British Museum – Energy Centre Programme

Discharge of SuDS Planning Condition

Prepared for The British Museum

December 2024

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Discharge of SuDS Planning Condition

1.0 Introduction

The British Museum is progressing with its strategy for transitioning to sustainable, low-carbon infrastructure. This project focuses on the design of wo key infrastructure upgrades needed to deliver this strategy. A major infrastructure building is proposed: the South West Energy Centre (SWEC), and the distribution of the site-wide services will also be upgraded. A new Intake Substation (ISS) is also proposed.

Planning permission for the development was granted in October 2024.

This note has been prepared to supplement ABA's 'Civil engineering notes on below-ground drainage and SuDS for planning submission', dated February 2024, and to confirm that the below-ground drainage design meets the following planning condition:

No.	Condition	Reason
23	Prior to commencement of development (excluding any external demolition down to ground level), full details of the sustainable drainage system including an attenuation tank of at least 24m³ to be submitted to and approved in writing by the local planning authority. Such a system should be designed to accommodate all storms up to and including a 1:100 year storm with a 40% provision for climate change such that flooding does not occur in any part of a building or in any utility plant susceptible to water, or on any part of the entire development site for up to and including a 1:30 year storm. The details shall demonstrate a site run-off rate conforming to a run-off rate of 2l/s approved by the Local Planning Authority. An up to date drainage statement, SuDS pro-forma, a lifetime maintenance plan and supporting evidence should be provided including: - The proposed SuDS or drainage measures including storage capacities - The proposed surface water discharge rates or volumes Systems shall thereafter be retained and maintained in accordance with the approved details	To reduce the rate of surface water run-off from the buildings and limit the impact on the storm-water drainage system in accordance with policies CC2 and CC3 of the London Borough of Camden Local Plan Policies and Policy SI 13 of the London Plan 2021.

2.0 SWEC

2.1 Existing below-ground drainage network

The main below-ground drainage artery that carries the discharge from the Western Range runs east-west beneath the thoroughfare which divides the site and collects combined foul and surface water from the Western Range and the Great Court. Surface water from the New Wing and the Lycian Building connects into this from the south. Combined foul and surface water from the Duveen Building flows underneath the South West Boiler House (SWBH) and connects to the main artery from the north. Where the east-west thoroughfare meets the West Road, the main artery turns south and runs to the main sewer in Great Russell Street.

2.2 Proposed surface water strategy

A new dedicated surface water run is proposed in the West Road. Rainwater pipes serving the new SWEC building and an area of existing roof equivalent to that of the new ISS building will connect into this run. The surface water run will comprise an oversized pipe and large diameter manholes. The outflow from the surface water run will be throttled to 2 l/s using a Hydrobrake or similar vortex flow control device (to detailed design by the contractor) before it connects into the existing combined water run which discharges into the public sewer in Great Russell Street.

The system has been designed to limit the surface water discharge into the combined network to 2 l/s for all storms up to and including a 1:100 year storm plus 40% climate change. The required 24 m^3 of attenuation storage volume will be provided by the combined storage volume of the surface water pipes and manholes upstream from the flow control.

The surface water run in the West Road will be installed as part of an enabling works contract and the proposals are shown on the drawings in Appendix A. The below-ground drainage for the SWEC building will then connect into this drainage run when it is subsequently constructed, as shown on the drawings in Appendix B.

2.2.1 Proposed storage volumes

The storage capacities of the manholes have been calculated based on a maximum water level of 23.245mAOD and are presented in the below table along with the storage capacities of the pipes between manholes.

Manhole	Internal diameter (m)	Invert level (mAOD)	Max. water level (mAOD)	Length (m)	Storage volume (m^3)
PSW01	1.2	21.81	23.245		1.62
	0.4x0.6 ovoid pipe (0.18m^2 cross-sectional area)			15.63	2.81
PSW03	1.2	21.72	23.245		1.74
	0.4x0.6 ovoid pipe (0.18m^2 cross-sectional area)			13.56	2.44
PSW04	1.35	21.64	23.245		2.30
	0.4x0.6 ovoid pipe (0.18m^2 cross-sectional area)			9.29	1.67
PSW05	1.35	21.59	23.245		2.37
	0.4x0.6 ovoid pipe (0.18m^2 cross-sectional area)			24.4	4.39
PSW11	1.8	21.36	23.245		4.80
	0.4x0.6 ovoid pipe (0.18m^2 cross-sectional area)			0.67	0.12
PSW06	1.8	21.34	23.245		4.85
				TOTAL STORAGE VOLUME	29.10

The proposed surface water run has been modelled in Infodrainage and the results are presented in Appendix D. The ovoid pipes have conservatively been modelled as Ø450mm circular pipes (cross-sectional area of 0.156 m^2). For the critical storm event, the storage volume within the manholes and pipes is sufficient to constrain the surface water outflow to 1.9 l/s without any manholes overtopping (maximum water level of 23.097 mAOD).

2.2.2 Exceedance

The storage volume provided is sufficient to constrain run-off for a 1 in 100 year + 40% climate change event, without flooding the site.

Proposed manhole PSW06 will have a flow control at the outlet and an overflow pipe with invert at 23.245 mAOD. Should the stored water level rise above this (e.g. in an extreme rainfall event in excess of the design event), the surface water will begin to drain into the combined network via the overflow pipe, bypassing the flow control. The maximum water level within the system is therefore 23.245 mAOD – as this is lower than the cover levels of any manholes or gullies, these will not overtop.

All internal manholes within the SWEC building will be sealed and so water will not be able to overtop inside the building.

2.3 Maintenance

The SuDS features on the site will be maintained by the British Museum. The following is typical of the maintenance activities that will be required.

2.3.1 General drainage

Activity	**Frequency**
Inspection of gullies, channels and inspection chambers to ensure that they are in good operative condition.	Monthly for three months and then annually (and following poor performance).
Cleaning of gullies, channels and inspection chambers of silts and other debris.	Monthly for three months and then annually (and following poor performance).
Surveying of drainage runs for sediment and other defects and cleaning where necessary	Every 5 years.
Repair pipework, gullies, channels and inspection chambers	As required.

2.3.2 Silt traps

Activity	**Frequency**
Inspection of silt accumulation.	Monthly and after heavy rainfall.
Removal of silt.	As required but at least annually.
Repair of inlets/outlets.	As required.

2.3.3 Roofs

Activity	**Frequency**
Cleaning of surfaces and gutters of debris.	Monthly for 3 months then every 6 months.
Rodding of downpipes.	Annually.
Repair of gutters and outlets.	As required.

2.3.4 Flow control devices

Activity	Frequency
Inspection of flow control chamber to assess if system is operating correctly and that flow control device is not blocked.	Monthly and after heavy rainfall.
Inspection of flow control chamber sump for silt build-up.	Monthly and after heavy rainfall.
Cleaning of flow control chamber sump of silts and other debris.	Annually or as required.
Repair/rehabilitate inlets, outlets and overflow.	As required.

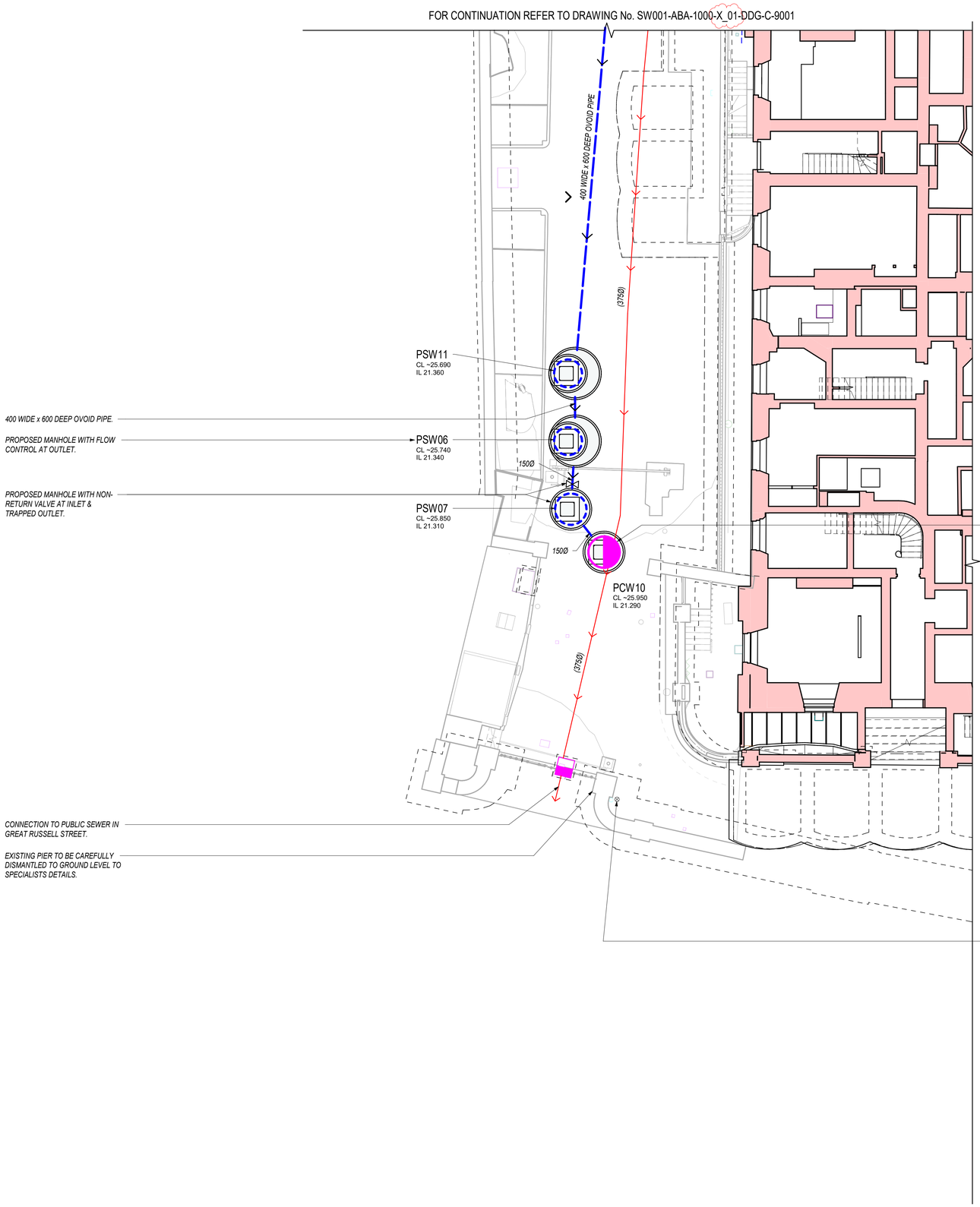
3.0 Incoming Substation (ISS)

Detailed drawings for the below-ground drainage proposals for the ISS site are given in Appendix C.

The proposed new ISS will be connected into the existing combined below-ground drainage network, with minor diversions to existing manholes to accommodate the new building. An existing rainwater pipe serving an area of roof equivalent to that of the new ISS will be connected into the surface water attenuation system described in section 2.2.

