



QUALITY CONTROL

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Prepared by	Graham Gardener	Table text	Table text	
Signature				
Checked by	Lorna Gribbin	Table text	Table text	Table text
Signature				
Authorised by	Katy Mayhew	Table text	Table text	Table text
Signature				
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OBJECTIVES



1 OBJECTIVES

1.1.1. This Landscape Maintenance and Management Plan (LMMP) outlines the proposed management of the landscape elements of the A29 Phase 1 realignment development (hereafter referred to as the 'Scheme'). This document sets out the long-term goals and landscape management practices for the initial five years of the Scheme after planting, and for the lifetime of the development. This LMMP, in its current form, should be viewed as an outline document and will be further developed throughout the design development of the project. A formal review should take place at the end of Year 1, 3 and 5 of the Defects Period, and updated in agreement with the Local Authority.

1.1.2. The objectives of this LMMP are:

- To ensure the continued health and vigour of the existing trees, shrubs and any retained vegetation on the site;
- To ensure the successful establishment and continued healthy growth through to maturity of all proposed vegetation;
- To manage drainage and infiltration areas to ensure they are effective;
- To achieve a clean, tidy condition and appearance of all external areas;
- To ensure the continued existence of natural habitat for existing species and promote the environment wherever possible; and
- To control invasive and injurious weeds within the planting plots and within the scheme boundary.

2 BACKGROUND

2.1 A29 REALIGNMENT

- 2.1.1. West Sussex County Council (referred to as 'the Applicant') is seeking to obtain detailed planning permission for the Phase 1 realignment of the A29 (the 'Scheme'), to the north of Eastergate village and the north-west of Barnham village, both to the north of Bognor Regis.
- 2.1.2. The aims of the landscape proposals are to improve biodiversity, provide screening for a noise barrier and to enhance legibility and connectivity. The proposals sit within the broader overarching principles outlined in the A29 Green Infrastructure Strategy (2020).

3 PRELIMINARIES

3.1 ESTABLISHMENT AND DEFECTS LIABILITY PERIOD

DEFECTS LIABILITY

3.1.1. Defects Liability: Any plants found to be defective during the five-year Defect Liability period as a result of:

- Plant failure;
- Poor or sub-standard materials;
- Lack of vigour; and
- Supplied and installed as not being in accordance with the specification.

Materials supplied shall be replaced immediately by the contractor for the first 18-month period at his own cost, followed by an additional 42 months by WSCC (totalling a five-year period).

3.1.2. Failures of plants (Pre-practical Completion): Any trees, shrubs and plants, other than those found to be missing or maliciously damaged, which are found to be defective at practical completion of the entire project shall be replaced by the Contractor entirely at his own cost.

3.1.3. Malicious damage or theft prior to Practical Completion: All loss or damage arising from theft or malicious damage prior to practical completion of the entire project shall be made good by the Contractor at his own expense.

3.1.4. Post Practical Completion: The maintenance of the planted areas after the date of practical completion will be carried out by the Contractor for the first 18-month period, followed by an additional 42 months by WSCC (totalling a five-year period) as specified.

3.1.5. Any plants found to be defective Post Practical Completion as a result of:

- Plant failure;
- Poor materials;
- Lack of vigour; and
- Being not in accordance with the specification.

Shall be replaced immediately by the contractor at his own cost.

3.1.6. Replacement of plants shall take place as many times as is necessary, in the 5 year Defects Liability Period, in order to maintain a complete cover of plants and to maintain the scheme as designed by the Landscape Architect in the As Built Drawings and be within the correct season for the type of plants specified.

4 GENERAL MAINTENANCE

- 4.1.1. No existing trees, shrubs or other plants shall be removed or cut without specific instructions from the Contract Administrator and written agreement of the Local Planning Authority Tree Officer.
- 4.1.2. All debris including pruning and litter shall be removed from site to a previously approved recycling centre.
- 4.1.3. The Contractor shall attend quarterly site inspections with the Project Landscape Architect as indicated in Section 11 Maintenance Schedule. Management prescriptions shall be adapted as required following findings from inspections.
- 4.1.4. The Landscape Contractor shall hold a BASIS amenity horticultural products certificate in order to be able to provide appropriate advice on the selection and application of herbicides (if required), and shall be competent in identifying plant species, including those proposed as part of seed and planting mixes and all undesirable species.
- 4.1.5. Any diseases or pests present should be reported to the Council in the first instance and a programme of removal and replacement should be provided by the Contractor.
- 4.1.6. Weed control shall be in accordance with Section 8 and 9 of this document.
- 4.1.7. Maintenance shall be carried out as per maintenance schedules in Section 11 of this document.
- 4.1.8. The Contractor shall liaise with adjacent landowners regarding the access arrangements and working hours to carry out hedge maintenance.
- 4.1.9. Litter shall be removed on a monthly basis or as necessary on the whole site where heavy littering has occurred. A co-ordinated approach to tackling litter problems should be sought with other management agencies and landowners in order to achieve a litter free zone.
- 4.1.10. Adjacent landowners should be encouraged to report illegal fly tipping activity. Provision should be made to remove any such illegal material as soon as possible to discourage any future fly tipping activity.

