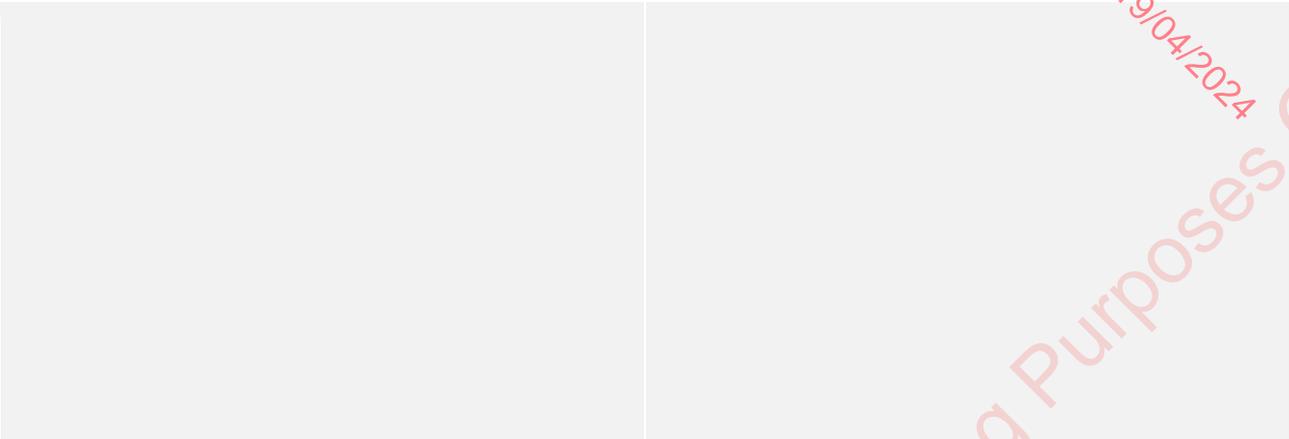
Location/context

Base of excavation

After reinstatement



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on gas mains observed by Wuxi Archaeologist and GNI inspector. 315mm Dia PE Gas distribution mains encountered at 1.3 mBGL, approx. 24.068 mOD. Pipe surround is grey grit and yellow Gas main warning tape in place. Location is approx. 2.2m southwest of drawing supplied by GNI

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	16/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704117.921 N: 802930.307 E: 704118.729 N: 802926.107
<b>ST01</b>	ST02-ST03	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		ST02 (24.337 mOD) ST03 (24.304)	
0 – 0.5m		<b>ST02</b> Dig with wide grading bucket – brown clay-soil- Large Boulders encountered, change location as Gas main unlikely to be backfilled with large boulders over it.	
0 – 0.3m		<b>ST03</b> We moved closer to AGI for a second slit trench. We encountered grey grit, typical of gas pipe surround material – hand dig with insulated spade	
0.3m – 1.0m		We encountered PE Gas distribution main, with warning tape (yellow brown striped main 315mm Dia according to Brendan, the GNI inspector	
		Top of pipe 23.420 mOD – Approx 0.9m below ground level	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on gas mains observed by Wuxi Archaeologist and GNI inspector. 315mm Dia PE Gas distribution mains encountered at 0.9 mBGL, approx. 23.4 mOD. Pipe surround is grey grit and yellow Gas main warning tape in place. Location is approx. 3m closer to AGI (south of drawing supplied by GNI)

This PE gas main has a capped end and a 60mm Dia test arm and top hat T piece as shown in the photos. This main does NOT branch into the AGI skid as indicated on the drawing provided by GNI, it terminates near the pedestrian gate to the AGI skid.

**Sketches/Additional Notes**



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Planning Document - Viewing Purposes Only

<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuirisg	<b>DATE</b>	16/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704116.758 N: 802934.249
<b>ST01</b>	ST04	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		24.281 mOD	
0 – 0.75m		<b>ST04</b> Dig with wide grading bucket – brown clay-soil- No gravel/grit/dust encountered	
0.75 m		CAT used to trace likely ESB services	
0.75m		We encountered ESB tile board (brown plastic board with yellow warning top	
		Top of tile board 23.6 mOD Approx Leanmix underneath. Didn't excavate further.	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level
				

