



KIRKLEES COUNCIL

HECKMONDWIKE BUS STATION

Drainage Strategy





KIRKLEES COUNCIL

HECKMONDWIKE BUS STATION

Drainage Strategy

ODS (REV 01) PUBLIC

PROJECT NO. 70097732

OUR REF. NO. TCF-WSP-XX-XX-RP-D-0001

DATE: JULY 2024

KIRKLEES COUNCIL

HECKMONDWIKE BUS STATION

Drainage Strategy

WSP

First Floor

3 Wellington Place

Leeds

LS1 4AP

Phone: +44 113 395 6200

WSP.com



QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	First Issue			
Date	July 2024			
Prepared by	D. Pantelakis			
Signature				
Checked by	D Leonard			
Signature				
Authorised by	S Grayson			
Signature				
Project number	70097732			
Report number	TCF-WSP-XX-XX-RP-0001			
File reference	TCF-WSP-XX-XX-RP-0001			

CONTENTS

1.	INTRODUCTION	3
1.1.	APPOINTMENT AND BRIEF	3
1.2.	OBJECTIVE OF STUDY	ERROR! BOOKMARK NOT DEFINED.
1.3.	CONSULTATION	3
1.4.	OVERVIEW	3
1.5.	EXISTING SURFACE WATER DISCHARGE REGIME	4
1.6.	PROPOSED SURFACE WATER DISCHARGE REGIME	5
1.7.	WATER QUALITY	9
1.8.	DRAINAGE MAINTENANCE AND MANAGEMENT STRATEGY	9
2.	CONCLUSIONS	11

APPENDICES

APPENDIX A

PROPOSED DEVELOPMENT PLAN

APPENDIX B

TOPOGRAPHICAL SURVEY

APPENDIX C

UTILITY SURVEY

APPENDIX D

WATER AUTHORITY ASSET RECORDS

APPENDIX E

CORRESPONDANCE

APPENDIX F

WSP DRAINAGE STRATEGY DRAWINGS

APPENDIX G

MODELLING RESULTS

1. DRAINAGE STRATEGY

1.1. INTRODUCTION

- 1.1.1. WSP has been commissioned by Kirklees Council to undertake this Drainage Strategy (DS) to accompany the planning application for the redevelopment of Heckmondwike Bus Station including a new concourse building with waiting room, changing places WC, driver offices, 6 No. bus stands, landscaping, and associated improvement works in the vicinity of the Bus Station (hereafter referred to as the 'Proposed Development' Appendix A) bounded to the east by Royle Fold, to the northwest by S George St, southwest by Northgate and to the south by A638 Westgate (hereafter referred to as the 'Site' Appendix B provides the topographical survey). The OS Grid Reference for the approximate centre of the Site is National Grid Reference 421510, 423542. This report relates solely to the above Site.
- 1.1.2. This report is intended for the sole benefit of the parties named above and shall not be capable of assignment. WSP shall not be liable for any use of the report for any reasons other than that for which the report was originally prepared and provided.
- 1.1.3. Although this report was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances, please note that WSP cannot take responsibility for errors in the information provided by third parties.
- 1.1.4. This report investigates drainage solution on Site and in the area and establishes the mitigation measures required to ensure the sustainability and safety of the Proposed Development over its lifetime.
- 1.1.5. The report has been produced in line with the requirements of the NPPF, Yorkshire Water (YW) and the Kirklees Council (KC) as the Lead Local Flood Authority (LLFA).

1.2. CONSULTATION

- 1.2.1. Consultation has been undertaken with Kirklees Council (KC), Lead Local Flood Authority and Yorkshire (YW).

Yorkshire Water have been consulted as part of the proposals and a search has been undertaken to identify any services (Appendix C) which are located within the vicinity of the Proposed Scheme. A number of Yorkshire Water assets (Appendix D) including combined water sewers been identified in close proximity to the Proposed Scheme.

As part of the consultation with YW it was confirmed that as the existing site currently drains to their asset subject to no increase in catchment and no requirement for additional connections to the system that they would be satisfied for the current drainage regime to continue.

1.3. OVERVIEW

- 1.3.1. It is essential for any scheme that surface water is managed effectively to limit the risk of surface water flooding off-site as well as on site which could be associated with an increase in run-off. As the proposed development will not increase impermeable area it is not expected to increase surface water flood risk.

- 1.3.2. The National Planning Policy Framework (NPPF) and Planning Policy Guidance (PPG) identify how new developments must take flood risks into account, including making an allowance for climate change impacts, and steer development to those areas at lowest risk.
- 1.3.3. The PPG sets out the requirement to consider Sustainable Drainage Systems (SuDS) within all new development where appropriate. It states that developments should aim to discharge surface water run off as high up the following hierarchy of drainage options as reasonably practicable:
- 1) Into the ground (infiltration);
 - 2) To a surface water body;
 - 3) To a surface water sewer. Highway drain, or another drainage system;
 - 4) To a combined sewer.

1.4. EXISTING SURFACE WATER DISCHARGE REGIME

- 1.4.1. The Site has been previously developed and is deemed to be brownfield land; therefore, the surface water discharge rate of the proposed development must not exceed the existing brownfield run-off rate. The total site area is approximately 0.362 ha. From the topographical survey data in Appendix B, this total area is deemed to be 89% impermeable which is fully positively drained.
- 1.4.2. Based on the site topography and sewer records, part of the surface water run-off currently discharges towards Royle Fold to the east and part of it to the S George Street to the west.
- 1.4.3. The existing site has been split into 3 separate catchment areas associated with each areas point of discharge. These catchment areas can be described as follows:

Catchment A: This area of S George Street currently incorporates road gullies to collect surface water and discharge into the combined sewer under S George Street.

Catchment B: This area includes the bus hub and Royle Fold which are drained through a drainage channel within the area of the hub and a combined kerb drainage system at the eastern kerb line, while both discharge into the combined sewer under Royle Fold.

Catchment C: This area includes the S George Street and Royle Fold southern impermeable zone, which is collected through road gullies and discharge into the existing combined sewers located under Northgate and Westgate.

Table 1-1 – Existing Impermeable Catchment Areas

Catchment	Impermeable Area
Catchment A	0.075
Catchment B	0.165
Catchment C	0.083
Total	0.323

- 1.4.4. It is also worth noting that as there are no engineering works taking place outside of the red line boundary and that there will be no alterations to the existing drainage system.

1.5. PROPOSED SURFACE WATER DISCHARGE REGIME

- 1.5.1. Proposed Development levels are intended to remain as close as possible to existing levels to avoid any change in the existing nature of run-off from the Site as shown in Appendix A12.
- 1.5.2. The proposed site has been split into 5 separate catchment areas associated with each area point of discharge and the form of the works being carried out in that area. The changes as described below allow for simplified drainage systems and clear understanding of who is responsible for the maintenance. These catchment areas can be described as follows:
- Catchment A: The proposed area of S George Street to be reconfigured to a new layout. This area will incorporate existing road gullies & proposed gullies where necessary to collect surface water and discharge into the combined sewer under S George Street as per previous regime.
- Catchment B1: This is the proposed remaining catchment of Royle Fold, which will incorporate a SuDs feature and an upgraded combined drainage kerb system to collect and discharge into the combined sewer under Royle Fold as per previous regime, with an aco channel to prevent highway run-off from entering the bus hub area.
- Catchment B2: This is the proposed bus hub area, which will incorporate a green roof for the bus hub building and a new drainage system to collect run-off that will be the responsibility of the bus operator to maintain this result results in an overall increase in catchment draining to Royle Fold through the reallocation of catchment from the Existing catchment A and C. These systems ultimately discharge to the same combined sewer in Regent Street though to reduce the risk of surface water flooding of the Royle Fold Combined sewer it is intended to balance the discharge rate and attenuate up to 1 in 100 storm event considering climate change and discharge into the combined sewer under Royle Fold as per previous regime.
- Catchment C: This is the proposed remaining catchment of S George Street and Royle Fold southern impermeable zone, which will be collected by the proposed SuDs features and road gullies before discharging into the existing combined sewers located under Northgate and Westgate as per previous regime.
- Catchment D: This is the proposed bin store area which will be collected through a yard gully and discharge into the S George Street.
- 1.5.3. Following completion of the proposed scheme the bus hub and associated drainage system will be owned and operated by the bus operator and the Kirklees Council highway authority will maintain the combined kerb drainage to the Royle Fold.

Table 1-2 – Proposed Impermeable Catchment Areas

Catchment	Impermeable Area
Catchment A	0.043
Catchment B1	0.068

Catchment B2	0.128
Catchment C	0.064
Catchment D	0.001
Total	0.304

- 1.5.4. Estimates of storage requirements have been determined via Microdrainage software. The calculations have incorporated a climate change allowance of 30% and the feasibility to match the existing discharge regime was examined in Table 1-3 below.

Table 1-3 – Catchment Areas Comparison

Discharge Point	Existing Catchment	Existing Impermeable Area	Proposed Catchment	Proposed Impermeable Area	Discharge Rate
S George Street	Catchment A	0.075	Catchment A	0.043	Note 1
			Catchment D	0.001	
Royle Fold	Catchment B	0.165	Catchment B1	0.068	Note 2
			Catchment B2	0.128	Note 3
Northgate & Westgate	Catchment C	0.083	Catchment C	0.064	Note 4

Note 1: Comparing the existing and proposed catchments there is a 40% reduction in the impermeable area draining to the existing outfalls.