5 EXISTING TREES

- 5.1.1. Temporary protective fencing will be erected around retained hedgerows and trees prior to the construction period, as specified in the Arboricultural Report Version 1. The location and extent of the protective area will be defined by the project arboriculturalist in advance of the works and updated by them as required throughout the works. Protective fencing will be maintained throughout the construction period. It is the Contractors responsibility to ensure all fencing around retained tees, hedges and other protected habitats are installed and maintained throughout the Construction period.
- 5.1.2. All works should be carried out in accordance with BS 3998:1989 *Recommendations for Tree Work*, and BS 5837:2012: *Trees in Relation to Design, Demolition and Construction*, and should be undertaken by certificated personnel from the Arboricultural Association's list of Registered Contractors. Proof of experience and insurance provision will be required. All work shall be undertaken at the appropriate time and with the consent of the Overseeing Organisation who shall approve a programme of work with the Council.
- 5.1.3. All operations shall be carefully carried out to avoid damage to retained trees on site or neighbouring trees adjacent to the site. No trees to be retained shall be used for anchorage or winching purposes.
- 5.1.4. The trees should be checked annually for signs of deterioration or distress and the appropriate actions undertaken, where a potential safety hazard is identified.
- 5.1.5. The understorey should otherwise remain undisturbed with little pro-active management required other than the severing of ivy stems where crown infestation of the larger trees is evident or where maintenance of grass or planted areas is required.
- 5.1.6. All diseased wood, prunings and rubbish should be removed from site to the nearest approved recycling centre and the site left in a clean and tidy condition.
- 5.1.7. Where identified by the Project arboricultural consultant or Council tree officer for health and safety reasons, any heavy branches to be removed should be removed in sections and undercut to avoid tearing the bark, thereafter to be lowered by slings. No branch stumps should be left, and no cuts should be sealed with fungicidal sealant. No cuts should be capable of holding water. Removed wood should be left for a minimum of 24hrs prior to cutting into sections to allow flight of Bats in cavities.
- 5.1.8. Heavy ivy growth is not recommended in development situations, where wind risk may be a concern. The form of the tree can also be affected, and it is therefore proposed to remove dense infestation of ivy if evident on site or during the maintenance period.
- 5.1.9. Bat surveys should be carried out on mature trees which are to be felled or are subject to any remedial work being carried out (refer to 70055091_WSP_ECO_RP_A29 Bats_V01). This should be completed by a suitably qualified specialist and in accordance with the Natural England policy.

6 EXISTING AND PROPOSED WILDFLOWER / GRASS AREAS

6.1 GENERAL MAINTENANCE: ALL GRASS & WILDFLOWER AREAS

- 6.1.1. The Scheme includes areas of existing grassland to be retained, new wildflower meadow seed mix areas, new wetland grass mix areas and new amenity grass mix areas to the roadside verges.
- 6.1.2. Generally, the entire area will be inspected prior to any cutting for obstacles such as rubbish and rubble etc. Obstacles to be removed from site. In the case of fixed obstacles such as manholes or standpipes, these should be clearly marked to avoid possible damage.
- 6.1.3. Dead wood which is found within the existing grass areas is to be removed from site.
- 6.1.4. Grass cutting is to be undertaken with great care. This may be by a combination of hand-held trimmers and industrial mowers set at the required setting in order to maintain the grass at the required height as set out in Table 6-1 Grass Cutting Table. Trimmers with guards fitted are essential, so that at no time will the cutter come in contact with trees.

Table 6-1 – Grass Cutting Table

Grass Area Designation*	Frequency	Height of Cut
Amenity grass	4 cuts per year	50-60mm
Visibility splays	10 cuts per year	25-50mm
Wildflower Meadow	Year 1: 3 cuttings per year Subsequent years: 1 cut per year	First year 40-60mm Subsequent years: 100mm
Wetland Grass	1 cut per year	100mm

- 6.1.5. Any hollows which appear within the grassland due to settlement or other causes, which are considered to be potentially hazardous, shall be top dressed in early spring with good quality topsoil and seeded with the appropriate grass seed mix for that area.
- 6.1.6. Molehills on grass areas shall have the soil removed and evenly distributed throughout the grass area or within nearby cultivated areas.
- 6.1.7. Weed control shall be in accordance of Section 8 and 9 of this document.

6.2 AMENITY GRASSLAND

- 6.2.1. Grass shall be cut during the growing season (generally April-October) using a sharp cutter to give a clean, even cut. Arisings shall be left in situ.