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

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Before excavation

Spoil heap

All excavated faces

Location/context

Base of excavation

After reinstatement



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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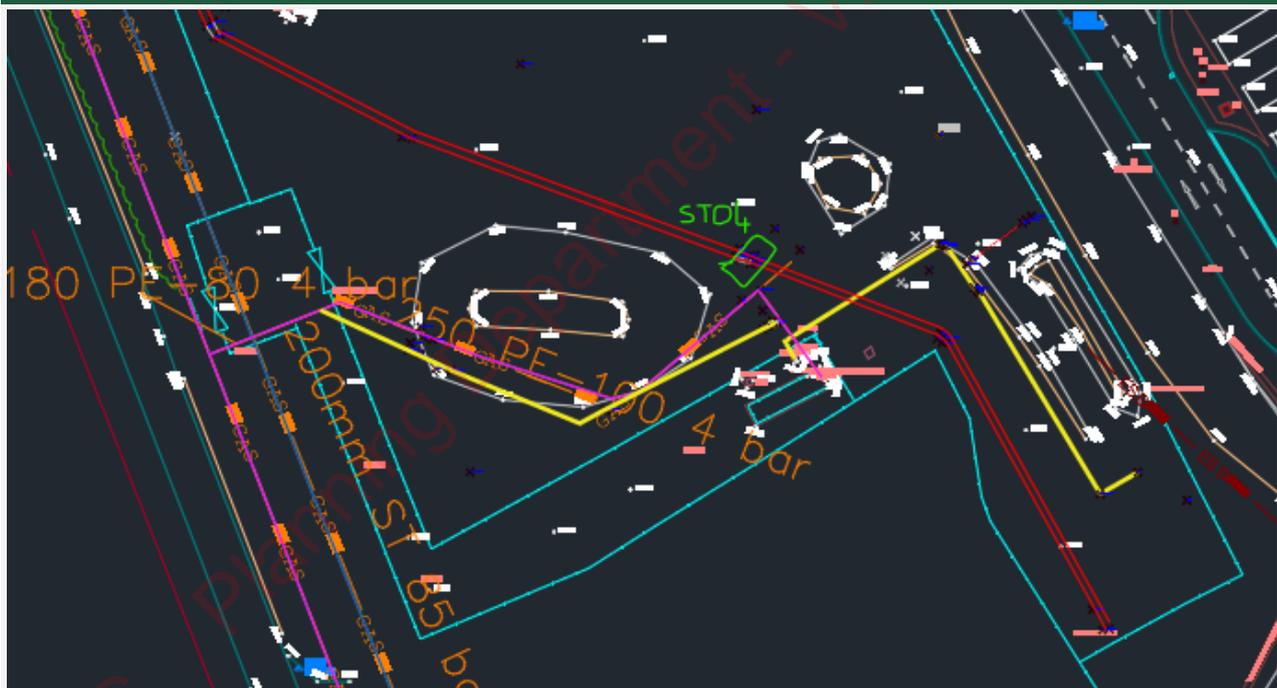
All excavations on ESB Cables observed by Wuxi Archaeologist. Atkins/Wuxi directed that we contact ESB networks before we commence excavating near cables to log onto their system and give a contact no.. This is done again at the end of the shift to log off. ESB cables traced with CAT on power mode with audible tone and shrill alarm and when near and directly above the cables.

We traced 2 separate signals and found 2 distinct lines of ESB warning tile board running NW to SE in ST04. Note that these are approx. 11m further west than indicated on the ESB service drawings and we only found evidence of 2 cables, not 3.

Leanmix concrete under the warning tile board. Good practise would have the tile board located 300mm above the ducts, and this was confirmed by the CAT. We can therefore assume the ESB ducts are approximately **23.300 mOD**

New cable warning tape placed over the tile board approx. 0.5m below surface when backfilling the trench

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	16/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704141.982 N: 802921.817
<b>ST01</b>	ST05	<b>Sheet of</b>	