Note 2: The proposed impermeable area that is discharging in Royle Fold for B1 will continue to drain the public highway as the existing regime did and it is proposed to maintain this as the existing connections will be utilised. Net increase to Royle Fold system to be dealt through B2 drainage system.

Note 3: The impermeable area shown as B2 incorporates a green roof which will ultimately reduce the surface water run-off and increase concentration time to the proposed drainage system. An existing discharge rate has been calculated using the modified rational method based on a 50mm/hr rainfall intensity and an impermeable area which is the remaining existing B catchment once catchment B1 has been subtracted (0.097ha) to provide a 13.5 l/s discharge rate.

Note 4: The existing regime will be maintained with a 23% reduction in catchment, due to the incorporation of the SuDs features that have been proposed within that area with the existing connections to be utilised.

- 1.5.5. The development represents an overall reduction in impermeable area of approximately 6% when considering the greenroof as fully impermeable.
- 1.5.6. The development also provides a total reduction in impermeable area with a free discharge of 31% with the remaining catchment area being attenuated to the 1 year discharge rate up to and including the 1 in 100 year plus climate change event.

- 1.5.7. In accordance with the PPG as stated in section 1.1 the scheme has considered the hierarchy of discharge options to determine that the most suitable outfall point and it has been identified that surface water would be disposed by utilising the existing combined sewer system.
- 1.5.8. According to the Phase 2 Geotechnical Interpretative Report the site and immediate surrounds have been developed for a variety of residential, commercial and industrial land uses. Made ground deposits are anticipated on site and contamination of ground and groundwater has been considered as a risk. As the risk of contaminated ground has not been discounted the design of any infiltration system will not be proposed for this scheme to reduce the pollution risk to water receptors.
- 1.5.9. As the nearest watercourse is River Spen which is located approximately 250m southwest of the site it has been considered as not practicable to discharge to watercourse.
- 1.5.10. There are no existing surface water drains in the proximity of the site which means it is not possible to connect the drainage into a surface water drain.
- 1.5.11. This only leaves discharging to combined sewer, Yorkshire Water has agreed for surface water run-off to continue to discharge to the combined sewers on the understanding that no additional impermeable area is to be connected to the system. As part of this Drainage Strategy, a Pre-Planning enquiry has been submitted to YW to ensure that the local sewer networks can accommodate the proposed discharges from the development. YW has raised no concerns in their response about the capacity of the existing system since the proposed scheme will continue to drain under the current regime and discharge into the local sewerage network. The proposed discharge rates for all areas have been agreed with Yorkshire Water.
- 1.5.12. The Proposed Development scheme is included in the Appendix A. In order to limit the rate of surface water runoff, the drainage system would incorporate below ground SuDS features to be used to store surface water runoff for storm events up to and including 1 in 100 year event plus 30% climate change.
- 1.5.13. The Proposed Development provides limited opportunities to add permeable areas to reduce the volume and rate of surface water of run-off as the proposed development will be used as a bus station with waiting and office areas.
- 1.5.14. Following the initial assessment of the required attenuation these volumes were used to carry out an assessment of the space available within the bus hub area to determine the feasibility of providing the required attenuation.
- 1.5.15. Attenuation requirements for each catchment area are summarised in Table 1-4 below.

Table 1-4 – Proposed Attenuation Requirements

Catchment	Attenuation Device	Area	Discharge Rate (Through Flow Control)	Attenuation Required 1 in 100 y +30%cc	Pipe Length/Plan Area Required
Catchment A	-	0.043	As per current regime	-	-
Catchment B1	-	0.068	As per current regime	-	-
Catchment B2	Oversized Twin 600Ø Pipes	0.128	13.5 l/s	14.2 m ³	25 m
Catchment C	-	0.064	As per current regime	-	-

Catchment D	-	0.001	As per current regime	-	-
-------------	---	-------	-----------------------	---	---

- 1.5.16. Using the information above it was possible to prepare a drainage layout for each catchment as can be seen on the Drainage Strategy Drawings in Appendix F.
- 1.5.17. The drainage layout is based on utilising a hydrobrake flow control with characteristics to match the discharge requirements, while the specification was selected based on the head and discharge rate to minimise flood risk.
- 1.5.18. Catchment A will utilise the existing combined sewer in S George Street, while surface water runoff will be captured through the existing and proposed gullies aligned to the new layout. The catchment represents a 40% reduction in the impermeable area and the existing connections are presented to be utilised as per the existing regime.
- 1.5.19. Catchment B1 will utilise the existing combined sewer in Royle Fold and has a proposed combined kerb drainage system located in the eastern kerb line to allow the surface water collection from the road crossfall. Furthermore, proposed drainage channels and road gullies will be aligned to the new layout in the western channel line with existing connections to be utilised as discharge points into the existing sewer. Soft landscape and SuDs feature has been incorporated into the proposed development to reduce runoff rates and volumes, allowing surface water to soak into the ground as well as providing a physical barrier between the upper impermeable area and adjacent footway.
- 1.5.20. Catchment B2 consists of a new drainage system of 25m with twin 600mm diameter pipe and a full retention separator to prevent hazardous chemicals and petroleum products from entering the public sewer downstream. A green roof will be installed in the bus hub building to provide a degree of retention, attenuation and treatment of rainwater while promoting evapotranspiration which will ultimately reduce the surface water runoff that will be conveyed into the drainage system. The surface water discharge rate will be controlled by a hydrobrake that will restrict flows to the designed and agreed rates.
- 1.5.21. Catchment C represents 23% reduction in catchment and existing gullies will be utilised to drain this area, while SuDs features have been incorporated to the public open space to receive surface water runoff from the northern hard surface and provide a physical barrier between the footway and the street.
- Catchment D will only capture surface water runoff from the bin store area a floor gully that will convey the water into a catchpit and then discharge unrestricted into the existing gully connection in S George Street. The impact of the bin's store impermeable area has been considered as minimal, due to the 40% reduction in catchment that presented in the Table 1-3.
- 1.5.22. The Catchment B2 for the bus hub proposed drainage system has then been modelled using Microdrainage software with the results in Table 1-5 below and detailed modelling results are included in Appendix G.

Table 1-5 – Proposed Discharge Rates

Catchment	1 year Peak Discharge Rate	30 year Peak Discharge Rate	100 year +30%cc Peak Discharge Rate
Catchment A	Due to the reduction in impermeable area the current regime will be utilised		

Catchment B1	Due to the reduction in impermeable area the current regime will be utilised		
Catchment B2	12.4 l/s	13.4 l/s	13.4 l/s
Catchment C	Due to the reduction in impermeable area the current regime will be utilised		
Catchment D	Due to the reduction in impermeable area the current regime will be utilised		

1.5.23. Opportunities for other forms of SuDs were considered for the Proposed Scheme and the following features have been incorporated in the design:

- **SuDs Features:** These bioretention systems would be utilised to receive surface water runoff from the hard surfaces and allow it to soak into the ground, which would eventually reduce runoff rates and volumes, and treat pollution through the use of engineered soils and vegetation.
- **Green Roof:** This living vegetation area will be installed on the top of the building for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff. The performance of green roofs in terms of reducing or preventing the runoff from normal rainfall events is usually very significant in the summer due to evapotranspiration processes and temporary storage provided by the roof. Although green roofs absorb most of the rainfall that they receive during frequent events, there will always be a need to discharge excess water to the building's drainage system.

1.5.24. The drainage collection system for this scheme will be design in accordance with the design manual for roads and bridges and where suitable longitudinal gradients cannot be achieved gullies will be replaced with linear channel drains and combined kerb drainage.

1.6. WATER QUALITY

1.6.1. Sustainable drainage design must ensure that the quality of any receiving water body is not adversely affected and preferably enhanced before it leaves the site.

1.6.2. The pollution hazard level from this type of roads is typically medium.

1.6.3. The bus hub drainage will incorporate roadside gullies and silt traps which will be a sufficient measure for pollution control from highways with the proposed carrier system passing through a full retention interceptor.

1.6.4. Other SuDS features will be incorporated within the designs to enhance water quality and biodiversity however, these will be limited due to the constrained nature and the available space of the site.

1.7. DRAINAGE MAINTENANCE AND MANAGEMENT STRATEGY

1.7.1. The Drainage Maintenance and Management Strategy (Table 1-6) has been produced by WSP and builds on information provided within the SUDS Manual; it is expected that the maintenance for the entire scheme will be under the management of Kirklees Council, in which a suitably qualified maintenance specialist will undertake the work.