The landscape architect's proposals for the ISS site are also given in Appendix C. The external areas adjacent to the ISS and the White Wing will be re-landscaped with gravelled areas and tree pits served by local run-off.

Appendix A – Proposed Drainage



notes (continued)

10. KEY:

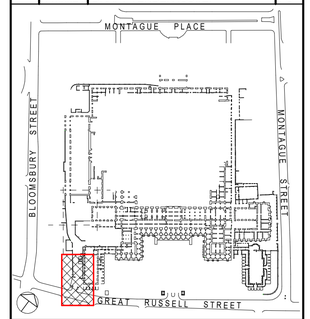
- EXISTING COMBINED MANHOLE.
- EXISTING FOUL WATER MANHOLE.
- EXISTING SURFACE WATER MANHOLE.
- EXISTING COMBINED DRAINAGE PIPE.
- EXISTING FOUL WATER DRAINAGE PIPE.
- EXISTING SURFACE WATER DRAINAGE PIPE.
- ☒ (g) EXISTING SURFACE WATER GULLY.
- PROPOSED COMBINED MANHOLE.
- PROPOSED SURFACE WATER MANHOLE.
- PROPOSED COMBINED DRAINAGE PIPE.
- PROPOSED SURFACE WATER DRAINAGE PIPE.
- ☒ G PROPOSED SURFACE WATER GULLY.
- PROPOSED SURFACE WATER CHANNEL DRAIN.
- x x x x x x x x EXISTING DRAINGE PIPE TO BE ABANDONED & GRUBBED UP.
- EXISTING BELOW GROUND MANHOLE / SERVICES CHAMBER TO BE ABANDONED & GRUBBED UP.

notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING.
3. THE INFORMATION SHOWN ON THIS DRAWING IS BASED ON:
   - PLOWMAN CRAVEN 3d REVIT BUILDING SURVEY MODEL, RECEIVED MARCH 2024.
   - JOHN ROBINSON ASSOCIATES 2d UTILITY MAPPING SURVEY, DATED JANUARY 2021.
   - M J FERGUSON SERVICES LTD. 2d GROUND PENETRATING RADAR & 2d TOPOGRAPHICAL SURVEY, DATED JANUARY 2024.
4. ALL DETAILS & CONDITION OF EXISTING DRAINAGE & SERVICES ARE APPROXIMATE ONLY & NEED TO BE CONFIRMED ON SITE BY THE CONTRACTOR OR SUB-CONTRACTORS.
5. FOR PROPOSED DRAINAGE DETAILS REFER TO DRAWING No's SW001-ABA-1000-W00_00-DDG-C-9010 & SW001-ABA-1000-W00_00-DDG-C-9011.
6. FOR PROPOSED MANHOLE SCHEDULES REFER TO DRAWING No. SW001-ABA-1000-W00_00-DDG-C-9020.
7. ALL NEW PIPES TO BE tbc.
8. THE INVERT LEVELS OF ALL EXISTING MANHOLES ARE TO BE CONFIRMED ON SITE AT THE BEGINNING OF THE WORKS TO THE DRAINAGE.
9. ALL NEW DRAINAGE IS TO BE CONCRETE ENCASED WHERE COVER TO CROWN OF PIPE IS LESS THAN 1200mm TO FINISHED GROUND LEVEL.
10. ALL NEW DRAINAGE GENERALLY TO BE TO ADOPTABLE STANDARDS & IN ACCORDANCE WITH SEWERS FOR ADOPTION 7th EDITION, BS 8301 & THE BUILDING REGULATIONS.

FOR INFORMATION ONLY

C01	15.07.24	ISSUED FOR TENDER. DRAWING NUMBERS REVISED.	CM
	14.06.24	DRAFT TENDER ISSUE.	PS



KEY PLAN (1:3000 @ A0/A1)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE PLAN, ZONE W01

drawn	checked
Spencer George	PS
date	**scale (original - A1)**
JUNE 2024	1:100

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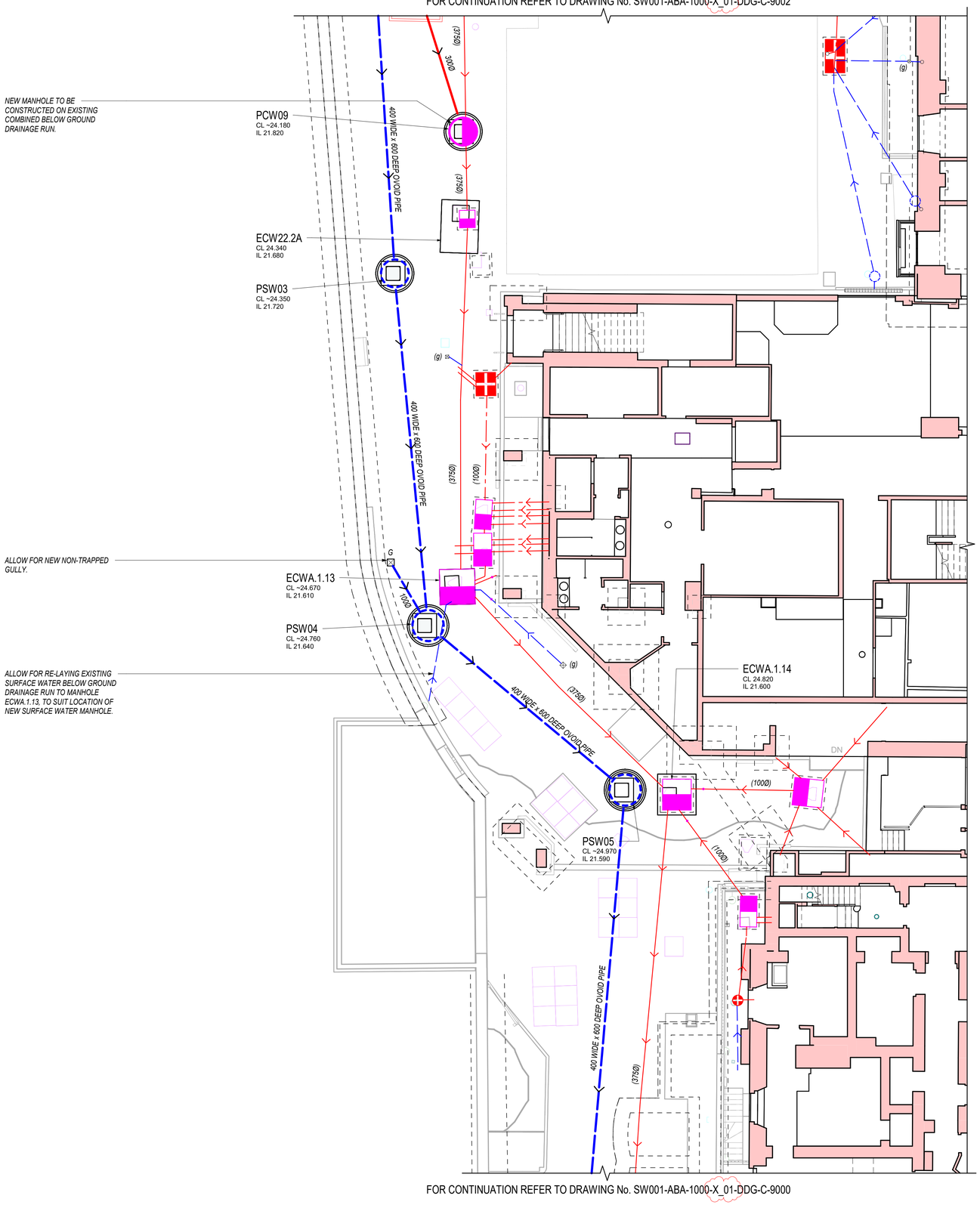
ABA JOB No. 1910-41

drg. no. SW001-ABA-1000-X_01-DDG-C-9000

rev. C01

FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9002



FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9000

notes

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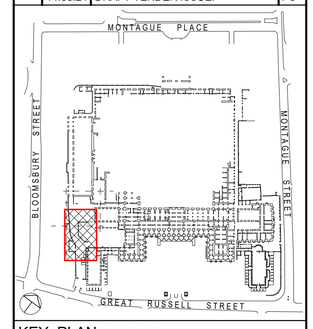

KEY PLAN (1:3000 @ A0/A1)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE PLAN, ZONE W02

drawn	checked
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date	**scale (original - A1)**
JUNE 2024	1:100

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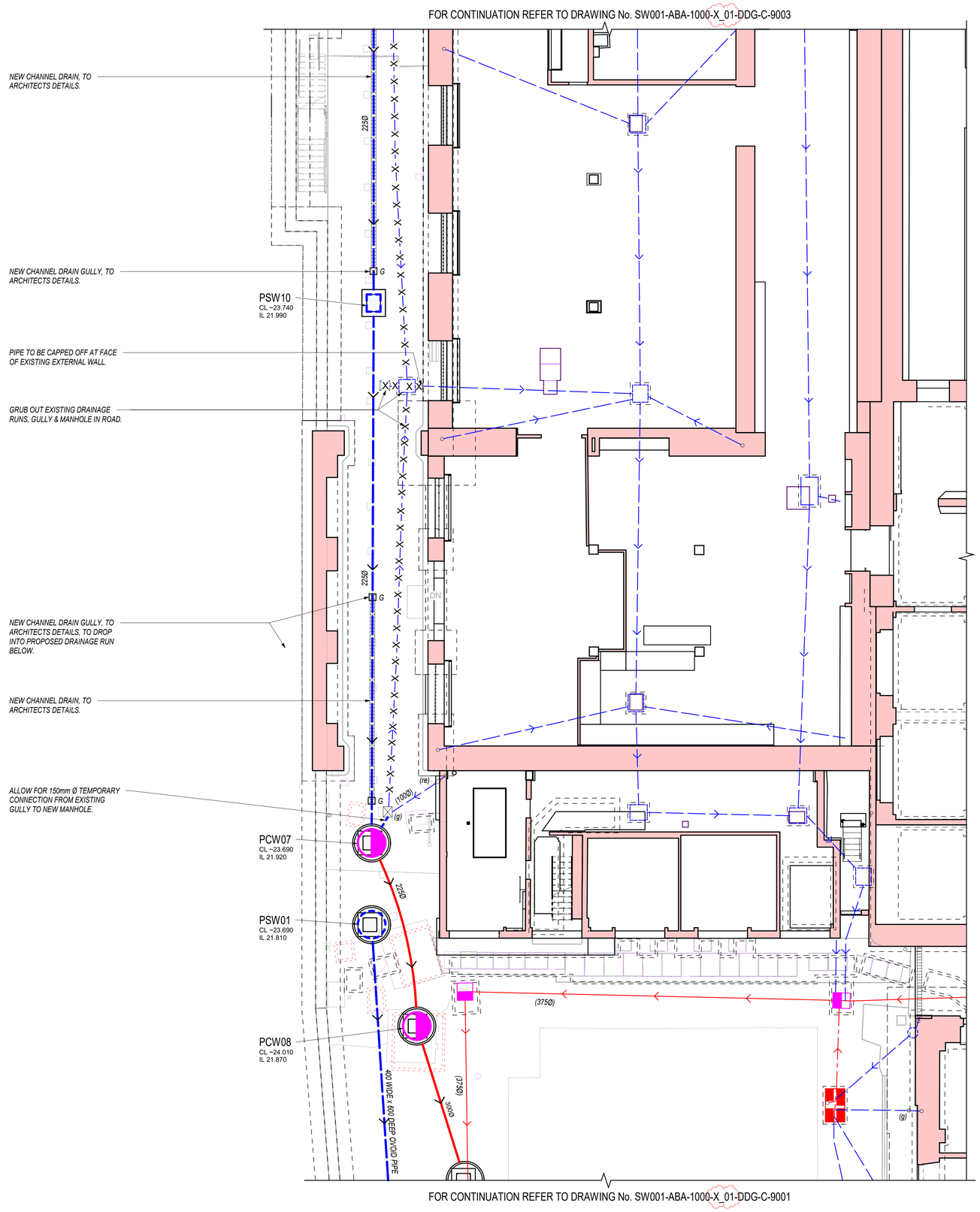
SW001-ABA-1000-X_01-DDG-C-9001	C01

FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9003



FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9001

notes

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FOR INFORMATION ONLY

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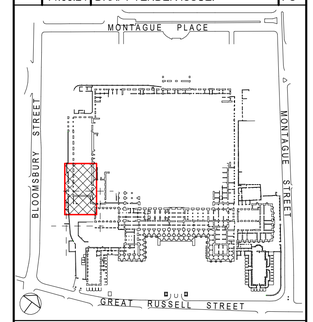

KEY PLAN (1:3000 @ A0/A1)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE PLAN, ZONE W03

drawn	checked
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date	**scale (original - A1)**
JUNE 2024	1:100

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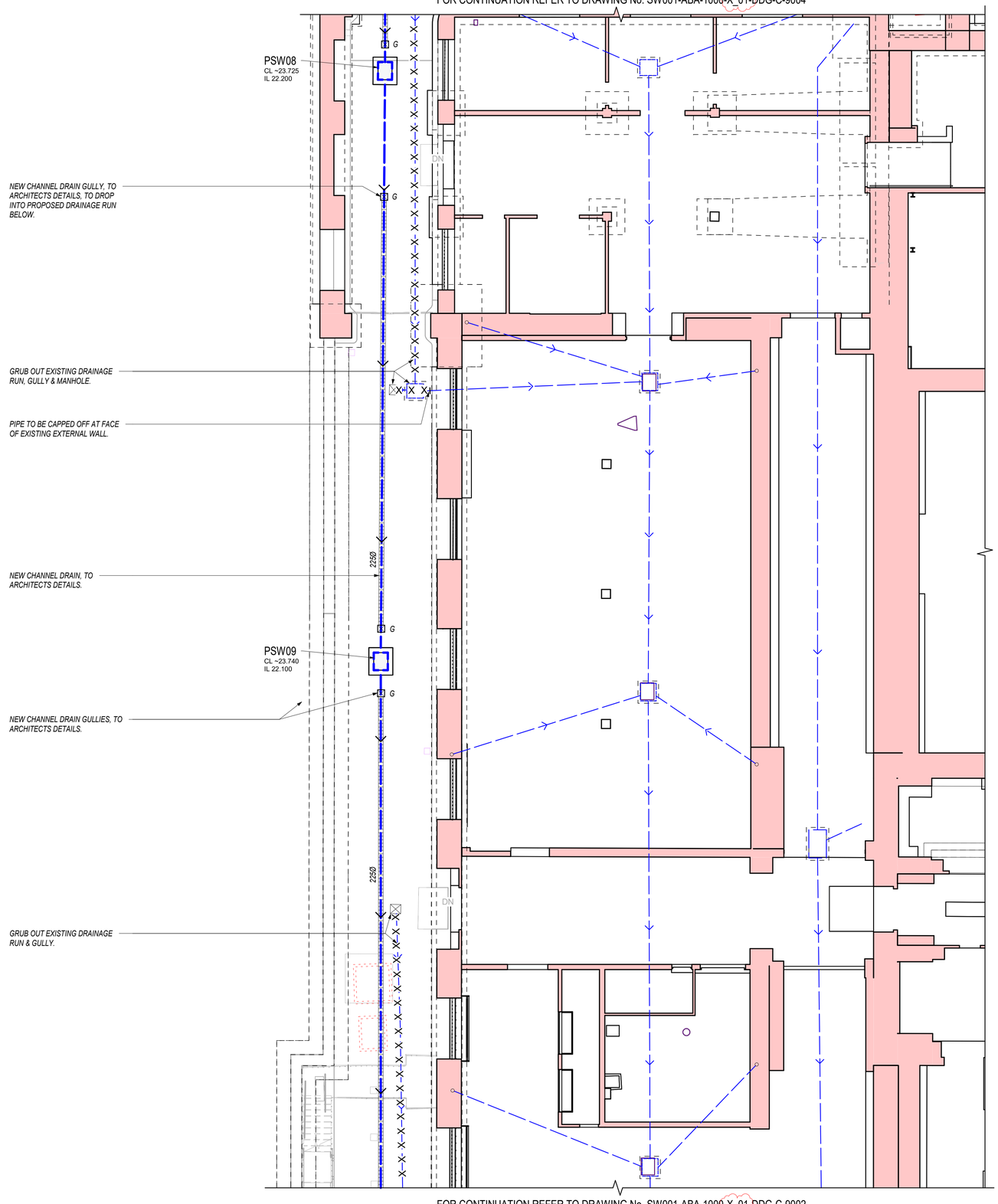
drg. no. SW001-ABA-1000-X_01-DDG-C-9002

rev. C01

FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9004



FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9002

notes

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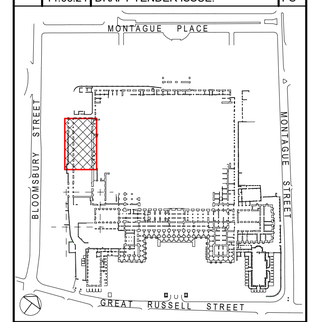

KEY PLAN (1:3000 @ A0/A1)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE PLAN, ZONE W04

drawn	checked
Spencer George	PS
date	**scale (original - A1)**
JUNE 2024	1:100

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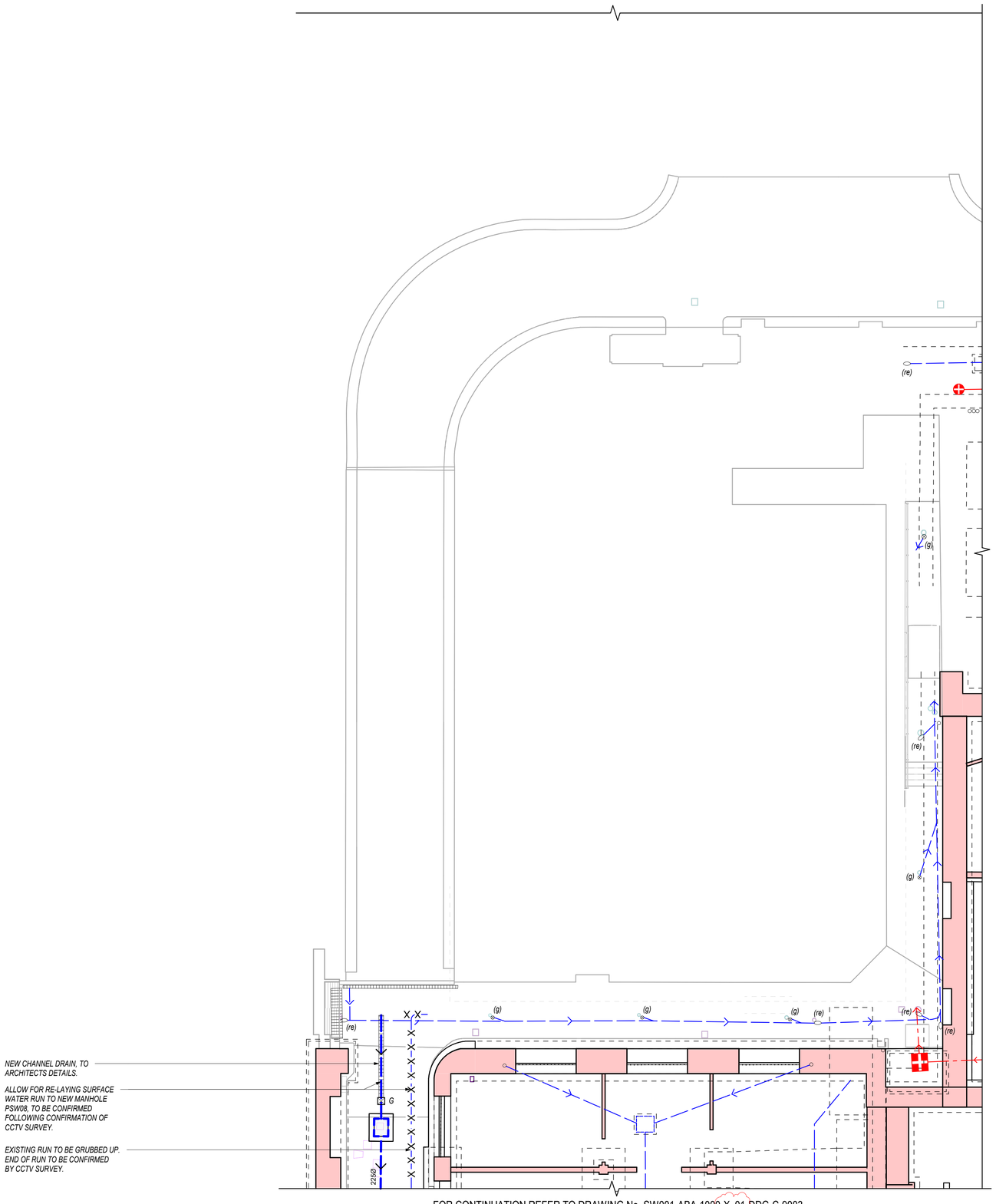
ABA JOB No. 1910-41

drg. no. SW001-ABA-1000-X_01-DDG-C-9003

rev. C01



NEW CHANNEL DRAIN, TO ARCHITECTS DETAILS.

ALLOW FOR RE-LAYING SURFACE WATER RUN TO NEW MANHOLE PSW08, TO BE CONFIRMED FOLLOWING CONFIRMATION OF CCTV SURVEY.

EXISTING RUN TO BE GRUBBED UP. END OF RUN TO BE CONFIRMED BY CCTV SURVEY.