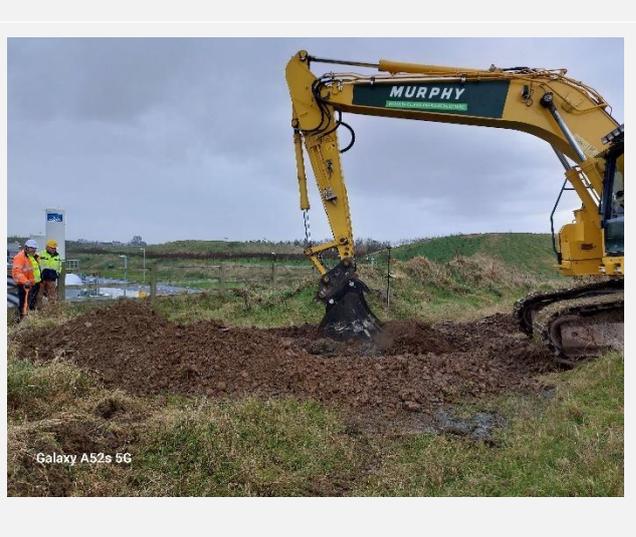
Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		24.110 mOD		
0 – 0.55m		<b>ST05 is a long trench</b> Dig with wide grading bucket – brown clay-soil- No gravel/grit/dust encountered		
0.55 m		CAT used to trace likely ESB services near fence corner. Grey gravel material and ESB tileboard encountered at 23.660 mOD, approx. 0.5m below the ground. 2 distinct signals heard.		
0.6m – 1.0m		We encountered gas warning tape (Gas Main Below) approx. 6m east along the trench from the ESB services. Yellow PE gas main approx. 1m BGL		
0.9m		Red 4" corrugated duct for CCTV, as advised by WuXi rep. Yellow mesh warning tape 200mm above duct.		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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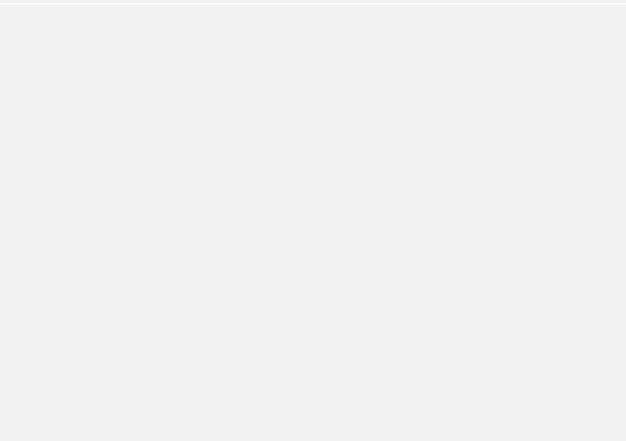
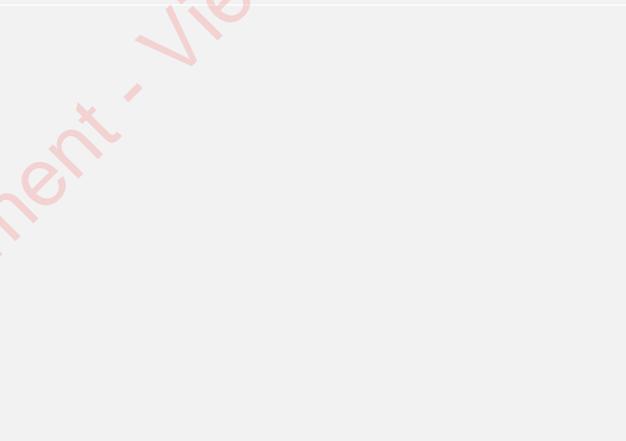
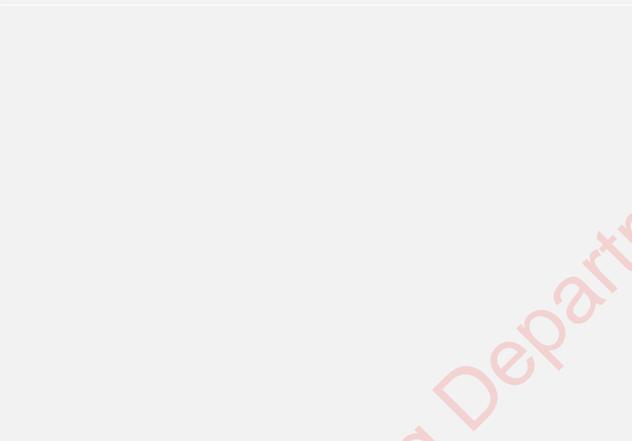
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**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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**ST05** All excavations on ESB Cables observed by Wuxi Archaeologist. Atkins/Wuxi directed that we contact ESB networks before we commence excavating near cables to log onto their system and give a contact no..This is done again at the end of the shift to log off. ESB cables traced with CAT on power mode with audible tone and shrill alarm and when near and directly above the cables.

We traced 2 separate signals and found ESB warning tile board near the corner of the palisade fence of Haynestown AGI. Note that these are approx. 9 m further west than indicated on the ESB service drawings and we only found evidence of 2 cables, not 3. We didn't uncover the tile board of the second ESB service as it is running quite close to the fence and excavating nearer to the fence may have undermined the concrete post foundations. The CAT gave a very strong signal to confirm the location of the cable.

Leanmix concrete found under the warning tile board. Good practise would have the tile board located 300mm above the ducts, and this was confirmed by the CAT. We can therefore assume the ESB ducts are approximately **23.350 mOD**

New cable warning tape placed over the tile board approx. 0.5m below surface when backfilling the trench

We continued north with ST05, as we wanted to find the gas feed to WuXi plant from the AGI skid, We encountered a 315 yellow PE main but it was orientated 90° to what we expected. **23.133mOD** approx. 900mm below ground level. Warning tape and grey grit surrounded the PE gas main.

We also found additional mesh barrier tape and a red 4" corrugated duct which is the CCTV feed from the plant to the AGI. This terminates in a chamber near the pedestrian gate of the AGI skid. **22.490mOD** approx. 850mm below ground level.