Table 1-6 – Proposed Drainage Maintenance Strategy

Maintenance requirements for bioretention systems		
Maintenance Schedule	Required Action	Typical Frequency

Regular maintenance	Remove litter and surface debris and weeds	Quarterly
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

Maintenance requirements for green roofs

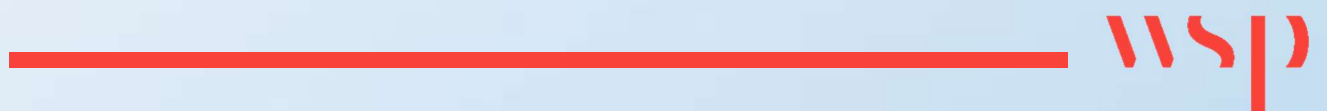
Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

2. CONCLUSIONS

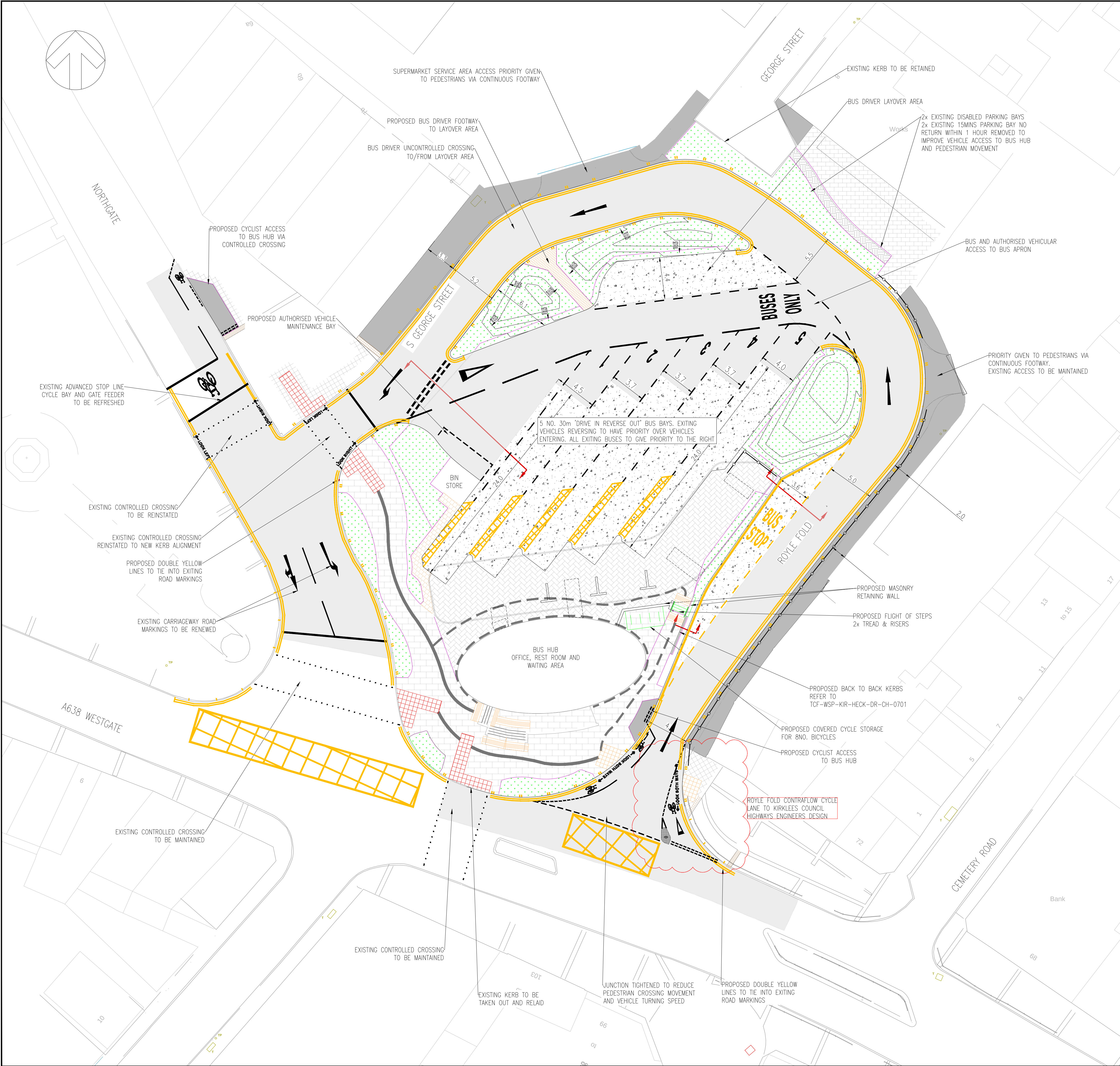
- 2.1.1. This Drainage Strategy has been prepared on behalf of Kirklees Council to support the planning application for the redevelopment of Heckmondwike bus station including a new concourse building with waiting, office areas and associated works.
- 2.1.2. The impermeable area of the proposed development represented with a 6% reduction of the proposed catchments, while further proposals have been explored to identify the scope of reducing the existing discharge rates to the sewerage system. For this purpose, the Site was divided in catchment areas which were used to identify the allowable discharge rates for the Proposed Development and improve the water quality.
- 2.1.3. In addition, the remaining Catchment A, B1, C and D will continue discharging to the existing sewerage without affecting the existing discharge rates, since the impermeable area will be reduced or remain as existing.
- 2.1.4. Through the analysis of the available area and Site restrictions has identified that the proposed impermeable area that is discharging to Royle Fold is presenting an increase cumulatively, however for B1 the exiting regime will be applied and existing connection to be utilised. Net increase to Royle Fold system will be dealt through B2 drainage system which will be restricted to 13.5 l/s through a flow control with an attenuation system to provide storage and a full retention separator to reduce any risks associated with the water quality.
- 2.1.5. The existing outfalls will be used as discharge points and ultimately discharge into the existing Yorkshire Water public combined sewerage networks in S George Road and Royle Fold.
- 2.1.6. The proposed surface water drainage strategy optimises the use of SuDS in line with best practice, national and local policy and has been developed in discussion with the relevant stakeholders. The Proposed Development is deemed to have a low overall flood risk and is not expected to have a detrimental impact on flood risk in the area.

Appendix A

PROPOSED DEVELOPMENT PLAN



File name: I:\UK\WSPGROUP\COMP\CENTRAL DATA\PROJECTS\7097XXX\7097732 - HECKMONDWIKE BS - RIBA403 WIP\CV CIVIL ENGINEERING\02 CAD-BIM MODEL\TCF-WSP-KIR-HECK-M2-C-0000.DWG, printed on 25 June 2024 13:37:32, by: C:\ppl\chris



KEY

- CARRIAGEWAY – ASPHALT CONSTRUCTION
- PROPOSED BUS BAYS – CONCRETE CONSTRUCTION
- FOOTWAY – ASPHALT CONSTRUCTION
- PROPOSED FOOTWAY – HAWKS VIEW FLAMED SANDSTONE DIAMOND SAWN 600x600mm PAVING UNIT
- PROPOSED FOOTWAY – HAWKS VIEW FLAMED SANDSTONE 200x100mm SETTS
- PROPOSED FOOTWAY – CONSERVATION SETTS 100x100mm
- PROPOSED FOOTWAY – CONSERVATION SETTS 100x100mm 3 COURSES
- UNCONTROLLED PEDESTRIAN CROSSING BUFF COLOURED BLISTER SURFACE FLAGS
- CONTROLLED PEDESTRIAN CROSSING RED COLOURED BLISTER SURFACE FLAGS
- FOOTWAY – RELAY EXISTING SETTS TO SUIT NEW LINE AND LEVELS
- PROPOSED SUDs RAIN GARDEN DETAILS TO DWG TCF-WSP-KIR-HECK-KH-BH-XXX-DR-LE-000003
- PROPOSED LANDSCAPING REFER TO DWG TCF-WSP-KH-BH-XXX-DR-LE-000001 TO TCF-WSP-KH-BH-XXX-DR-LE-000003
- PROPOSED LANDSCAPE BUNDS MAX. HEIGHT 0.5m WITH 1:3 SLOPE REFER TO DWG TCF-WSP-KIR-HECK-DR-CH-0800
- PROPOSED PEDESTRIAN GUARDRAIL TYPE WITH VISIBILITY PANEL
- PROPOSED PRECAST CONCRETE FLAGS
- PROPOSED BUFF COLOURED CORDUROY HAZARD WARNING SURFACE
- PROPOSED WAITING OF VEHICLES PROHIBITED AT ALL TIMES
- EXISTING LOADING AND UNLOADING OF VEHICLES RESTRICTIONS TRANSFERRED TO PROPOSED KERB ALIGNMENT
- SECTION MARKERS # REFER TO LETTERS FOR CROSS SECTION DETAILS REFER TO DWG TCF-WSP-KIR-HECK-DR-CH-0701
- PROPOSED TRAFFIC ISLAND AS SPECIFIED BY KIRKLEES COUNCIL HIGHWAYS ENGINEERS

HEALTH AND SAFETY SYMBOLS LEGEND

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

H&S GENERAL NOTES

- EXCAVATING EXISTING CARRIAGEWAY POTENTIAL FOR TAR TO BE PRESENT RISK OF DAMAGE TO HEALTH OR BODY, BOTH REVERSIBLE AND IRREVERSIBLE.
- WORKING ADJACENT PEDESTRIANS IN CLOSE PROXIMITY TO WORK SITE POTENTIAL FOR COLLISION WITH CONSTRUCTION WORKS
- WORKING ADJACENT THE LIVE CARRIAGEWAY POTENTIAL FOR COLLISION WITH MOVING VEHICLES RESULTING IN RISK OF DEATH OR INJURY
- WORKING IN VICINITY OF EXISTING AND PROPOSED UTILITIES. LOCATION OF UTILITIES TO BE INVESTIGATED BY CONTRACTOR ON-SITE PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR TO REFER TO EXISTING UTILITIES DRAWING TCF-WSP-KIR-HECK-DR-UT-0001
- EXCAVATING IN VICINITY OF EXISTING MADE/ CONTAMINATED LAND POTENTIAL FOR HAZARDOUS MATERIAL TO BE PRESENT RISK OF DAMAGE TO HEALTH OR BODY, BOTH REVERSIBLE AND IRREVERSIBLE.
- EXCAVATING IN VICINITY OF OLD CELLAR WALLS POTENTIAL FOR OBSTRUCTION AND/OR COLLAPSE AND FOR HAZARDOUS MATERIAL TO BE PRESENT RESULTING IN RISK OF DEATH OR INJURY FROM MANUAL HANDLING
- KERBING & FOOTWAY WORKS WILL REQUIRE MECHANICAL LIFTING AIDS FOR ITEMS HEAVIER THAN 20kgs. IF MECHANICAL LIFTING AIDS ARE IMPRACTICAL A RISK ASSESSMENT SHOULD BE UNDERTAKEN TO AVOID RISK OF INJURY FROM MANUAL HANDLING