FOR CONTINUATION REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9003

notes

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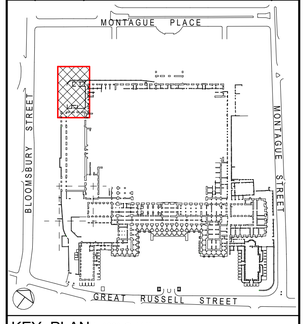

KEY PLAN (1:3000 @ A0/A1)

job
BRITISH MUSEUM
ENERGY CENTRE PROGRAMME

title
ENABLING WORKS -
PROPOSED BELOW GROUND DRAINAGE PLAN, ZONE W05

drawn	checked
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date	scale (original - A1)
JUNE 2024	1:100

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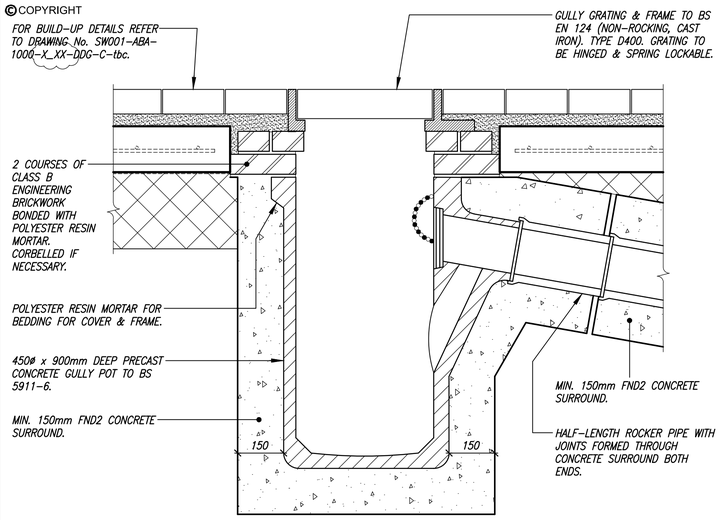
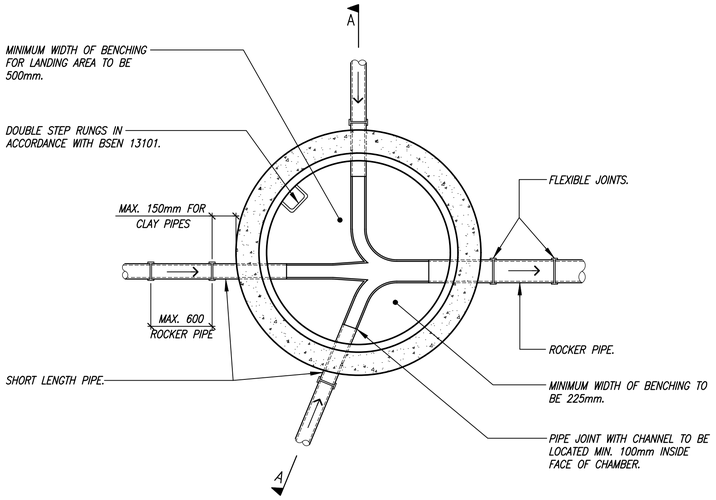
rev. C01



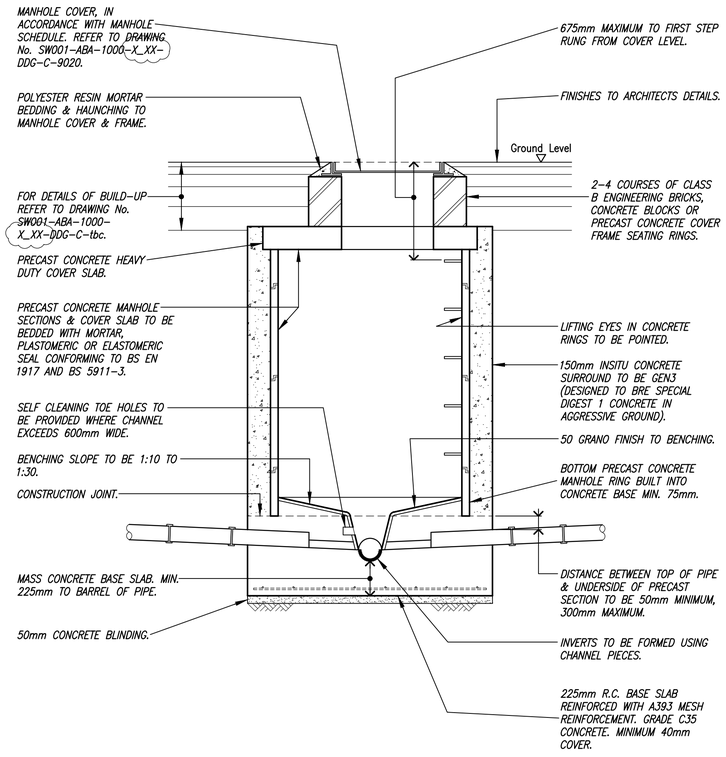
DETAIL 01. (1:10.)

(TYPICAL ROAD GULLY DETAIL.)



DETAIL 02. (1:20.)

(TYPICAL EXTERNAL PRECAST CONCRETE MANHOLE, TYPE 2.)



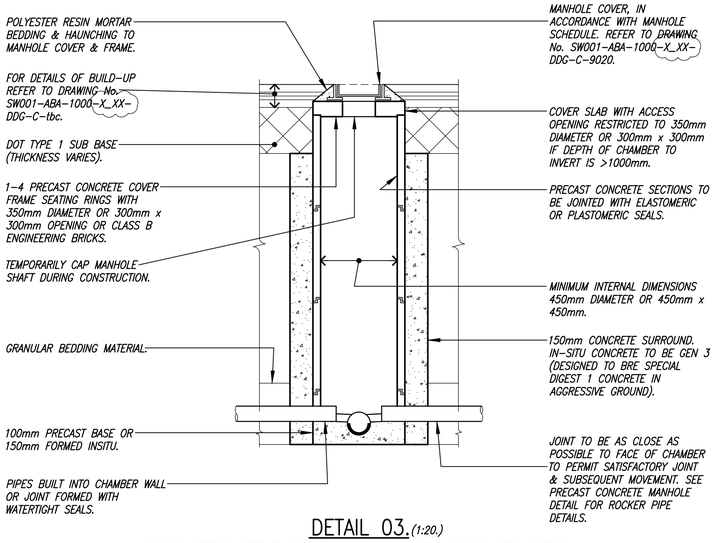
SECTION A-A. (1:20.)

(MAX. DEPTH FROM GROUND LEVEL TO BENCHING 3000mm MAX.)

notes

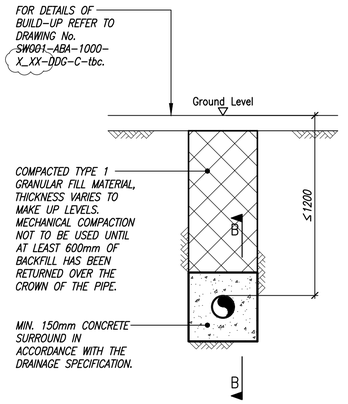
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING.
3. FOR GENERAL NOTES & KEY REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9000.
4. FOR PROPOSED BELOW GROUND DRAINAGE PLANS & FURTHER GENERAL NOTES REFER TO DRAWING No's SW001-ABA-1000-X_01-DDG-C-9000, SW001-ABA-1000-X_01-DDG-C-9001, SW001-ABA-1000-X_01-DDG-C-9002, SW001-ABA-1000-X_01-DDG-C-9003 & SW001-ABA-1000-X_01-DDG-C-9004.
5. WHERE MAIN INLET & OUTLET PIPES ARE OF DIFFERENT DIAMETERS THE PIPES ARE TO BE LAID WITH LEVEL SOFFITS.

ISSUED FOR INFORMATION



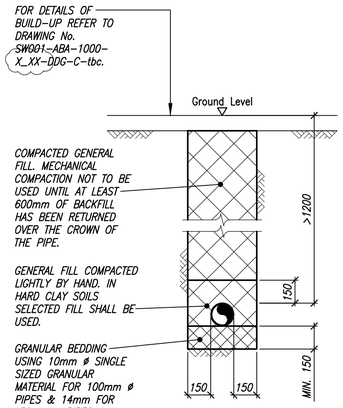
DETAIL 03. (1:20.)

(TYPICAL EXTERNAL PRECAST CONCRETE INSPECTION CHAMBER MANHOLE DETAIL, TYPE 3.)



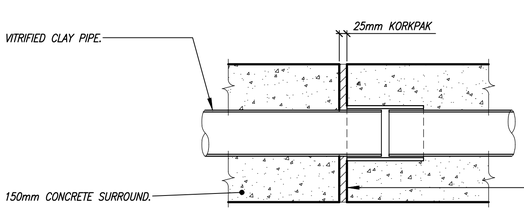
DETAIL 04. (1:20.)

(TYPICAL EXTERNAL PIPE BED DETAIL WHERE COVER TO CROWN <1200mm.)

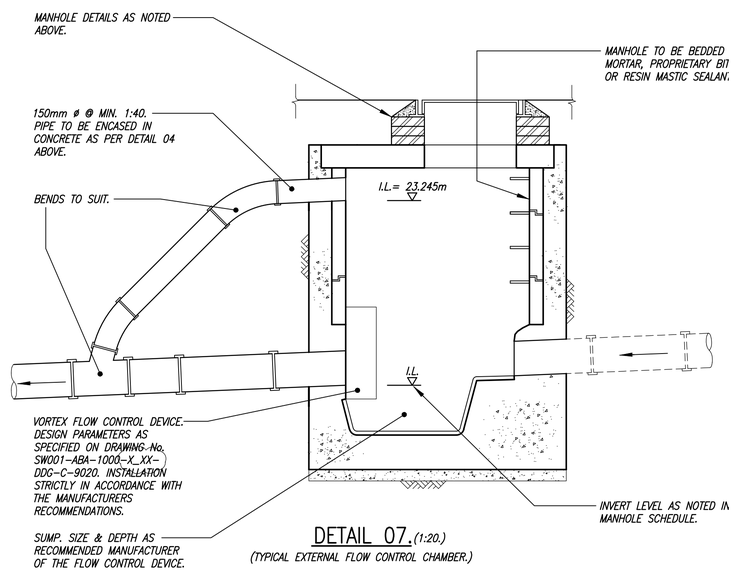


DETAIL 05. (1:20.)

(TYPICAL EXTERNAL PIPE BED DETAIL WHERE COVER TO CROWN >1200mm.)

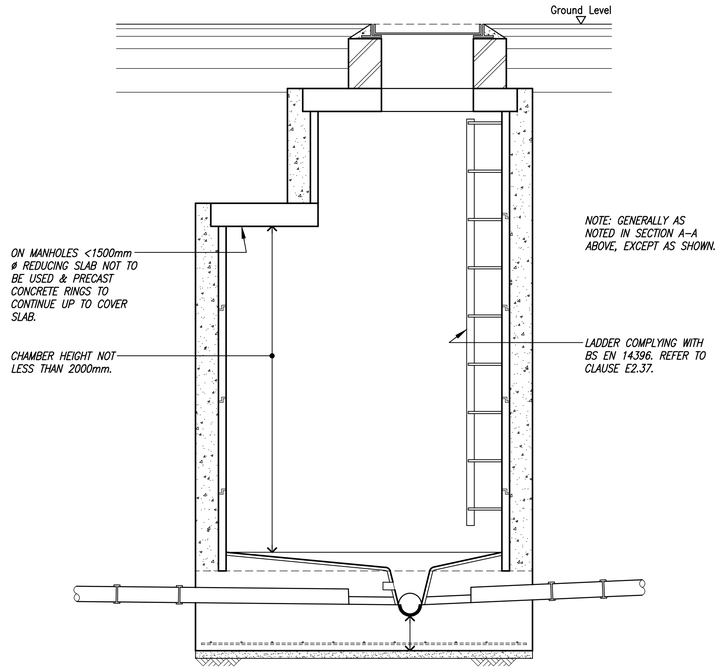


SECTION B-B. (1:10.)