**Sketches/Additional Notes**



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTúairisg	<b>DATE</b>	17/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704056.009 N: 802963.304
<b>ST01</b>	ST06	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.400 mOD	
0 – 0.6m		Dig with wide grading bucket – brown clay-soil- no grey grit and yellow warning tape encountered. Move closer to the boundary fence	
0 - 0.6 m		We encountered gas warning tape (Gas Main Below) and grey grit. Dig by hand to uncover yellow PE gas main approx. 1.2m BGL	
0 - 0.6		We moved towrd the AGI to find the 90° bend. We encountered gas warning tape (Gas Main Below) approx. halfway between the fences. 90 collar found.	
1.2m		Yellow PE gas main (suspect 315mm Dia as we found an offcut piece) approx. 1.2m BGL at 22.461m OD	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>

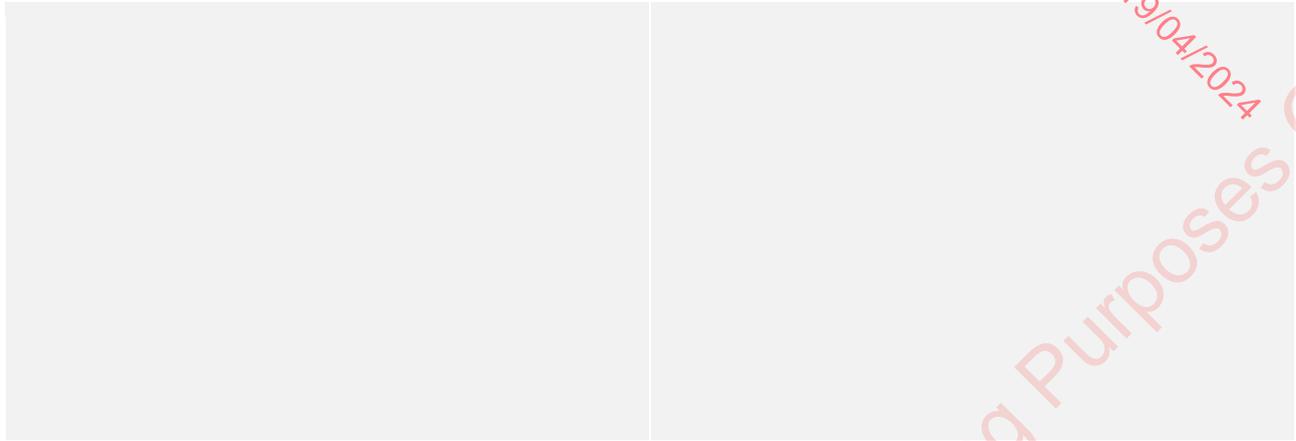


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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

**ST06** All excavations on ESB Cables observed by Wuxi Archaeologist and GNI inspector  
The gas supply main was found in 2 spots in this trench, approx. 1.2m BGL. We found the yellow straight part and the black 90° fusion collar  
Grey grit and warning tape were found and new warning tape installed during backfill.  
New cable warning tape placed over the tile board approx. 0.5m below surface when backfilling the trench



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTúairisg	<b>DATE</b>	17/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704138.613 N: 802935.597
<b>ST01</b>	ST07	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.970 mOD	
0 – 0.55m		Dig with wide grading bucket – brown clay-soil- no grey grit and yellow warning tape encountered. Move closer to the boundary fence	
0 - 0.6 m		We encountered gas warning tape (Gas Main Below) and grey grit. Dig by hand to uncover yellow PE gas main approx. 1.2m BGL	
0 - 0.6		We moved towrd the AGI to find the 90° bend. We encountered gas warning tape (Gas Main Below) approx. halfway between the fences. 90 collar found.	
1.2m		Yellow PE gas main (suspect 315mm Dia as we found an offcut piece) approx. 1.2m BGL at 22.461m OD	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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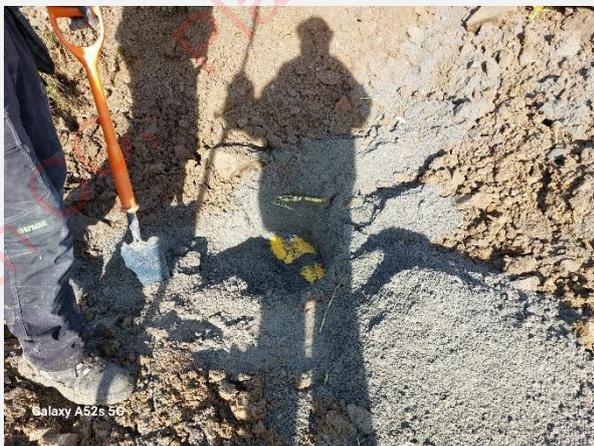
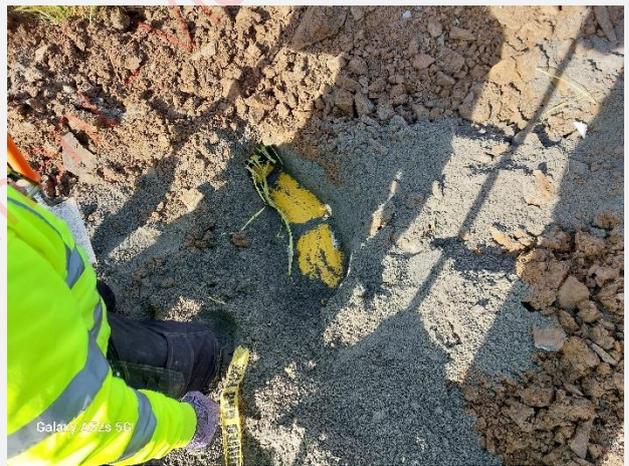
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**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