DO NOT SCALE

NOTES

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELATED DOCUMENTATION AND STANDARD DETAILS.
- THE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE DOT MCDHW, DMRB AND THE LOCAL REQUIREMENTS OF KIRKLEES COUNCIL.
- CONFLICTING INFORMATION SHOWN ON THE ENGINEER'S DRAWINGS OR DISCREPANCIES BETWEEN THE INFORMATION GIVEN BY THE ENGINEER AND THAT PROVIDED BY OTHERS MUST BE REFERRED TO THE ENGINEER BEFORE THE WORKS COMMENCE.
- THE CONTRACTOR SHALL USE SETTING OUT COORDINATES AND DIMENSIONS PROVIDED WHICH TAKE PREFERENCE OVER ANY LESS ACCURATE SCALED DIMENSIONS.
- TEMPORARY WORKS DESIGN ASSOCIATED WITH THE CONSTRUCTION OF THE WORKS SHALL BE RESPONSIBILITY OF THE CONTRACTOR.
- ALL WORKS AND PROGRAMMING SHALL BE AGREED IN ADVANCE WITH THE OVERSEEING ORGANISATION AND THE CLIENT.
- THE CONTRACTOR SHALL MAINTAIN FREE AND OPEN ACCESS TO THE PUBLIC HIGHWAY AND ADJACENT LANDS AND PROPERTIES AT ALL TIME UNLESS OTHERWISE AGREED IN WRITING WITH THE INTERESTED PARTIES.
- PRIOR TO THE START OF THE WORKS THE CONTRACTOR SHALL AGREE A REGIME OF FORMATION TESTING WITH THE ADOPTING AUTHORITY. THE FINDINGS OF SUCH TESTING (FOR EXAMPLE CBR READINGS) SHALL BE AGREED WITH THE ADOPTING AUTHORITY AND THE CAPPING / SUB BASE DESIGN REVIEWED ACCORDINGLY.
- FOR DETAILS ON BUS HUB PROPOSALS REFER TO THE ARCHITECTS DRAWINGS AND SPECIFICATION.
- FOR STEP DETAILS REFER TO DWG TCF-WSP-KIR-HECK-DR-CH-1100 TO TCF-WSP-KIR-HECK-DR-CH-1101
- FOR SOFT LANDSCAPING REFER TO DWG TCF-WSP-KH-BH-XXX-DR-LE-000001 TO TCF-WSP-KH-BH-XXX-DR-LE-000003

UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES OR STATUTORY BODIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR AND / OR EMPLOYER COMMENCE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK

REV	DATE	BY	DESCRIPTION	CHK	APP
P03	25/06/2024	CC	DRAWING UPDATED IN LINE WITH KIRKLEES COUNCIL TECHNICAL REVIEW	SG	SG
P02	09/01/2024	CC	AMENDED AFTER TRO COMMENTS	SG	DB
P01	23/06/2023	CC	FIRST ISSUE	SG	DB

DRAWING STATUS: S2 - FOR INFORMATION

CLIENT: KIRKLEES COUNCIL

ARCHITECT: SGP

SITE/PROJECT: HECKMONDWIKE BUS STATION RIBA 4

TITLE: GENERAL ARRANGEMENT

SCALE @ A1:	CHECKED:	APPROVED:
1:200	SG	DB

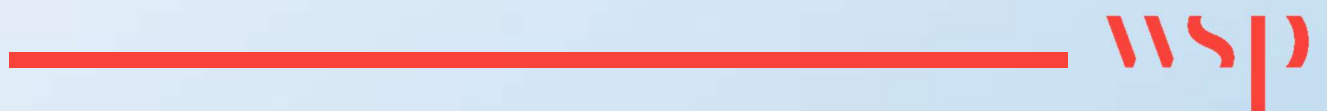
PROJECT NO:	DESIGNED:	DRAWN:	DATE:
70097732	CC	BT	July 23

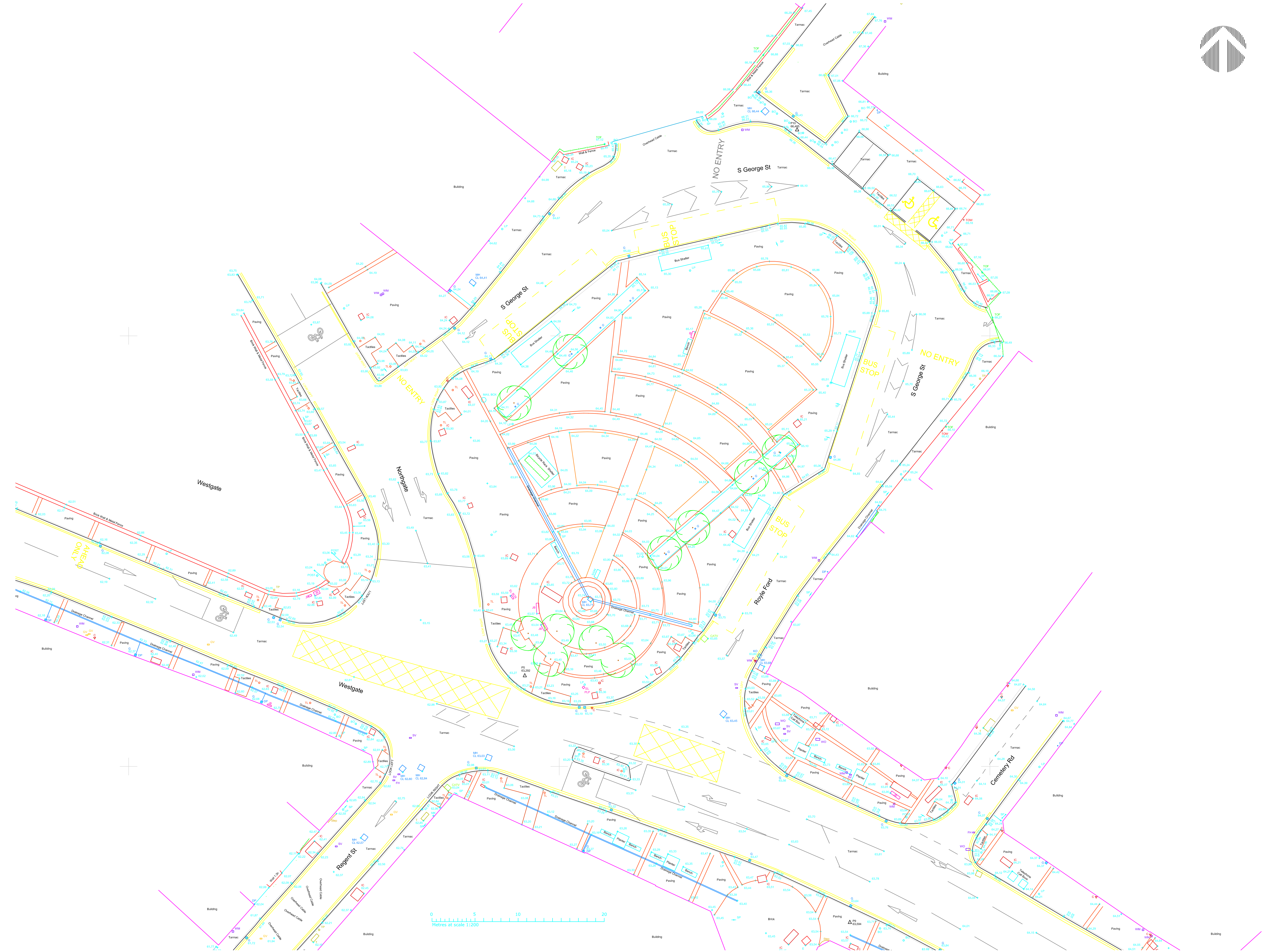
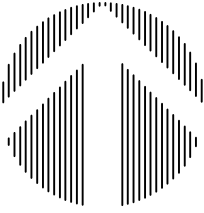
DRAWING NO:	REV:
TCF-WSP-KIR-HECK-M2-C-0000	P03

© WSP UK Ltd

Appendix B

TOPOGRAPHICAL SURVEY





Topographic Key			
AV	Air Valve	V	Vent
BH	Borehole	WL	Water Level
BIN	Bus Stop	WM	Water Meter
OSBM	Benchmark	WO	Wash Out
BO	Bollard	WV	Water Valve
MAIL	Postbox		
BUS	Bus Stop		
CCTV	Camera		
C	Cable Supply		
Col	Column		
G	Gully		
EL	Electric Point		
EP	Electric Pole		
ER	Earth Rod		
FH	Fire Hydrant		
FFL	Floor Level		
FP	Flag Pole		
FV	Flap Valve		
GP	Gate Post		
GV	Gas Valve		
IL	Invert Level		
LIGHT	Floor Light		
LP	Lamp Post		
MH	Manhole		
MK	Marker		
RE	Rodding Eye		
RWP	Rain Water		
Pipe	Pipe		
SC	Stop Tap		
SP	Sign		
SV	Stop Valve		
SVP	Soil Vent Pipe		
TAP	Tap		
TOW	Top of Wall		
TEL	Telecom Cover		
THL	Threshold Level		
TL	Traffic Light		
UTL	Telegraph Pole		
	Unable To Lift		

General

This survey has been carried out in accordance with RICS accuracy band F, as described in RICS guidance note buildings and utilities (3rd Ed.)