DETAIL 07. (1:20.)

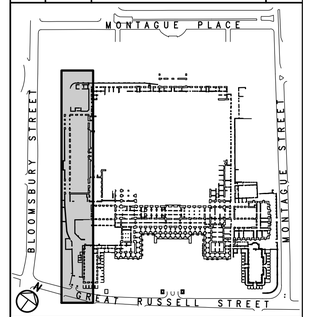
(TYPICAL EXTERNAL FLOW CONTROL CHAMBER.)



DETAIL 06. (1:20.)

(TYPICAL EXTERNAL PRECAST CONCRETE MANHOLE, TYPE 4. DEPTH FROM GROUND LEVEL TO BENCHING 3000 – 6000mm MAX.)

C01	15.07.24	ISSUED FOR TENDER. DRAWING NUMBERS REVISED.	CM
	14.06.24	DRAFT TENDER ISSUE.	PS



KEY PLAN (1:3000 @ A1.)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE, TYPICAL DETAILS, SHEET 1

drawn	checked
Spencer George	PS
date	**scale (original - A1)**
JUNE 2024	AS SHOWN

Alan Baxter

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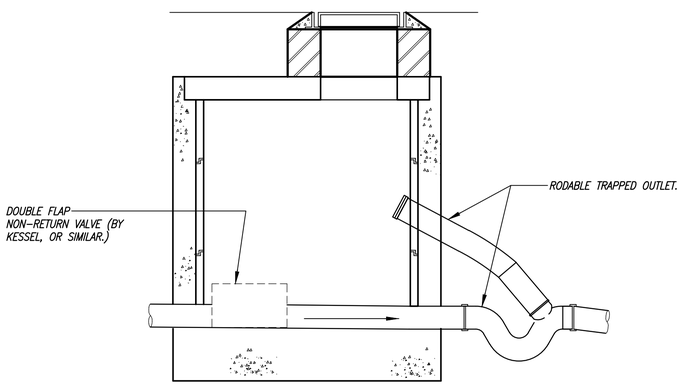
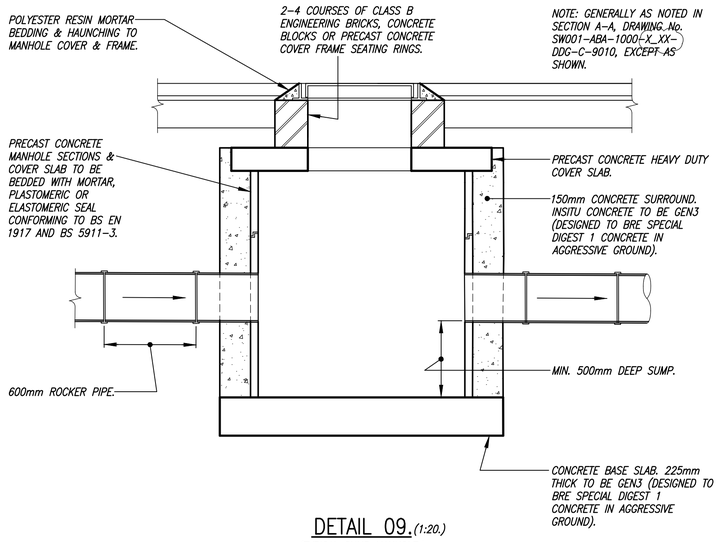
ABA job. no. 1910/41

drg. no. **SW001-ABA-1000-X_XX-DDG-C-9010** rev. **C01**



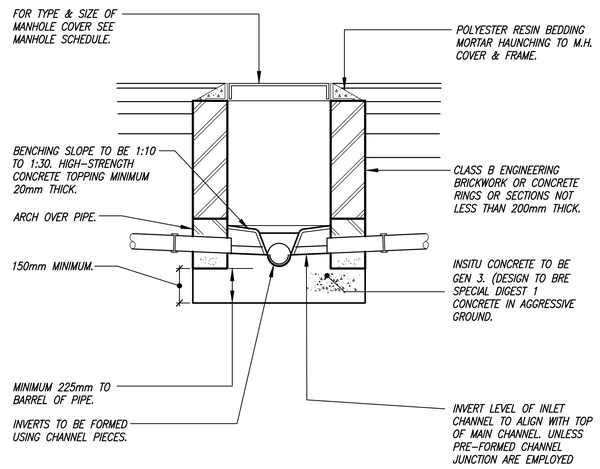
DETAIL 08. (1:20.)

(TYPICAL INDICATIVE ARRANGEMENT OF NON-RETURN VALVE & TRAP.)



DETAIL 09. (1:20.)

(TYPICAL SUMP MANHOLE.)



DETAIL 10. (1:20.)

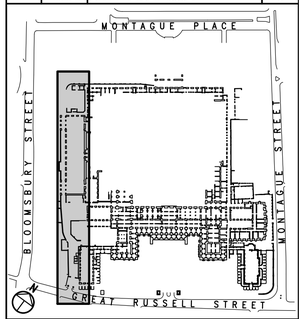
(TYPICAL BRICK MANHOLE.)

notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING.
3. FOR GENERAL NOTES & KEY REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9000.
4. FOR PROPOSED BELOW GROUND DRAINAGE PLANS & FURTHER GENERAL NOTES REFER TO DRAWING No's SW001-ABA-1000-X_XX-DDG-C-9000, SW001-ABA-1000-X_XX-DDG-C-9001, SW001-ABA-1000-X_XX-DDG-C-9002, SW001-ABA-1000-X_XX-DDG-C-9003 & SW001-ABA-1000-X_XX-DDG-C-9004.
5. WHERE MAIN INLET & OUTLET PIPES ARE OF DIFFERENT DIAMETERS THE PIPES ARE TO BE LAID WITH LEVEL SOFFITS.

ISSUED FOR INFORMATION

C01	15.07.24	ISSUED FOR TENDER. DRAWING NUMBERS REVISED.	CM
	14.06.24	DRAFT TENDER ISSUE.	PS



KEY PLAN (1:3000 @ A1.)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE, TYPICAL DETAILS, SHEET 2

drawn: Spencer George
checked: PS
date: JUNE 2024
scale (original - A1): AS SHOWN

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ABA job. no. 1910/41

drg. no. **SW001-ABA-1000-X_XX-DDG-C-9011**
rev. **C01**

COMBINED DRAINAGE, MANHOLE SCHEDULE.

MANHOLE REFERENCE	COVER LEVEL (m AOD)	CONNECTIONS	PIPE			INTERNAL MANHOLE SIZE (mm)	TYPES		FRAME	COMMENTS
COORDINATES	DEPTH TO PIPE SOFFIT (d) (m)			INVERTS (m AOD)	DIAMS. (mm)		MANHOLE	COVER		
PCW07	~23.690		1	21.930	225	1200 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	–
REFER TO PLANS FOR SETTING OUT	d = 1.530		0	21.920	225					
PCW08	~24.010		1	21.880	225	1200 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	–
REFER TO PLANS FOR SETTING OUT	d = 1.810		0	21.870	300					
PCW09	~24.180		1	21.830	450(EX.)	1350 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	FINAL INVERT LEVELS TO BE CONFIRMED FOLLOWING EXCAVATION OF MANHOLE LOCATION ON SITE.
REFER TO PLANS FOR SETTING OUT	d = 1.847		2	22.045	300					
			0	21.820	450(EX.)					
ECW22.2A	24.340		1	(EX.)	450(EX.)	AS EXISTING	AS EXISTING	tbc	TBC	ALLOW FOR REPLACING MANHOLE COVER & FRAME. DETAILS TO BE CONFIRMED WITH ARCHITECT.
REFER TO PLANS FOR SETTING OUT	d = 2.147		0	21.680(EX.)	450(EX.)					
ECWA.1.13	24.670		1	(EX.)	450(EX.)	AS EXISTING	AS EXISTING	tbc	TBC	ALLOW FOR REPLACING MANHOLE COVER & FRAME. DETAILS TO BE CONFIRMED WITH ARCHITECT.
REFER TO PLANS FOR SETTING OUT	d = 2.547		2	(EX.)	100(EX.)					
			3	(EX.)	100(EX.)					
			4	(EX.)	100(EX.)					
			5	21.835	100(tbc)					
			0	21.610(EX.)	450(EX.)					
ECWA.1.14	24.820		1	(EX.)	300(EX.)	AS EXISTING	AS EXISTING	tbc	TBC	ALLOW FOR REPLACING MANHOLE COVER & FRAME. DETAILS TO BE CONFIRMED WITH ARCHITECT.
REFER TO PLANS FOR SETTING OUT	d = 2.890		0	21.600(EX.)	300(EX.)					
PCW10	~25.950		1	(EX.)	300(EX.)	1350 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	FINAL INVERT LEVELS TO BE CONFIRMED FOLLOWING EXCAVATION OF MANHOLE LOCATION ON SITE.
REFER TO PLANS FOR SETTING OUT	d = 4.330		2	21.440	150					
			0	21.290(EX.)	300(EX.)					

SURFACE WATER DRAINAGE, MANHOLE SCHEDULE.