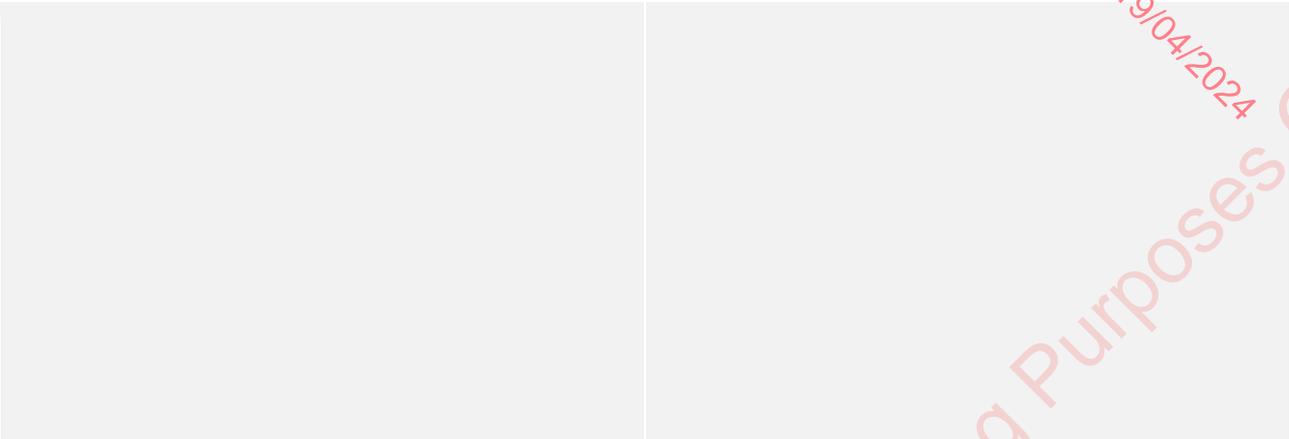
Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>



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Viewing Department Purposes Only

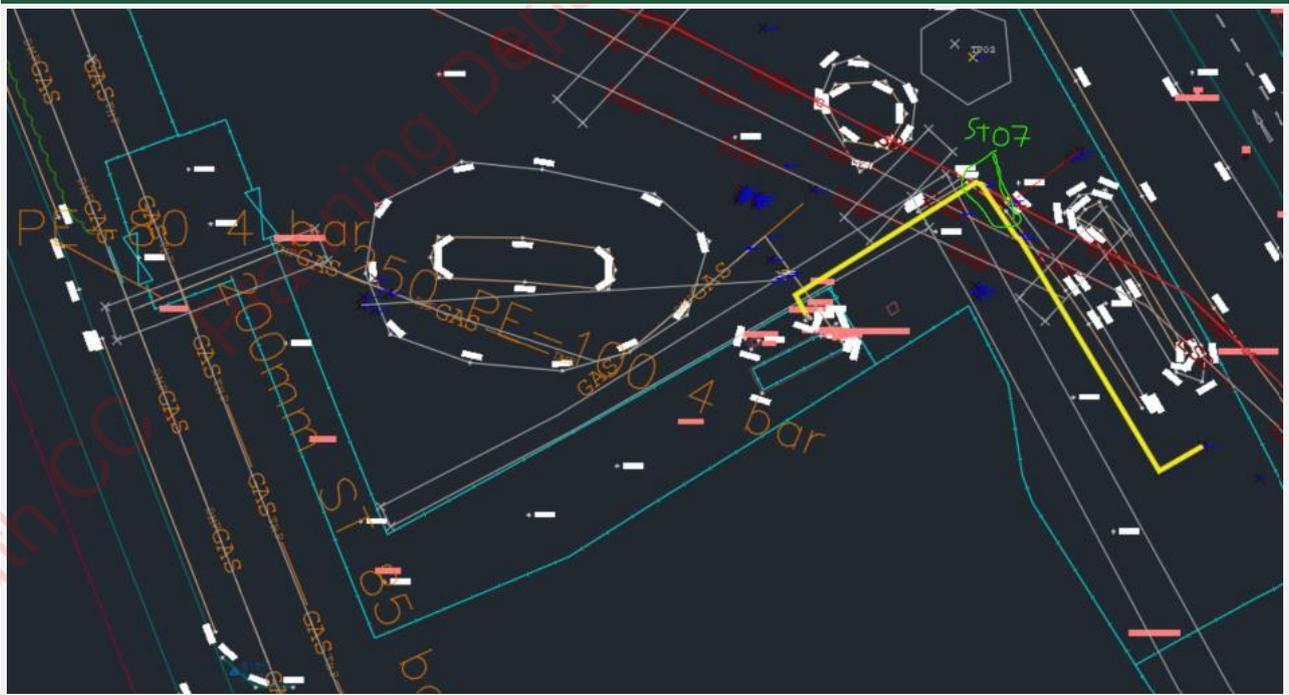


**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on gas mains observed by Wuxi Archaeologist and GNI inspector

The gas supply main was found in 2 spots in this trench, approx. 0.75 BGL. We found the yellow straight part and the yellow 90° swept fusion bend at 23.211 mOD