Drawing units are meters, quoted units are metres.

Grid ticks should be used to check for plotting distortions.

Details or services hidden or obscured by vegetation, debris or vehicles at survey dates may be omitted. Hedge & Vegetation details are outline.

Any assumed details are shown in DASHDOT linetype

Control & Datum Information

All levels shown on this drawing are related to Ordnance Survey Datum by means of multiple network GNSS observations taken at Station P1.

The grid shown on this survey is based on Ordnance Survey Grid (OSGB36) using OSTN15. These coordinates have been derived from multiple network GNSS observations taken at Station P1.

All other stations are related to this in plane projection and Grid North orientation is from P2 (i.e. one point localisation with a scale factor equal to 1).



...\\Wireless TCF 3rd\USB work\Heckmondwike 2020\Wireless Council Logo.jpg



33 Park Place
Leeds
LS1 2RY
T: +44 (0)113 246 7969
www.stephengeorge.co.uk

HECKMONDWIKE BUS HUB

Drawing Name:
TOPOGRAPHICAL SURVEY

Drawing Stage: **INFORMATION**

Suitability: **S2 - Information**

SGP File Ref: 020001

20-233-003 23.12.2020 AB LEEDS 1:200 @A1 P2

SGP Project No: Date: Drawn: Team: Scale: Rev:

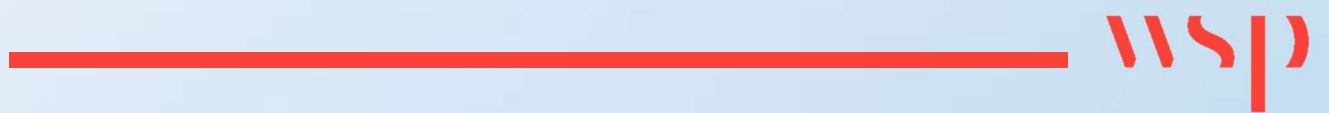
Drawing Number:

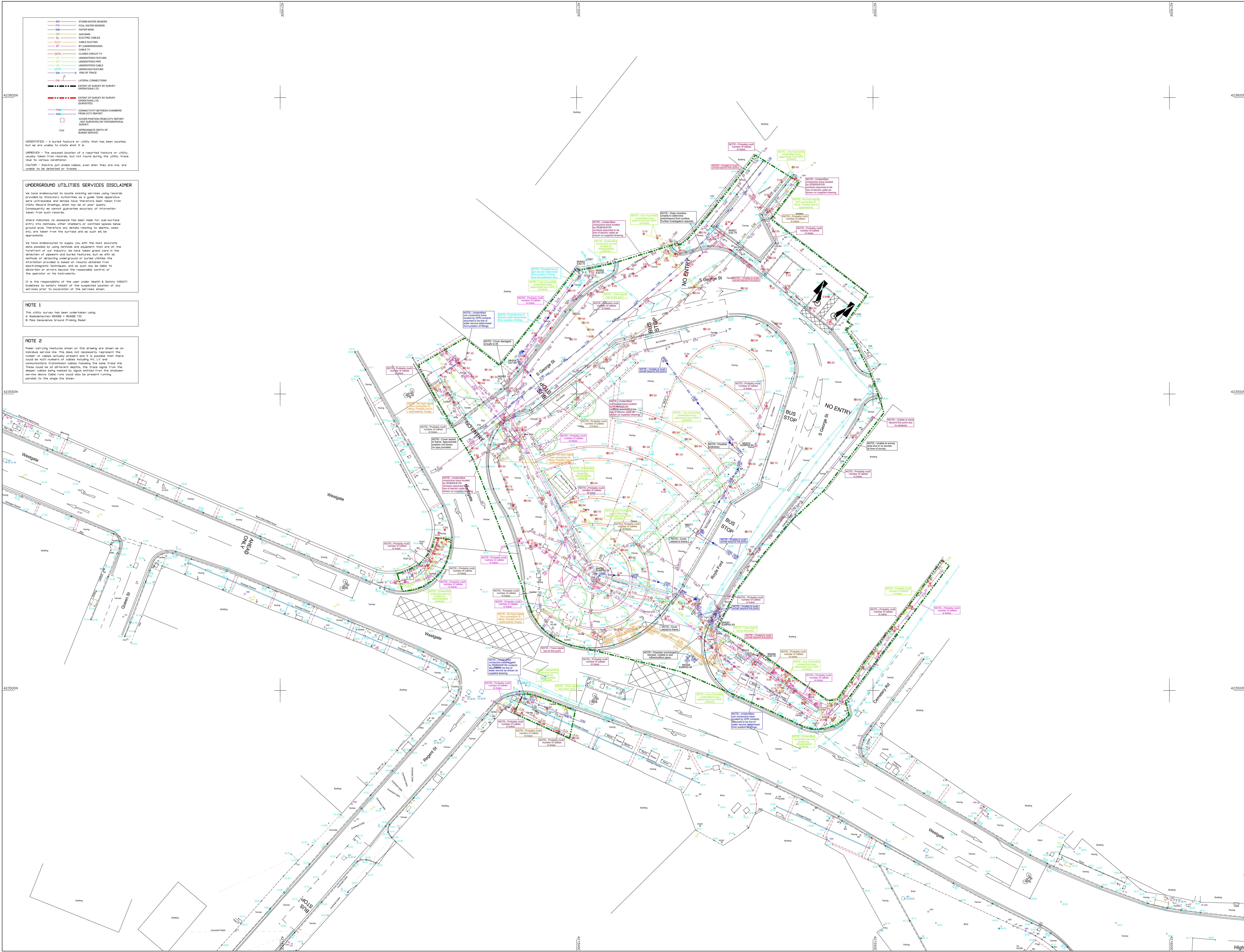
20233-03- SGP-HEK-00-DR-A-020001

Project Code Originator Zone Level Type Role Number

Appendix C

UTILITY SURVEY





© Survey Operations Limited 2021
Reproduction in whole or in part by any means is prohibited without the prior permission of Survey Operations Limited.

Note:
All levels relate to Existing Site Datum.
Orientation to Existing Site Grid.

Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

Drainage information must be verified with local authority records before use

Utility survey added to topographical survey (GR19473-20T-Preliminary-Section E) supplied by client.

EL UNPROVEN ELEC
ST UNPROVEN ST
GW UNPROVEN GAS
WM UNPROVEN WATER
SW UNPROVEN SURFACE
FW UNPROVEN FOUL

All unproven lines without additional notes on drawing show the approximate location of a reported utility or feature as indicated on available stat records.

Survey OPERATIONS

Smith Street, Sharncliffe, Lincs. WN8 5LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@surveys.co.uk - www.surveys.co.uk

Client
Kirklees Metropolitan Council

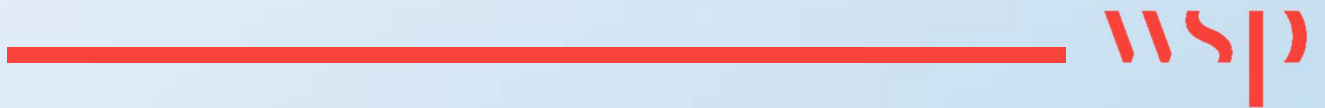
Drawing Title
Utility Survey of Land at:
Heckmondwike Bus Point
Heckmondwike

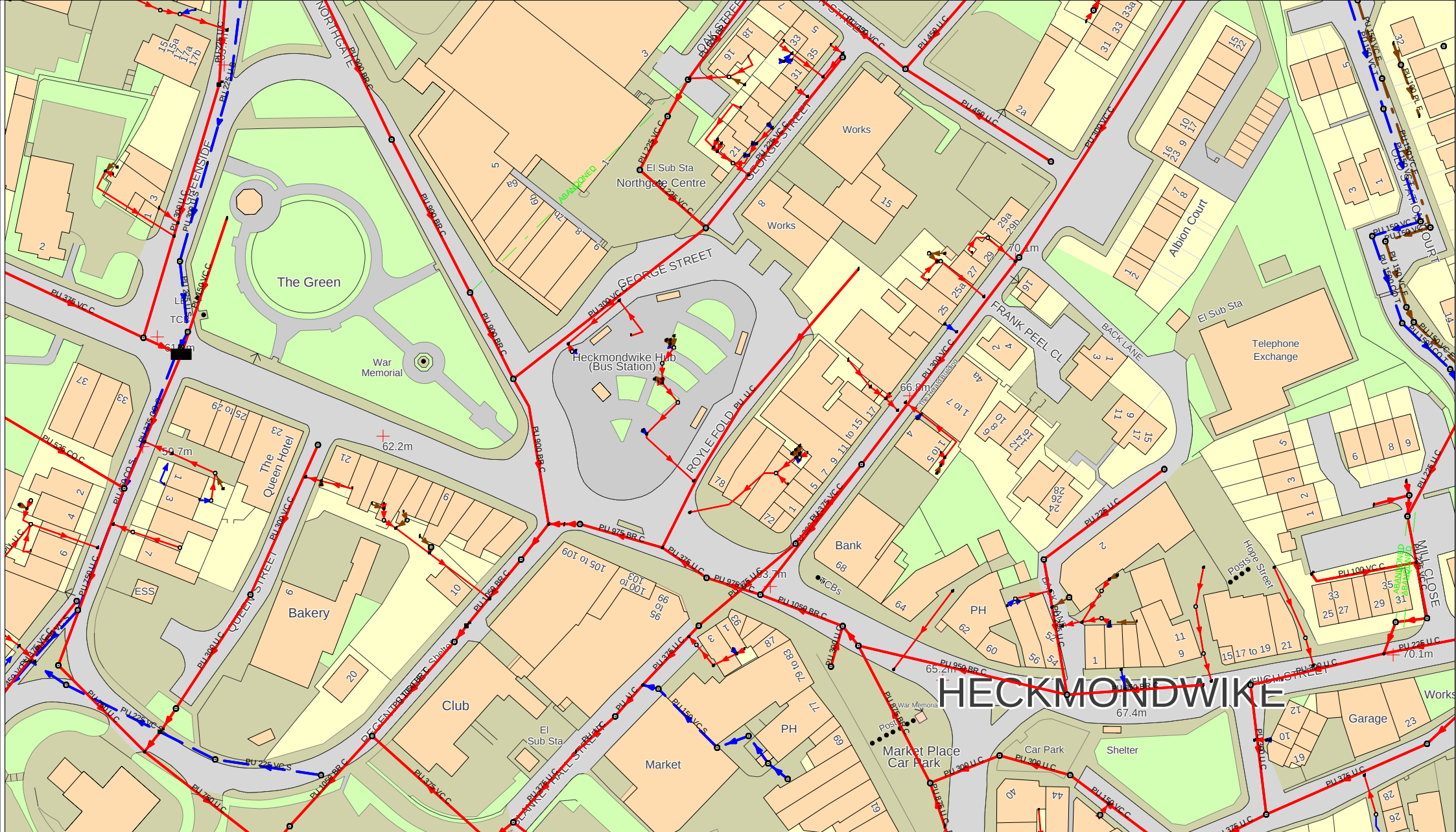
Scale(s)	1:200	Surveyor	SC
Date	DEC 21	Drawn	IT
Job Number	21J119	Checked	SO