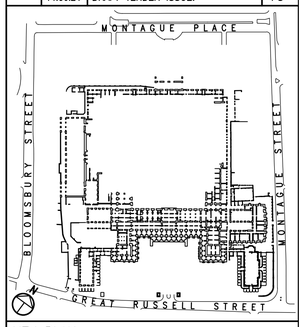
MANHOLE REFERENCE	COVER LEVEL (m AOD)	CONNECTIONS	PIPE			INTERNAL MANHOLE SIZE (mm)	TYPES		FRAME	COMMENTS
COORDINATES	DEPTH TO PIPE SOFFIT (d) (m)			INVERTS (m AOD)	DIAMS. (mm)		MANHOLE	COVER		
PSW01	~23.690		0	21.810	400x600#	1200 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	MANHOLE TO HAVE SUMP AS PER DETAIL. *400 WIDE x 600mm DEEP OVOID PIPE.
REFER TO PLANS FOR SETTING OUT	d = 1.194									
PSW03	~24.350		1	21.730	400x600#	1200 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	*400 WIDE x 600mm DEEP OVOID PIPE.
REFER TO PLANS FOR SETTING OUT	d = 1.944		0	21.720	400x600#					
PSW04	~24.760		1	21.650	400x600#	1350 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	*400 WIDE x 600mm DEEP OVOID PIPE.
REFER TO PLANS FOR SETTING OUT	d = 2.434		2	21.940	100					
			0	21.640	400x600#					
PSW05	~24.970		1	21.600	400x600#	1350 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	*400 WIDE x 600mm DEEP OVOID PIPE.
REFER TO PLANS FOR SETTING OUT	d = 2.694		0	21.590	400x600#					
PSW06	~25.740		1	21.350	400x600#	1800 ø	PRECAST CONCRETE TYPE 4	600 x 600 D400 TO BS EN 124	TBC	*400 WIDE x 600mm DEEP OVOID PIPE.
REFER TO PLANS FOR SETTING OUT	d = 3.714		0	21.340	150					
PSW07	~25.850		1	21.320	150	1350 ø	PRECAST CONCRETE TYPE 2	600 x 600 D400 TO BS EN 124	TBC	NON-RETURN VALVE TO BE INSTALLED ON BRANCH 1.
REFER TO PLANS FOR SETTING OUT	d = 4.375		0	21.310	150					
PSW08	~23.725		1	22.210	tbc	750 x 600	PRECAST CONCRETE TYPE 3	300 x 300 D400 TO BS EN 124	TBC	–
REFER TO PLANS FOR SETTING OUT	d = 1.285		0	22.200	225					
PSW09	~23.740		1	22.110	225	750 x 600	PRECAST CONCRETE TYPE 3	300 x 300 D400 TO BS EN 124	TBC	–
REFER TO PLANS FOR SETTING OUT	d = 1.400		0	22.100	225					
PSW10	~23.740		1	22.000	225	750 x 600	PRECAST CONCRETE TYPE 3	300 x 300 D400 TO BS EN 124	TBC	–
REFER TO PLANS FOR SETTING OUT	d = 1.510		0	21.990	225					
PSW11	~25.690		1	21.370	400x600#	1800 ø	PRECAST CONCRETE TYPE 4	600 x 600 D400 TO BS EN 124	TBC	MANHOLE TO BE FITTED WITH VORTEX FLOW CONTROL DEVICE TO LIMIT DISCHARGE TO 2 l/s. *400 WIDE x 600mm DEEP OVOID PIPE.
REFER TO PLANS FOR SETTING OUT	d = 3.644		0	21.360	400x600#					
ESW01	25.670		1	22.700(tbc)	100(tbc)	1200 x 1000	TBC	600 x 600 D400 TO BS EN 124	TBC	EXISTING MANHOLE TO BE REBUILT.
REFER TO PLANS FOR SETTING OUT	d = 3.070(tbc)		0	22.700(tbc)	100(tbc)					

notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING.
3. FOR GENERAL NOTES & KEY REFER TO DRAWING No. SW001-ABA-1000-X_01-DDG-C-9000.
4. FOR PROPOSED BELOW GROUND DRAINAGE PLANS & FURTHER GENERAL NOTES REFER TO DRAWING No's SW001-ABA-1000-X_XX-DDG-C-9000, SW001-ABA-1000-X_XX-DDG-C-9001, SW001-ABA-1000-X_XX-DDG-C-9002, SW001-ABA-1000-X_XX-DDG-C-9003 & SW001-ABA-1000-X_XX-DDG-C-9004.

ISSUED FOR INFORMATION

C01	15.07.24	ISSUED FOR TENDER. DRAWING NUMBERS REVISED.	CM
	14.06.24	DRAFT TENDER ISSUE.	PS



KEY PLAN (1:3000 @ A1.)

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ENABLING WORKS - PROPOSED BELOW GROUND DRAINAGE, MANHOLE SCHEDULES, SHEET 1

drawn: Spencer George
checked: PS
date: JUNE 2024
scale (original - A1): N.T.S.

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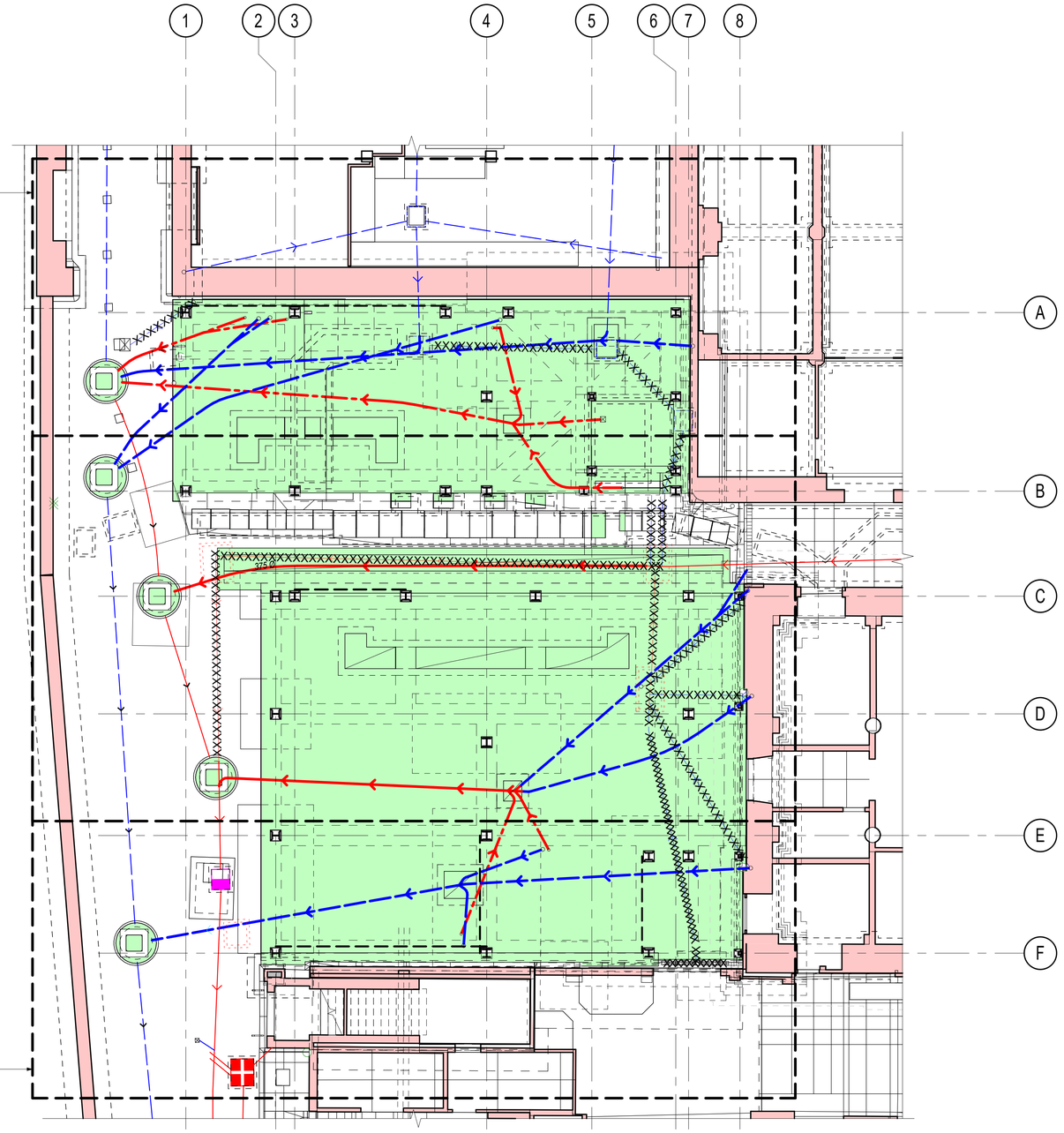
drg. no. SW001-ABA-1000-X_XX-DDG-C-9020
rev. C01

Appendix B – Proposed Plans
South West energy Centre (SWEC)

PHASE 2. REFER TO DRAWING No. SW001-ABA-1063-C_01-DDG-D-0218.



PHASE 1. REFER TO DRAWING No. SW001-ABA-1062-C_01-DDG-D-0208.

notes (continued)

11. KEY:

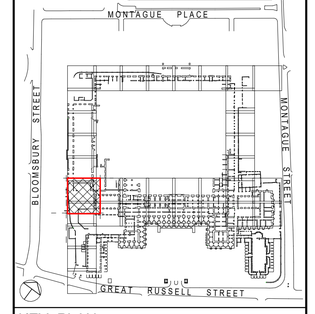
- EXISTING COMBINED MANHOLE.
- EXISTING FOUL WATER MANHOLE.
- EXISTING SURFACE WATER MANHOLE.
- EXISTING COMBINED DRAINAGE PIPE.
- EXISTING FOUL WATER DRAINAGE PIPE.
- EXISTING SURFACE WATER DRAINAGE PIPE.
- ☒ (g) EXISTING SURFACE WATER GULLY.
- PROPOSED COMBINED MANHOLE.
- PROPOSED SURFACE WATER MANHOLE.
- PROPOSED COMBINED DRAINAGE PIPE.
- PROPOSED SURFACE WATER DRAINAGE PIPE.
- ☒ G PROPOSED SURFACE WATER GULLY.
- PROPOSED SURFACE WATER CHANNEL DRAIN.
- x x x x x x x x EXISTING DRAINGE PIPE TO BE ABANDONED & GRUBBED UP.
- EXISTING BELOW GROUND MANHOLE / SERVICES CHAMBER TO BE ABANDONED & GRUBBED UP.

notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS & ENGINEERS DRAWINGS & THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING.
3. THE INFORMATION SHOWN ON THIS DRAWING IS BASED ON:
   - PLOWMAN CRAVEN 3d REVIT BUILDING SURVEY MODEL. RECEIVED MARCH 2024.
   - JOHN ROBINSON ASSOCIATES 2d UTILITY MAPPING SURVEY, DATED JANUARY 2021.
   - M J FERGUSON SERVICES LTD. 2d GROUND PENETRATING RADAR & 2d TOPOGRAPHICAL SURVEY, DATED JANUARY 2024.
4. ALL DETAILS & CONDITION OF EXISTING DRAINAGE & SERVICES ARE APPROXIMATE ONLY & NEED TO BE CONFIRMED ON SITE BY THE CONTRACTOR OR SUB-CONTRACTORS.
5. FOR PROPOSED DRAINAGE DETAILS REFER TO DRAWING No. SW001-ABA-1060-X-DDG-C-0390.
6. FOR PROPOSED MANHOLE SCHEDULES REFER TO DRAWING No. SW001-ABA-1060-X-DDG-C-0395.
7. ALL NEW PIPES LAID UNDER THE PROPOSED R.C. SLAB TO BE 100mm Ø CAST IRON, UNLESS NOTED OTHERWISE. LAID TO A MINIMUM GRADIENT OF 1:40. ALL NEW PIPES LAID EXTERNALLY TO BE 100mm Ø VITRIFIED CLAY, UNLESS NOTED OTHERWISE. LAID TO A MINIMUM GRADIENT OF 1:80.
8. THE INVERT LEVELS OF ALL EXISTING MANHOLES ARE TO BE CONFIRMED ON SITE AT THE BEGINNING OF THE WORKS TO THE DRAINAGE.
9. ALL NEW DRAINAGE IS TO BE CONCRETE ENCASED WHERE COVER TO CROWN OF PIPE IS LESS THAN 1200mm TO FINISHED GROUND LEVEL.
10. ALL NEW DRAINAGE GENERALLY TO BE TO ADOPTABLE STANDARDS & IN ACCORDANCE WITH SEWERS FOR ADOPTION 7th EDITION, BS 8301 & THE BUILDING REGULATIONS.