We can now be confident of the route and level of the PE gas main that feeds the Wuxi plant from the AGI skid



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	17/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704056.009 N: 802963.304
<b>ST01</b>	ST08	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		25.221 mOD	
0 – 0.4m		Trace Cables from substation with CAT, Medium brown clay soil with small boulders	
0 - 0.4 m		Leanmix found 400mm down, no tile board or warning tape. 2 distinctive very strong signals from CAT.	
0.4m		Concrete slab uncovered near cables. Wuxi rep suggested it was part of a concrete viewing platform set up to view the WuXi site.	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

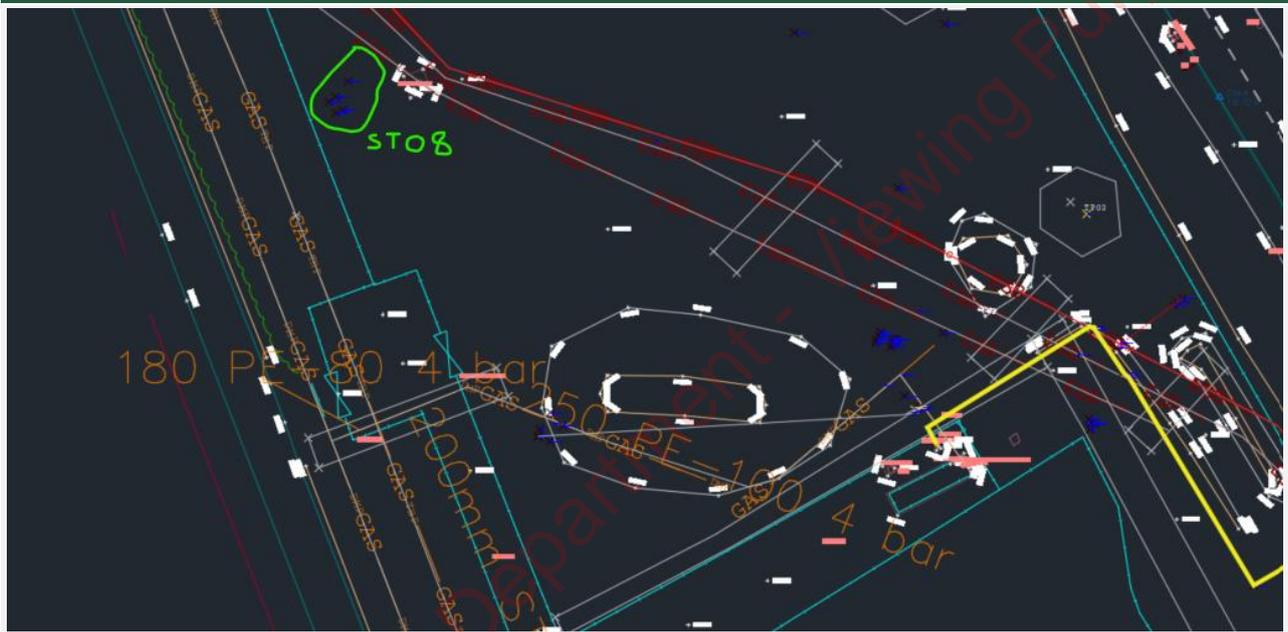
Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>



**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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All excavations on ESB lines registered with ESB Prox work centre.  
Leanmix uncovered about 400mm below ground. Strong CAT signals (2 not 3)  
Assume if ESB ducts are 300mm below leanmix (good practice), they are approx. 24.700m OD





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Before excavation

Spoil heap

All excavated faces

Location/context

Base of excavation

After reinstatement



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on ESB lines registered with ESB Prox work centre.