Sheet Size & Drg Number & Revision
A0 21J119/001

Appendix D

WATER AUTHORITY ASSET RECORDS





HECKMONDWIKE

421430 : 423471

Map Name : SE2123SW

Title

Partial Key

This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.



Yorkshire Water,
PO Box 500,
Halifax Road,
Bradford BD6 2LZ
Contact Name :
C Cooke
Contact Tel :

Notes

(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432

Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

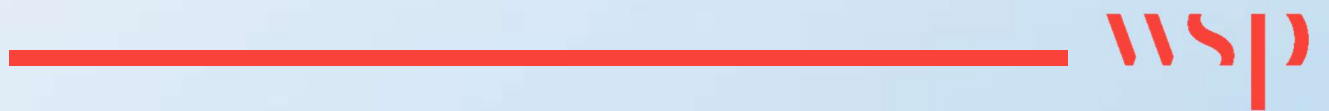
Date Req : 09/09/2021, 14:54:32

Date Gen : 09/09/2021, 14:54:34

Source : Sewer Network Enquiry

Appendix E

CORRESPONDANCE



Cooper, Chris

From: Grayson, Stuart
Sent: 16 January 2024 14:44
To: Pantelakis, Dimitrios; Cooper, Chris
Cc: Bowker, Dave
Subject: FW: Heckmondwike Bus Hub, Heckmondwike, WF16 0HR - Pre-planning Enquiry V213034

Categories: Completed



Stuart Grayson

Associate Director – Development Infrastructure

T+ 44 (0)113 395 6639

Confidential

This message, including any document or file attached, is intended only for the addressee and may contain privileged and/or confidential information. Any other person is strictly prohibited from reading, using, disclosing or copying this message. If you have received this message in error, please notify the sender and delete the message. Thank you. WSP UK Limited, a limited company registered in England & Wales with registered number 01383511. Registered office: WSP House, 70 Chancery Lane, London, WC2A 1AF.

From: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Sent: Tuesday, January 16, 2024 10:04 AM
To: Grayson, Stuart <stuart.grayson@wsp.com>
Subject: RE: Heckmondwike Bus Hub, Heckmondwike, WF16 0HR - Pre-planning Enquiry V213034

Dear Mr Stuart,

Thank you for the additional information.

The proposed drainage is acceptable as per Technical Note TCF-WSP-KIR-TN-CH-0001 dated 01/12/23.

Kind Regards



Chris Roberts

Pre-Development Technician

Developer Services

Tel: 0345 1 20 84 82

*******Please note we have 10 working days to respond to email enquiries*******

Did I WOW you today?

If you were happy with your service, please nominate me for a WOW! Award.



[CLICK HERE](#)

Let's keep our conversation going

We'd love to hear about your experience with Developer Services.



Would you mind taking 5 minutes to give us some feedback?

[CLICK HERE](#)

From: Grayson, Stuart <stuart.grayson@wsp.com>

Sent: 02 January 2024 10:31

To: Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>

Subject: Heckmondwike Bus Hub, Heckmondwike, WF16 0HR - Pre-planning Enquiry V213034

WARNING - EXTERNAL SOURCE

This email has been sent from an account outside of the Kelda Group network and could be a phishing email.

Please **THINK** before clicking links or opening any attachments.

If you suspect that this email is suspicious please report it to the Cyber Security Team using the "Report Message" button.

Hi,

With regards to the Pre-Planning Enquiry mentioned above please find attached a technical note and catchment drawings to demonstrate how the discharge rate has been calculated.

regards



Stuart Grayson

Associate – Development Infrastructure

T+ 44 (0)113 395 6639

Confidential

This message, including any document or file attached, is intended only for the addressee and may contain privileged and/or confidential information. Any other person is strictly prohibited from reading, using, disclosing or copying this message. If you have received this message in error, please notify the sender and delete the message. Thank you. WSP UK Limited, a limited company registered in England & Wales with registered number 01383511. Registered office: WSP House, 70 Chancery Lane, London, WC2A 1AF.

NOTICE: This communication and any attachments ("this message") may contain information which is privileged, confidential, proprietary or otherwise subject to restricted disclosure under applicable law. This message is for the sole use of the intended recipient(s). Any unauthorized use, disclosure, viewing, copying, alteration, dissemination or distribution of, or reliance on, this message is strictly prohibited. If you have received this message in error, or you are not an authorized or intended recipient, please notify the sender immediately by replying to this message, delete this message and all copies from your e-mail system and destroy any printed copies.

-LAEmHhHzdJzBITWfa4Hgs7pbKI

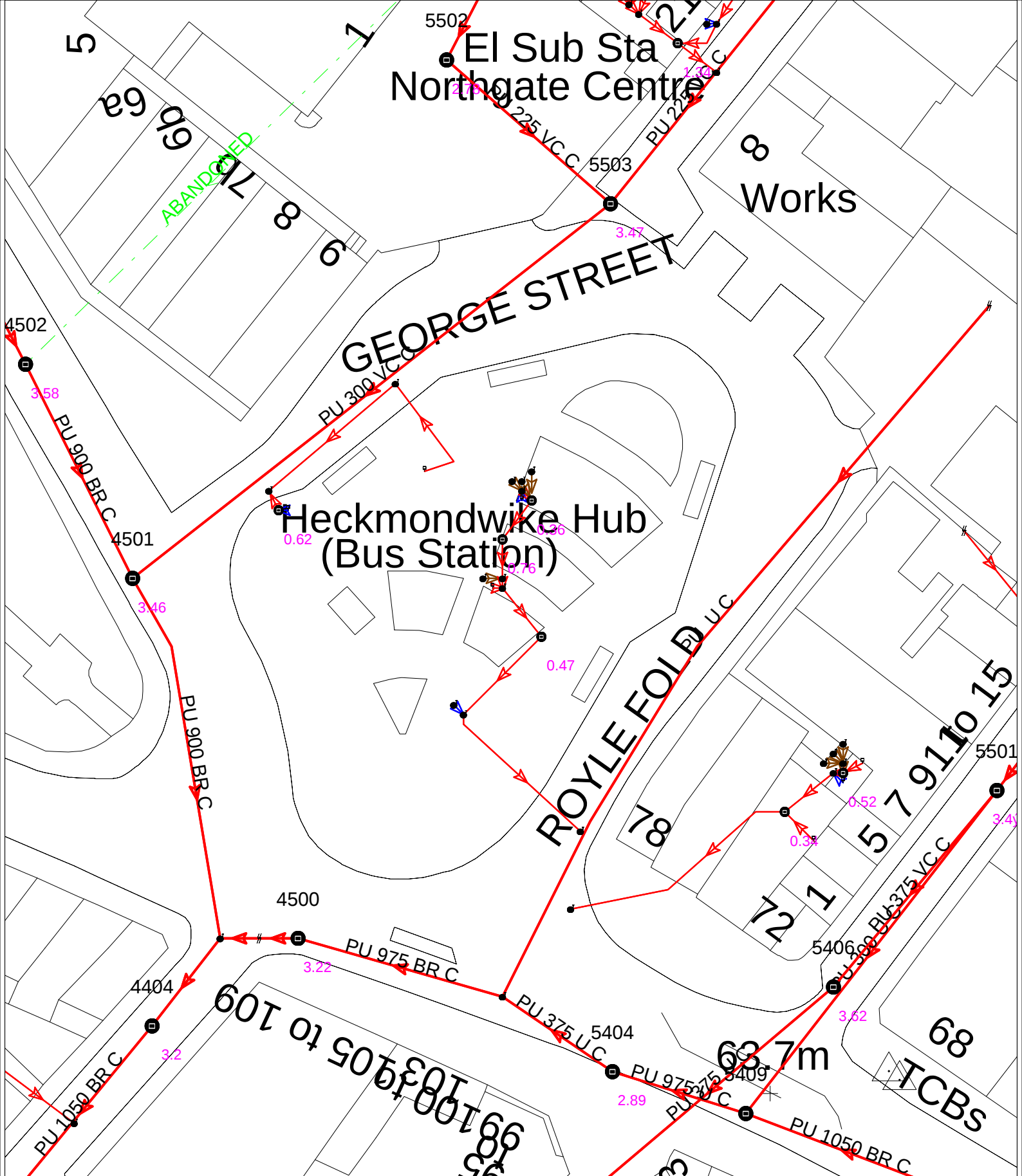
Want to know a bit more about Yorkshire Water? Our website is full of useful info, from how to apply for a water meter to planning your next walk at one of our beautiful reservoirs - it's all at yorkshirewater.com

Need to talk to us? For the best way to get in touch with us, go to yorkshirewater.com/contact

Now the legal stuff! The information and any files sent as part of this email are confidential, possibly legally privileged and for the addressee's attention only. If you've wrongly received this email, please reply to it to let the sender know and delete it from your computer. Just to confirm, this email isn't a binding offer, acceptance, amendment, waiver or any agreement or obligation – unless this is clearly stated in the email.