NOT FOR CONSTRUCTION
FOR EMPLOYERS
REQUIREMENTS ONLY

28.10.24	STAGE 4 ISSUE.	PS



KEY PLAN (1:3000 @ A0/A1)

job
BRITISH MUSEUM
ENERGY CENTRE PROGRAMME

title
ZONE P00 -
PROPOSED STRUCTURE,
BELOW GROUND DRAINAGE PLAN

drawn	checked
Spencer George	PS
date	scale (original - A1)
SEPTEMBER 2024	1:100

EMPLOYERS REQUIREMENTS

THESE DRAWINGS SHOW THE DESIGN INTENT FOR THE PROPOSED WORKS. THE CONTRACTOR IS TO DEVELOP THEIR OWN DESIGN FOR THE PROPOSED WORKS WHICH THEY SHALL REMAIN ENTIRELY RESPONSIBLE FOR. AS A MINIMUM, THEIR DESIGN SHALL ACHIEVE THE OVERALL QUALITY & ROBUSTNESS AS THESE PROPOSALS WHILST ADHERING TO THE REQUIREMENTS SET OUT ON THE DRAWINGS & SPECIFICATION.

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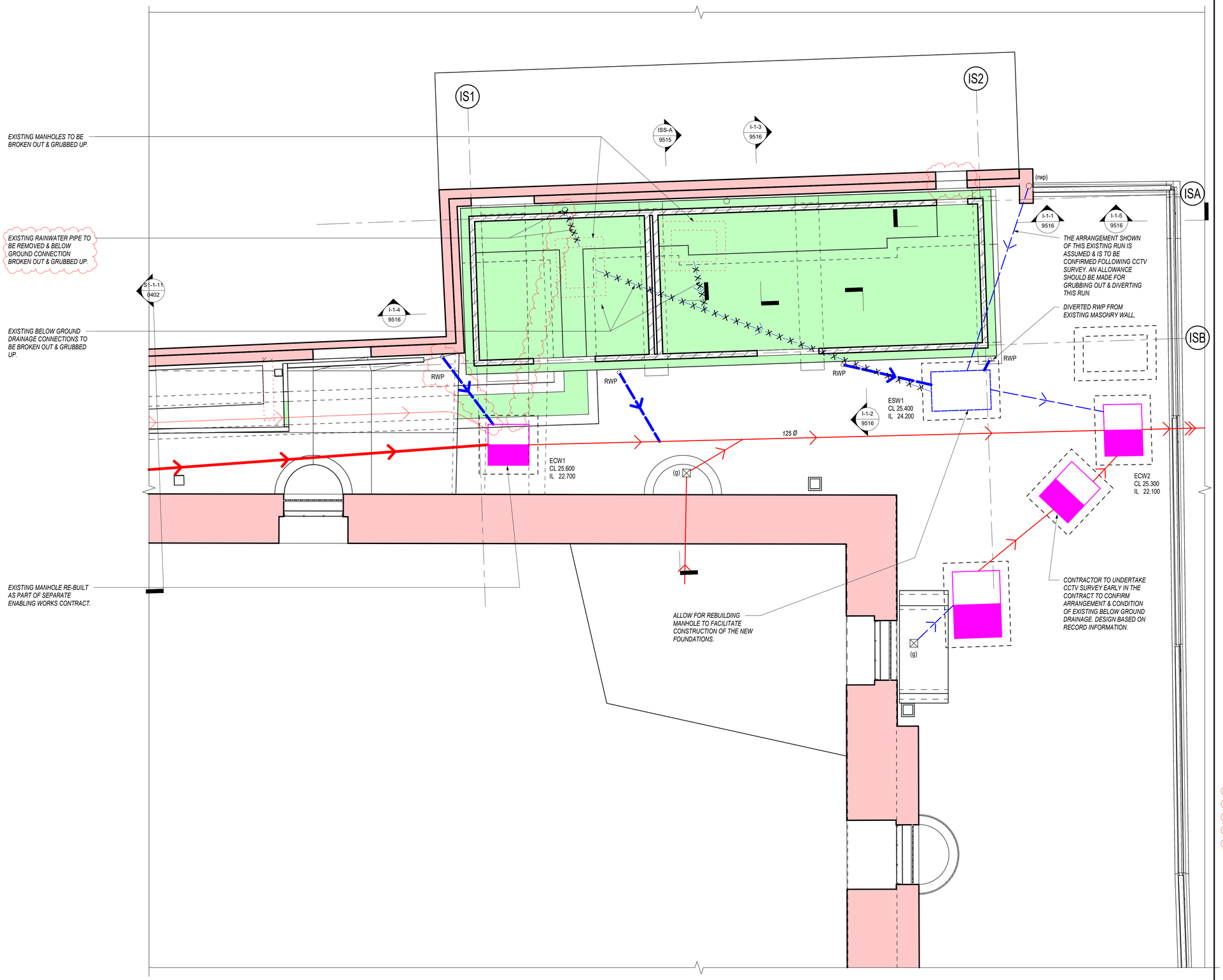
ABA JOB No. 1910-41

drg. no. **SW001-ABA-1060-C_01-DDG-D-0198** rev.

Appendix C– Proposed Plans Incoming Sub Station (ISS)



notes (continued)

11. KEY:

- EXISTING COMBINED MANHOLE.
- EXISTING FOUL WATER MANHOLE.
- EXISTING SURFACE WATER MANHOLE.
- EXISTING COMBINED DRAINAGE PIPE.
- EXISTING FOUL WATER DRAINAGE PIPE.
- EXISTING SURFACE WATER DRAINAGE PIPE.
- ☒ (g) EXISTING SURFACE WATER GULLY.
- PROPOSED COMBINED MANHOLE.
- PROPOSED SURFACE WATER MANHOLE.
- PROPOSED COMBINED DRAINAGE PIPE.
- PROPOSED SURFACE WATER DRAINAGE PIPE.
- ☒ G PROPOSED SURFACE WATER GULLY.
- PROPOSED SURFACE WATER CHANNEL DRAIN.
- x x x x x x x x EXISTING DRAINGE PIPE TO BE ABANDONED & GRUBBED UP.
- EXISTING BELOW GROUND MANHOLE / SERVICES CHAMBER TO BE ABANDONED & GRUBBED UP.

notes

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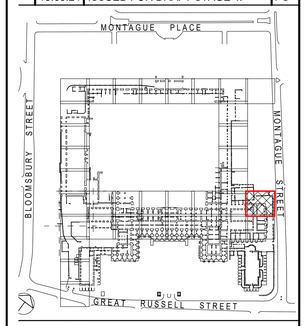
2. DO NOT SCALE FROM THIS DRAWING.
3. THE INFORMATION SHOWN ON THIS DRAWING IS BASED ON:
   - PLOWMAN CRAVEN 3d REVIT BUILDING SURVEY MODEL, RECEIVED MARCH 2024.
   - JOHN ROBINSON ASSOCIATES 2d UTILITY MAPPING SURVEY, DATED JANUARY 2021.
   - M J FERGUSON SERVICES LTD. 2d GROUND PENETRATING RADAR & 2d TOPOGRAPHICAL SURVEY, DATED JANUARY 2024.
4. ALL DETAILS & CONDITION OF EXISTING DRAINAGE & SERVICES ARE APPROXIMATE ONLY & NEED TO BE CONFIRMED ON SITE BY THE CONTRACTOR OR SUB-CONTRACTORS.
5. FOR PROPOSED DRAINAGE DETAILS REFER TO DRAWING No's SW001-ABA-tbc.
6. FOR PROPOSED MANHOLE SCHEDULES REFER TO DRAWING No. SW001-ABA-tbc..
7. ALL NEW PIPES TO BE 100mm Ø CAST IRON. TIMESAVER BY SAINT GOBAIN, UNLESS NOTED OTHERWISE. PIPES TO BE LAID AT MINIMUM GRADIENT 1:40 UNDER BUILDING & 1:80 ELSEWHERE, UNLESS NOTED OTHERWISE.
8. THE INVERT LEVELS OF ALL EXISTING MANHOLES ARE TO BE CONFIRMED ON SITE AT THE BEGINNING OF THE WORKS TO THE DRAINAGE.
9. ALL NEW DRAINAGE IS TO BE CONCRETE ENCASED WHERE COVER TO CROWN OF PIPE IS LESS THAN 1200mm TO FINISHED GROUND LEVEL OR 300mm TO UNDERSIDE OF R.C. FLOOR SLAB.
10. ALL NEW DRAINAGE GENERALLY TO BE TO ADOPTABLE STANDARDS & IN ACCORDANCE WITH SEWERS FOR ADOPTION 7th EDITION, BS 8301 & THE BUILDING REGULATIONS.

C01	28.10.24	STAGE 4 ISSUE. NOTES REVISED. REVISED TO SUIT ARCHITECTS REQUIREMENTS.	CM
	13.09.24	ISSUED FOR DRAFT STAGE 4.	PS



KEY PLAN (1:3000 @ A0/A1)

NOT FOR CONSTRUCTION FOR EMPLOYERS REQUIREMENTS ONLY

EMPLOYERS REQUIREMENTS

THESE DRAWINGS SHOW THE DESIGN INTENT FOR THE PROPOSED WORKS. THE CONTRACTOR IS TO DEVELOP THEIR OWN DESIGN FOR THE PROPOSED WORKS WHICH THEY SHALL REMAIN ENTIRELY RESPONSIBLE FOR. AS A MINIMUM, THEIR DESIGN SHALL ACHIEVE THE OVERALL QUALITY & ROBUSTNESS AS THESE PROPOSALS WHILST ADHERING TO THE REQUIREMENTS SET OUT ON THE DRAWINGS & SPECIFICATION.

job
BRITISH MUSEUM ENERGY CENTRE PROGRAMME

title
ZONE H05, ISS - PROPOSED STRUCTURE, BELOW GROUND DRAINAGE PLAN

drawn	checked
Spencer George	PS
date	scale (original - A1)
SEPTEMBER 2024	1:50

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ABA JOB No. 1910-41

drg. no. **SW001-ABA-1145-B_01-DDG-C-9519** rev. **C01**

General Notes

Drawings to be read in conjunction with Architect's information and Specification.
This drawing is not for construction and should not be scaled.
All dimensions and setting out shall be verified on site.
Spot heights and contour levels are approximate only.
Any discrepancies must be reported to Hortus Collective.

Key

Gravel Surface (167m²)
100mm Gravel Surface - Crushed yorkstone chippings 20mm
Refer to Detail BML-L401.

Topsoil to Planting Areas (103m²)
300mm depth TS6 10mm Topsoil by Bourne Amenity (or Similar Approved).
Refer to Detail BML-L401.

Root Protection Barrier (97m)
ReRoot 1000 by GreenBlue Urban or similar approved. Installed 20mm below finish level within mulch layer.
Refer to Detail BML-L401.

Tree Pit (20no.)
1200mm diameter tree pits.
Refer to Detail BML-L401.