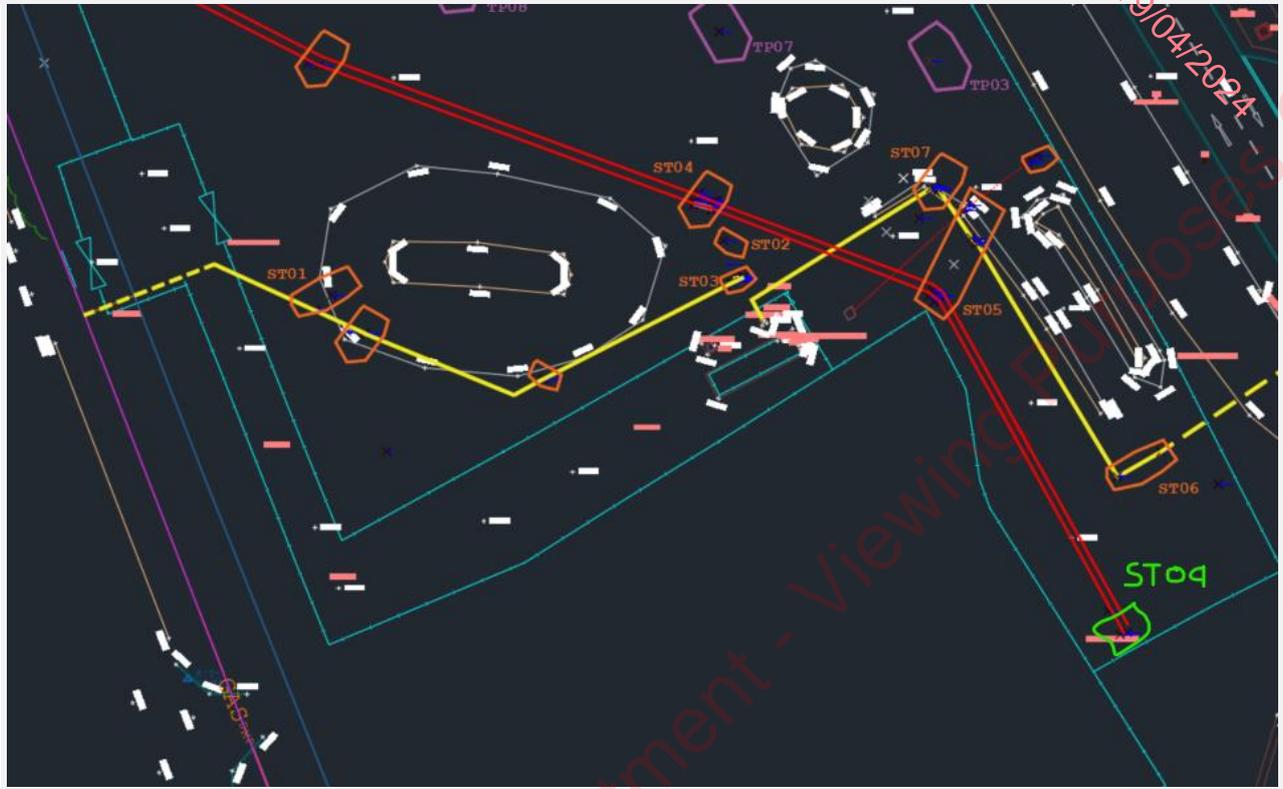
Leanmix/gravel material uncovered about 300mm below ground. Strong CAT signals (2 not 3)

Warning tape encountered 500mm BGL

ESB tile warning board encountered 750mm BGL

Assume if ESB ducts are 300mm below leanmix (good practice), they are approx. 24.700m OD

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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	20/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704076.441 N: 802948.078
<b>ST01</b>	ST10	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		25.132 mOD	
0 – 0.3m		Trace Cables with CAT, Medium brown clay soil with small boulders	
0.5 m		Leanmix material, with cable warning tape	
0.6m		ESB Warning tile board found	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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Uses Only

All excavated faces

Location/context

Base of excavation

After reinstatement



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on ESB lines registered with ESB Prox work centre.

Strong CAT signals (2 not 3) where the cables are expected to be

Warning tape encountered 500mm BGL

ESB tile warning board encountered 600mm BGL leanmix beneath.

Assume if ESB ducts are 300mm below leanmix (good practice), they are approx. 24.200m OD



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	20/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704148.666 N: 802938.449
<b>ST01</b>	ST11	<b>Sheet of</b>	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		23.400 mOD		
0 – 0.6m		Trace Cables with CAT, Medium brown clay soil with small boulders, warning mesh tape found		
0.6 m		Grey grit material, with cable warning tape		
0.9m		Red corrugated 4" duct found. CCTV Power signal and radio signal from CAT		
		This duct goes as far as a concrete chamber outside the AGI gate		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

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Poses Only

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>



Galaxy A52s 5G



Galaxy A52s 5G

**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

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All excavations on ESB lines registered with ESB Prox work centre.  
medium CAT signals on power and radio mode  
Warning tape encountered 600mm BGL grey grit material  
Duct uncovered 900mm BGL it is approx. 22.490 m OD  
We traced it to a concrete chamber outside the AGI pedestrian access gate.