We need to let you know that the content is subject to the legal notice at yorkshirewater.com/about-us/our-policies/privacy-policy. Any disclosure, copying, distribution or action taken based on its contents, is prohibited and may be unlawful.

Yorkshire Water Services Limited
Registered Office Western House, Halifax Road, Bradford, BD6 2SZ
Registered in England and Wales No 2366682



421486 : 423504		Map Name : SE2123SW		Title	
 Yorkshire Water Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel 87 2582 (Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432		Notes			
		Partial Key		This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.	
		Foul Sewer = F			
		Combined Sewer = C			
		Surface Water Sewer = SW			
		Trade Sewer = TD			
		Partially Separate = PS			
Date Req : 31/08/2023, 12:49:59		Date Gen : 31/08/2023, 12:51:03			
Source :		Sewer Network Enquiry			

Mr R Hammond
Kirklees Council
Civic Centre
3 Market Street
Huddersfield
HD1 9EL
roger.hammond@kirklees.gov.uk

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482

Your Ref:
Our Ref: Z004288

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

31st August 2023

Dear Mr Hammond,

Heckmondwike Bus Hub, Heckmondwike, WF16 0HR – Pre-planning Enquiry V213034

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Existing Infrastructure

There is a 300 mm diameter public combined water sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 3 (three) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

On the Statutory Sewer Map, there is an unknown diameter public combined sewer recorded in Royle Fold. It is essential that the presence of this infrastructure is taken into account in the design of the scheme.

There is a 150 mm diameter public combined sewer recorded on the site. In this instance, building-over may take place under the control of Part H4 Building Regulations 2010. No trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

Foul Water

The proposed foul discharge is very high and will require evidence of how it was calculated before it would be agreed.

Foul water from kitchens and/or food preparation areas of any restaurants and/or canteens etc. must pass through a fat and grease trap of adequate design before any discharge to the public sewer network.

Surface Water

Curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site.

Surface water run-off from communal parking (greater than 800 sq metres or more than 50 car parking spaces) and hardstanding must pass through an oil, petrol and grit interceptor/separator of adequate design before any discharge to the public sewer network. Roof water should not pass through the traditional 'stage' or full retention type of interceptor/separator. It is good drainage practice for any interceptor/separator to be located upstream of any on-site balancing, storage or other means of flow attenuation that may be required.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website - <https://www.yorkshirewater.com/developers/sewerage/sewerage-connections/>

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

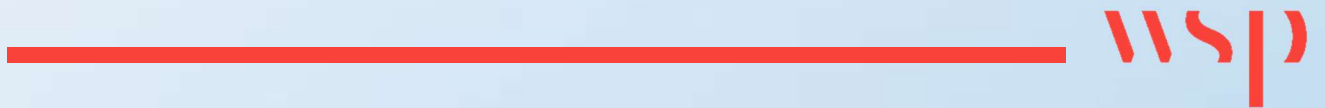
Chris Roberts
Development Services Technician



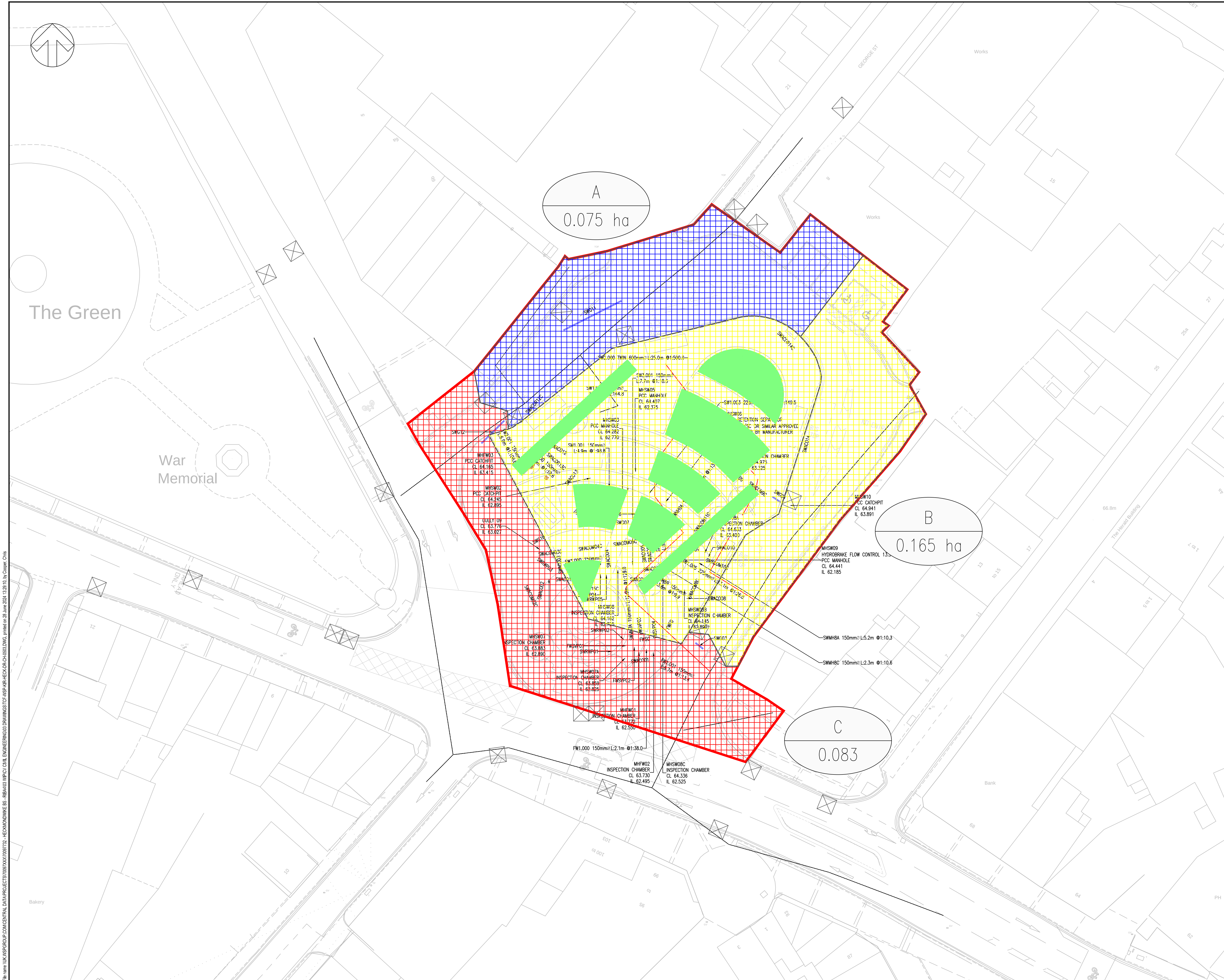
YorkshireWater

Appendix F

WSP DRAINAGE STRATEGY DRAWINGS



File name: \\UK.WSPGROUP.COM\CENTRAL DATA\PROJECTS\70097732\000\000\00732 - HECKMOND WKE SS - RIBA\03 MPICV CIVIL ENGINEERING\03 DRAWINGS\TCF-NSP-MR-HECK-DR-CH-0503.DWG, printed on 28 June 2024 13:29:10, by Cooper, Chris



DO NOT SCALE

KEY

EXISTING GULLY

CATCHMENT AREAS

EXISTING LANDSCAPING

COLOUR KEY

CATCHMENT	CATCHMENT AREA	
	m ²	HA
A	745.22	0.075
B	1653.00	0.165
C	829.04	0.083

THIS PROVISIONAL PRELIMINARY DESIGN IS FOR GUIDANCE PURPOSES ONLY. WSP ACCEPTS NO LIABILITY FOR ANY DAMAGE, LOSS, EXPENSES OR COST INCURRED AS A RESULT OF RELYING ON THE INFORMATION PROVIDED IN THE DESIGN APPRAISAL ESTIMATE. THE APPRAISAL ESTIMATE WAS DERIVED FROM A MIXTURE OF THIRD PARTY INFORMATION AND THE APPLICATION OF WSP'S REASONABLE SKILL AND CARE, BUT MAY BE SUBJECT TO OTHER SUCH INFORMATION AND VARIATIONS OF WHICH WSP IS UNAWARE. THE DESIGN APPRAISAL ESTIMATE SHOULD NOT BE RELIED UPON FOR TENDER OR PROCUREMENT PURPOSES. FOR ACCURATE ADVICE A DETAILED DESIGN SHOULD BE CARRIED OUT AT THE APPROPRIATE DESIGN STAGE, THEREFORE, USE OF THE INFORMATION IS ENTIRELY AT YOUR OWN RISK.