Benches (12no.)
W600 x L2400mm benches
Refer to Architect's drawings and specification

1A MONTAGUE STREET

Area not part of 3D survey scope, refer to existing museum 2D CAD plans for more information

HIRAYAMA CONSERVATION STUDIO

FIRE SECTOR BOUNDARY

Existing manhole proposed to be removed

MONTAGUE STREET

1
L4010

THE WHITE WING

MONTAGUE STREET

0m 5m

Rev	Description	Date

Hortus Collective

 www.hortuscollective.co.uk

Project
British Museum, London - ECP: Incoming Substation (ISS)

Drawing
Landscape - Soilworks Plan

Scale	Date	Drawn	Checked	Status
1:100 @A1	**18.10.24**	**EE**	**MR**	**Stage 4**

Drawing Number: **SW001-HCO-1145-B_01-DDG-L-2010**

Revision: **-**

General Notes

Drawings to be read in conjunction with Architect's information and Specification.
All planting to be set out by Landscape Architect with notice.
This drawing is not for construction and should not be scaled.
All dimensions and setting out shall be verified on site.
Spot heights and contour levels are approximate only.
Any discrepancies must be reported to Hortus Collective.

Planting Schedules

Qty	Species	Common Name	Pot Size	Height/Size	Habit
	TREES				
13	*Rhus Typhina*	Staghorn sumac	Root Ball	2.0-2.5m	MS Branching
7	*Rhus Typhina*	Staghorn sumac	Root Ball	2.5-3.0m	MS Branching
	SHRUBS				
15	*Sarcococca hookeriana 'Winter Gem'*	Sweet Box 'Winter Gem'	15L	0.5m	Bushy
17	*Mahonia eurybracteata subsp. ganpinensis 'Soft Caress'*	Mahonia 'Soft Caress'	15L	0.5-1m	Bushy
52	***Total***				

Qty	Species	Common Name	Pot Size
	HERBACEOUS		
27	*Anemone 'Honorine jobert'*	Japanese anemone	2L
53	*Astrantia major 'Florence'*	Masterwort 'Florence'	2L
33	*Aquilegia vulgaris 'Nivea'*	Aquilegia 'Nivea'	2L
16	*Dryopteris wallichiana*	Wallich's Wood Fern	2L
23	*Deschampsia cespitosa*	Tufted Hair Grass	2L
77	*Geranium 'Album'*	Bloody Cranesbill 'Album'	2L
82	*Hakonechloa macra*	Japanese Forest Grass	2L
21	*Polypodium vulgare*	Common polypody	2L
332	***Total***		

Qty	Species	Common Name	Type
	BULBS (IIn drifts throughout)		
1000	*Crocus tommasinianus*	*Early crocus*	Bulb
600	*Crocus sativus*	*Saffron crocus*	Bulb
250	*Ipheion 'Alberto Castillo'*	*Spring starflower*	Bulb
300	*Narcissus 'Thalia'*	*Triandrus daffodil 'Thalia'*	Bulb
2150	***Total***		

Rev	Description	Date

Hortus Collective

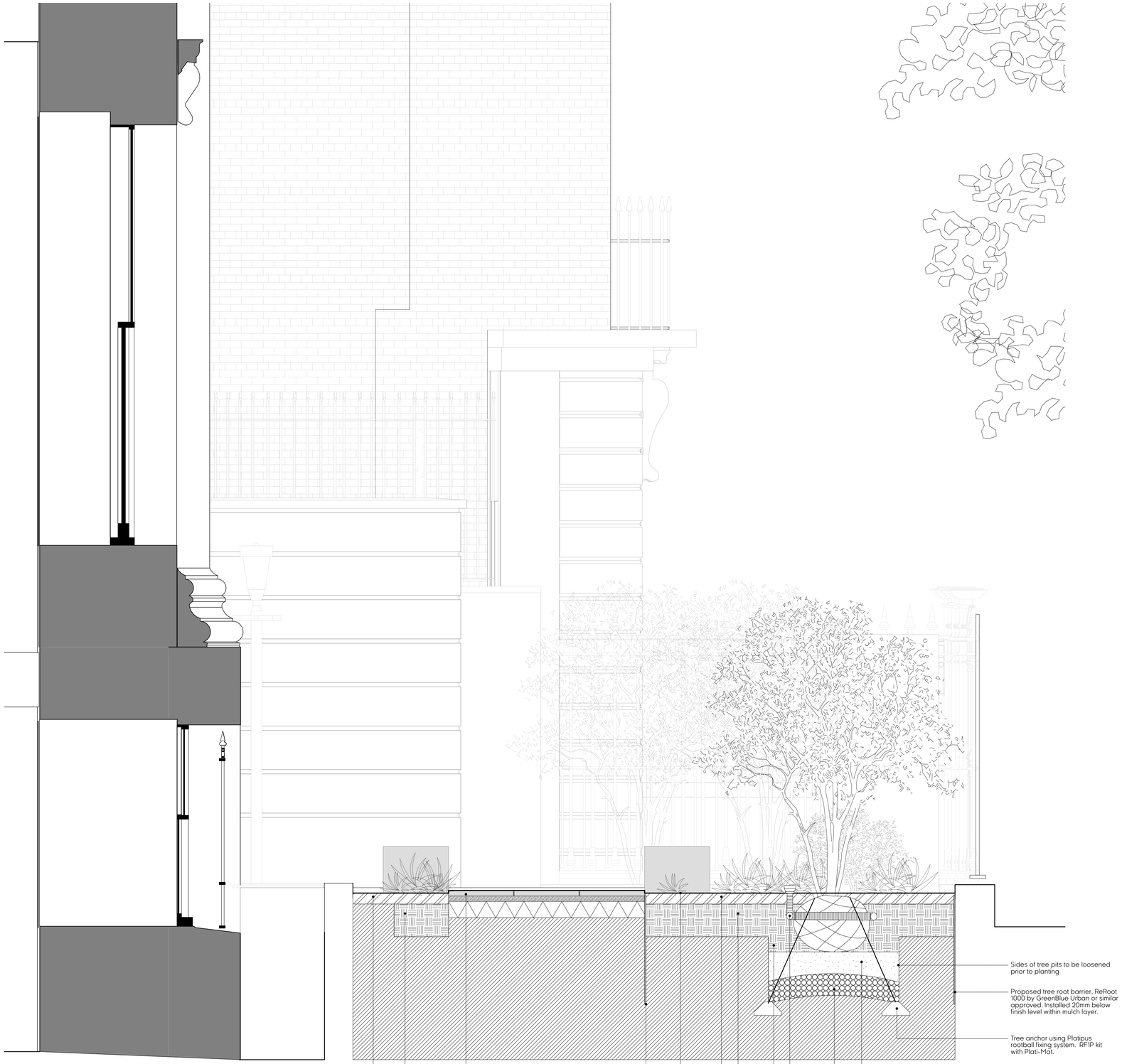
 www.hortuscollective.co.uk

Project
British Museum, London - ECP: Incoming Substation (ISS)

Drawing
Landscape - Planting Plan

Scale	Date	Drawn	Checked	Status
1:100 @A1	**18.10.24**	**EE**	**MR**	**Stage 4**

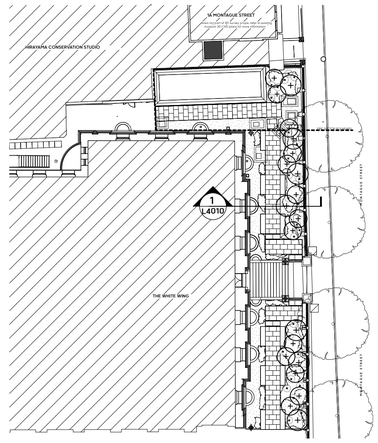
Drawing Number: **SW001-HCO-1145-B_01-DDG-L-2020** Revision: **-**



1 L4010 **Typical Section Elevation - Soils and Tree Planting**
1:20 @ A1

General Notes

Drawings to be read in conjunction with Architect's information and Specification.
This drawing is not for construction and should not be scaled.
All dimensions and setting out shall be verified on site.
Spot heights and contour levels are approximate only.
Any discrepancies must be reported to Hortus Collective.



Location Plan
Not to scale

Rev	Description	Date

Hortus Collective

 www.hortuscollective.co.uk

Project
British Museum, London - ECP: Incoming Substation (ISS)

Drawing
Landscape - Planting Detailed Section

Scale	Date	Drawn	Checked	Status
1:20 @A1	**18.10.24**	**EE**	**MR**	**Stage 4**

Drawing Number: **SW001-HCO-1145-B_01-DDG-L-4010** Revision: **-**

Appendix D – Calculations

Project:	Date: 28/05/2024		
	Designed by: cwhite	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Catchment Area	FSR: 100 years: +40 %: 15 mins: Summer	0.05	44.8	19.460

Project:	Date: 28/05/2024		
	Designed by: cwhite	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
PSW01	FSR: 100 years: +40 %: 120 mins: Winter	23.690	21.810	23.097	1.287	12.6	1.455	0.000	10.7	35.538	Surcharged
PSW03	FSR: 100 years: +40 %: 120 mins: Winter	24.350	21.720	23.097	1.377	10.7	1.557	0.000	8.2	32.829	Surcharged
PSW04	FSR: 100 years: +40 %: 120 mins: Winter	24.760	21.640	23.097	1.457	8.2	1.648	0.000	7.0	30.204	Surcharged
PSW05	FSR: 100 years: +40 %: 120 mins: Winter	24.970	21.590	23.097	1.507	7.0	1.704	0.000	5.8	26.800	Surcharged
PSW06	FSR: 100 years: +40 %: 120 mins: Winter	25.740	21.340	23.097	1.757	3.6	4.471	0.000	1.9	20.088	Surcharged
PSW07	FSR: 100 years: +40 %: 120 mins: Winter	25.850	21.310	21.331	0.021	1.9	0.023	0.000	1.9	20.040	OK
PSW10	FSR: 100 years: +40 %: 120 mins: Winter	25.950	21.250	21.270	0.020	1.9	0.000	0.000	1.9	20.040	OK
PSW11	FSR: 100 years: +40 %: 120 mins: Winter	25.690	21.390	23.097	1.707	5.8	4.344	0.000	3.6	22.318	Surcharged

Project:	Date: 28/05/2024		
	Designed by: cwhite	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PSW01	PSW03	23.690	22.186	0.421	18.036	1.0	0.19	43.8	OK
Pipe (1)	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PSW03	PSW04	24.350	22.186	0.450	15.052	0.8	0.18	42.1	Surcharged
Pipe (2)	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PSW04	PSW05	24.760	22.187	0.450	12.301	0.7	0.14	29.7	Surcharged
Pipe (4)	FSR: 100 years: +40 %: 120 mins: Winter	Pipe	PSW06	PSW07	25.740	23.097	0.023	20.064	0.6	0.01	1.9	Surcharged
Pipe (5)	FSR: 100 years: +40 %: 120 mins: Winter	Pipe	PSW07	PSW10	25.850	21.331	0.020	20.040	0.7	0	1.9	OK
Pipe (3)	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	PSW05	PSW11	24.970	22.187	0.450	8.832	0.8	0.05	13.0	Surcharged
Pipe (3) (1)	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	PSW11	PSW06	25.690	22.186	0.450	4.170	0.5	0.02	7.5	Surcharged

Prepared by	Cara Malcolm
Reviewed by	Paul Snape
Issued	December 2024

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