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<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	20/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704100.121 N: 802916.467
<b>ST01</b>	ST12	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		24.420 mOD	
0 – 0.6m		Medium brown clay soil with small boulders,	
0.6 m		Grey grit material, with gas warning tape	
0.95m		Yellow brown striped PE gas main 315mm Dia	
0 – 0.4m		Tried a different location to find the bend, but could not locate	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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All excavated faces

Location/context

Base of excavation

After reinstatement



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**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

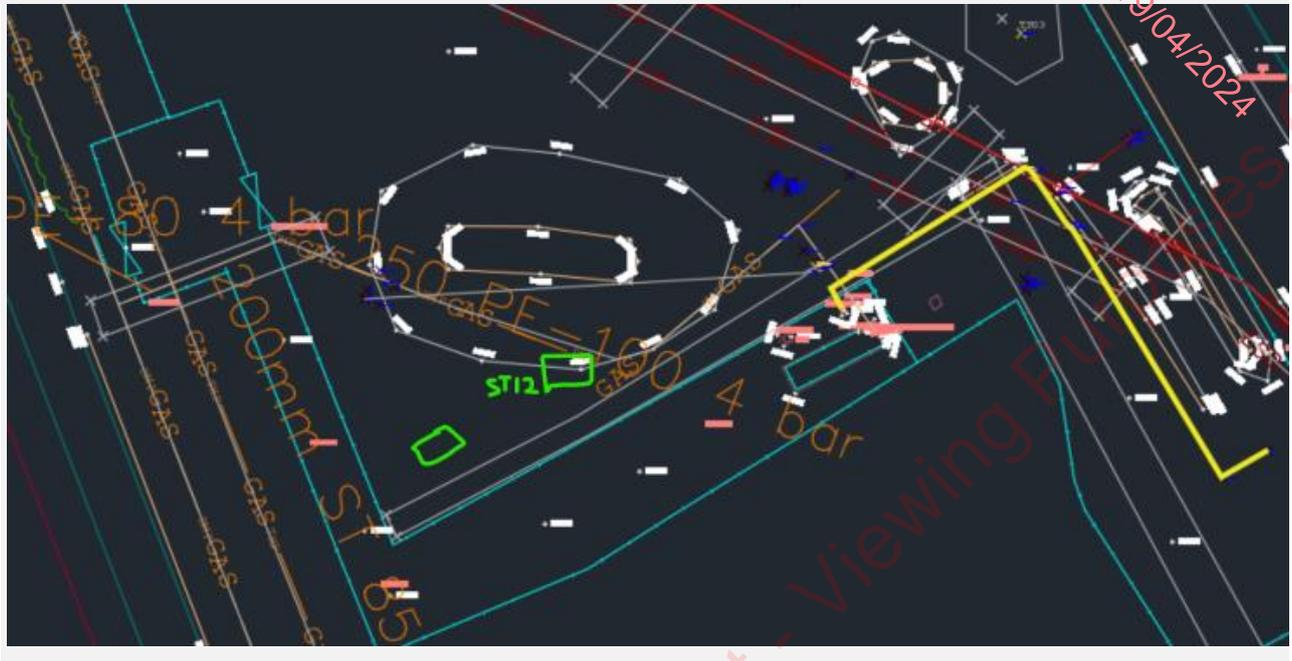
Gas main (315mm Dia) brown and yellow pipe installed by GNI

Warning tape encountered 600mm BGL grey grit material

pipe uncovered 950mm BGL it is approx. 23.360 m OD

Second location further west excavated to find the bend, but large boulders near the surface confirmed not in this location.

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Viewing Purposes Only

<b>PROJECT</b>	Wuxi Biologics WwPTP	<b>CONTRACT NO</b>	1011-000121
<b>LOGGED BY</b>	CÓTuairisg	<b>DATE</b>	20/11/23
<b>WEATHER CONDITIONS</b>	Overcast, Drizzly, Cold	<b>CO-ORDINATES</b>	E: 704080.368 N: 802921.158
<b>ST01</b>	ST13	<b>Sheet of</b>	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		24.542 mOD	
0 – 0.5m		Medium brown clay soil with small boulders,	
0.5 m		Grey grit material, with gas warning tape	
0.55m		Yellow brown striped PE gas main 315mm Dia	
		Can now connect the straights, to find the route of the main	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

**Photos** - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation  Spoil heap

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Only

All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>



**Service Location Trial Pits:** Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

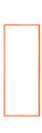
Gas main (315mm Dia) brown and yellow pipe installed by GNI  
 Warning tape encountered 500mm BGL grey grit material  
 pipe uncovered 550mm BGL it is approx. 24.010 m OD  
 Pipe very shallow in this location. But ground rises in a small hill just above it.

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-  PE Gas Main 315mm Dia
-  ESB Cables
-  Trial Pit
-  Silt Trench

<b>MURPHY</b> WORLD-CLASS INFRASTRUCTURE	
MURPHY INTERNATIONAL LTD	
Client: Wuxi Biologics WWPTP	
Title: Site Investigation Results	
Scale: NTS	Date: 23/11/2023
Checked: CB	Drawn: CB
Drawing Number: MIL-000121-SI-001	Rev: A