P01	08/12/2023	CC	FIRST ISSUE	SG	DB
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS:

S0 - WORK IN PROGRESS

wsp

3 Wellington Place, Leeds, LS1 4AP, UK
T+ 44 (0) 113 395 6200, F+ 44 (0) 113 395 6201
wsp.com

CLIENT:

KIRKLEES COUNCIL

ARCHITECT:

SGP

SITE/PROJECT:

HECKMOND WKE BUS STATION
RIBA 4

TITLE:

EXISTING DRAINAGE
CATCHMENTS

SCALE @ A1:	CHECKED:	APPROVED:		
1:250	DB	SG		
PROJECT NO:	DESIGNED:	DRAWN:	DATE:	
70097732	CC	CC	December 23	
DRAWING NO:				REV:
TCF-WSP-KIR-HECK-DR-CH-0503				P01

© WSP UK Ltd

File name: \\UK-WSPGROUP\COMMON\DATA\PROJECTS\70097732-HECKMONDWIKE\SS-RIBA\03-WP\PCV-CIVIL\ENGINEERING\03-DRAWINGS\TCF-INSP-MR-HECK-DR-CH-050A.DWG, printed on 28 June 2024 13:21:19, by Cooper, Chris



DO NOT SCALE

KEY

EXISTING GULLY

CATCHMENT AREAS

EXISTING LANDSCAPING

COLOUR KEY

	CATCHMENT	CATCHMENT AREA	
		m ²	HA
	A	430.91	0.043
	B1	683.48	0.068
	B2	1275.42	0.128
	C	640.36	0.064
	D	14.18	0.001

THIS PROVISIONAL PRELIMINARY DESIGN IS FOR GUIDANCE PURPOSES ONLY. WSP ACCEPTS NO LIABILITY FOR ANY DAMAGE, LOSS, EXPENSES OR COST INCURRED AS A RESULT OF RELYING ON THE INFORMATION PROVIDED IN THE DESIGN APPRAISAL ESTIMATE. THE APPRAISAL ESTIMATE WAS DERIVED FROM A MIXTURE OF THIRD PARTY INFORMATION AND THE APPLICATION OF WSP'S REASONABLE SKILL AND CARE, BUT MAY BE SUBJECT TO OTHER SUCH INFORMATION AND VARIATIONS OF WHICH WSP IS UNAWARE. THE DESIGN APPRAISAL ESTIMATE SHOULD NOT BE RELIED UPON FOR TENDER OR PROCUREMENT PURPOSES. FOR ACCURATE ADVICE A DETAILED DESIGN SHOULD BE CARRIED OUT AT THE APPROPRIATE DESIGN STAGE, THEREFORE, USE OF THE INFORMATION IS ENTIRELY AT YOUR OWN RISK.

P02	10/05/2024	DP	IMPERMEABLE AREAS REVISED	SG	DB
P01	08/12/2023	CC	FIRST ISSUE	SG	DB
REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: S0 - WORK IN PROGRESS

wsp

3 Wellington Place, Leeds, LS1 4AP, UK
T+ 44 (0) 113 395 6200, F+ 44 (0) 113 395 6201
wsp.com

CLIENT: KIRKLEES COUNCIL

ARCHITECT: SGP

SITE/PROJECT: HECKMONDWIKE BUS STATION
RIBA 4

TITLE: PROPOSED DRAINAGE
CATCHMENTS

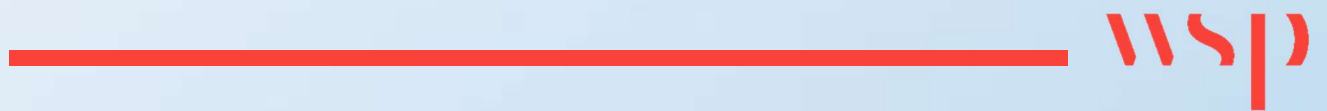
SCALE @ A1: 1:250	CHECKED: DB	APPROVED: SG
PROJECT NO: 70097732	DESIGNED: CC	DRAWN: CC DATE: May 24

DRAWING NO: TCF-WSP-KIR-HECK-DR-CH-0504	REV: P02
---	----------

© WSP UK Ltd

Appendix G

MODELLING RESULTS



WSP Group Ltd			Page 4		
Date 24/06/2024 18:44			Designed by UKDXP051		
File SW.MDX			Checked by		
XP Solutions			Network 2019.1		
Online Controls for Storm Hydro-Brake® Optimum Manhole: 9, DS/PN: 1.005, Volume (m³): 3.0 Unit Reference MD-SHE-0164-1350-1200-1350 Design Head (m)1.200 Design Flow (l/s)13.5 Flush-Flo™Calculated ObjectiveMinimise upstream storage ApplicationSurface Sump AvailableYes Diameter (mm)164 Invert Level (m)62.215 Minimum Outlet Pipe Diameter (mm)225 Suggested Manhole Diameter (mm)1500 Control Points Head (m) Flow (l/s) Design Point (Calculated)1.20013.5 Flush-Flo™0.36013.5 Control Points Head (m) Flow (l/s) Kick-Flo®0.79611.1 Mean Flow over Head Range-11.6 The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated Depth (m) Flow (l/s) 0.1005.9 0.20012.7 0.30013.4 0.40013.5 0.50013.3 0.60012.9 0.80011.2 1.00012.4 Depth (m) Flow (l/s) 1.20013.5 1.40014.5 1.60015.5 1.80016.4 2.00017.2 2.20018.0 2.40018.8 2.60019.5 Depth (m) Flow (l/s) 3.00020.9 3.50022.5 4.00024.0 4.50025.4 5.00026.7 5.50027.9 6.00029.1 6.50030.3 Depth (m) Flow (l/s) 7.00031.4 7.50032.4 8.00033.5 8.50034.5 9.00035.4 9.50036.4 Time Area Diagram for Green Roof at Pipe Number 3.001 (Storm) Area (m³) 180 Evaporation (mm/day) 3 Depression Storage (mm) 5 Decay Coefficient 0.050 Time (mins) Area From: To: (ha) 040.003271 480.002678 8120.002193 12160.001795 16200.001470 20240.001203 24280.000985 Time (mins) Area From: To: (ha) 28320.000807 32360.000660 36400.000541 40440.000443 44480.000362 48520.000297 52560.000243 Time (mins) Area From: To: (ha) 56600.000199 60640.000163 64680.000133 68720.000109 72760.000089 76800.000073 80840.000060 Time (mins) Area From: To: (ha) 84880.000049 88920.000040 92960.000033 961000.000027 1001040.000022 1041080.000018 1081120.000015 ©1982-2019 Innovyze					

Time Area Diagram for Green Roof at Pipe Number 3.001 (Storm)

Time (mins)			Area			Time (mins)			Area			Time (mins)			Area		
From:	To:		From:	To:	(ha)	From:	To:		From:	To:	(ha)	From:	To:		From:	To:	(ha)
112	116		0.000012	116	120	0.000010											

•

•

•

Date 24/06/2024 18:44

File SW.MDX

XP Solutions

Designed by UKDXP051

Checked by

Network 2019.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Flow (l/s)		
1.001	2	-0.088	0.000	0.35		4.9	OK	
1.002	3	-0.127	0.000	0.39		10.6	OK	
2.000	4	-0.564	0.000	0.00		0.3	OK	
1.003	5	-0.137	0.000	0.32		9.6	OK	
1.004	6	-0.111	0.000	0.29		9.6	OK	
3.000	7	-0.118	0.000	0.10		3.3	OK	
3.001	8	-0.119	0.000	0.09		3.2	OK	
1.005	9	-0.017	0.000	0.35		12.4	OK	

•
•
•

Designed by UKDXP051

Checked by

Network 2019.1

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged	Flooded	Flow / Overflow		Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow Cap.	Overflow (l/s)	Flow (l/s)		
1.001	2	0.014	0.000	0.97		13.6	SURCHARGED	
1.002	3	0.018	0.000	1.09		29.6	SURCHARGED	
2.000	4	-0.337	0.000	0.00		1.9	OK	
1.003	5	0.088	0.000	0.44		13.2	SURCHARGED	
1.004	6	0.166	0.000	0.36		11.8	SURCHARGED	
3.000	7	-0.099	0.000	0.25		8.0	OK	
3.001	8	-0.102	0.000	0.22		8.0	OK	
1.005	9	0.272	0.000	0.38		13.4	SURCHARGED	

•
•
•

Designed by UKDXP051

Checked by

Network 2019.1

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Flow (l/s)		
1.001	2	0.195	0.000	1.63		22.8	SURCHARGED	
1.002	3	0.167	0.000	1.49		40.5	SURCHARGED	
2.000	4	0.133	0.000	0.00		2.0	SURCHARGED	
1.003	5	0.558	0.000	0.41		12.2	SURCHARGED	
1.004	6	0.637	0.000	0.37		12.4	SURCHARGED	
3.000	7	-0.081	0.000	0.43		13.5	OK	
3.001	8	0.282	0.000	0.35		12.5	SURCHARGED	
1.005	9	0.734	0.000	0.38		13.4	SURCHARGED	



First Floor
3 Wellington Place
Leeds
LS1 4AP

wsp.comp