6.3 WILDFLOWER MEADOW

- 6.3.1. Allow arisings to dry and shed seed for 1-7 days, arisings will be collected and removed off site to a licensed recycling / disposal centre. Grass cutting will be undertaken when ground and weather conditions are suitable, refer to table 6.1.

6.4 WETLAND GRASS

- 6.4.1. A wetland grass seed mix is proposed for use within the roadside swales and the perimeter of the attenuation basins.
- 6.4.2. Allow arisings to dry and shed seed for 1-7 days, arisings will be collected and removed off site to a licensed recycling / disposal centre. Grass cutting will be undertaken when ground and weather conditions are suitable, refer to table 6.1.

7 SHRUB, HEDGE, WOODLAND AND TREE PLANTING AREAS

SHRUBS

- 7.1.1. Shrub planting is located across the site (refer to Landscape drawings A29-WSP-LA-GA-001), they have been proposed in key visual areas for screening purposes and to provide planting on sloped embankments.
- 7.1.2. Shrubs shall be maintained in their natural shape and pruned as set out in Section 9 of this document. Any growth which will obscure signs, visibility splays or sight-lines shall be removed. Once established, any supporting canes shall be removed from the shrubs.

WOODLAND PLANTING

- 7.1.3. Woodland edge planting is proposed to the boundaries of the Scheme to provide connectivity between on-site and existing off-site tree cover, and to provide screening for the proposed acoustic barrier.
- 7.1.4. As the planting matures it may be necessary to selectively thin the planted areas at 5 and 10 years to achieve an appropriate canopy and understorey. This cannot be definitive as the importance of biodiversity should be considered when removing species.
- 7.1.5. If thinning work is required it should take place during the dormant months, typically November to January, and out of the wildlife nesting and breeding seasons.
- 7.1.6. Tree stakes should be checked and adjusted, repaired or replaced as necessary. Stakes should be removed by Year 5, or as instructed by the project Landscape Architect.
- 7.1.7. Provide artificial irrigation through the use of a Bowser to maintain healthy growth during the establishment period growing season (April – September, inclusive).

TREE PLANTING

- 7.1.8. Individual native trees are proposed in areas of orchard planting and along pathways, where they will provide a more immediate visual impact.
- 7.1.9. In addition to the maintenance prescriptions for the Woodland Edge Planting, the individual tree planting also requires the actions outlined below.
- 7.1.10. Minor pruning of dead or damaged wood shall be carried out as necessary. Wounds exceeding 25mm diameter must not be treated with a sealant. On substantial trees, West Sussex County Council's Tree Officer must be consulted for any necessary approvals.
- 7.1.11. Fruiting trees are proposed in the Scheme. A management plan shall be agreed with the Local Authority and Contractor regarding picking up fallen fruit from fruiting trees.
- 7.1.12. Newly planted specimen trees shall be checked at 6 monthly intervals for signs of damage, disease or pests present and all tree ties shall be adjusted accordingly at six monthly intervals or as required during monthly maintenance visits. Care should be taken when carrying out maintenance operations so as not to damage the base of trees with grass cutting machinery.
- 7.1.13. Once the trees have reached establishment and no longer require support, guards, ties and stakes may be removed and disposed of at the nearest recycling centre or kept in storage for reuse in the future.

7.1.14. Twice yearly tree inspections are required to assess any surgery and/or maintenance requirements.

HEDGE PLANTING

- 7.1.15. Native species hedge planting is proposed along site boundaries and adjacent to the proposed acoustic barrier. Hedges will help create wildlife corridors and define boundaries. Hedge adjacent to the noise barrier will be allowed to grow freely without maintenance.
- 7.1.16. No hedge maintenance shall take place during bird nesting season, see schedule in Section 9.
- 7.1.17. Hedges to achieve established height of 1.8m
- 7.1.18. Where growth on established hedge is up to two years old, highway hedgerow planting may be maintained with tractor mounted side arm flails, provided they cut cleanly without leaving ragged ends.
- 7.1.19. Growth on established hedges shall be reduced slightly above the point of the previous cut (to a maximum height of 1.8m and a maximum width of 1.2m) and on completion, the top shall be level and a slight angle to the base with the base being wider than the top of the hedge (within a tolerance of 100mm).
- 7.1.20. All hedge clippings shall be removed from site to a previously approved recycling centre.

8 WEED CONTROL

- 8.1.1. A weed management plan should be submitted for each successive year of maintenance and should include the control of the following species:
- Spear Thistle;
 - Creeping Thistle;
 - Broad Leaved Dock;
 - Common Ragwort.
- 8.1.2. The following methods of treatment may be used:
- Hand removal; or
 - Cutting on grass and wildflower meadow areas.
- 8.1.3. Advice on the methods of weed control is available from several sources, including DEFRA publications, notably 'The Weeds Act – guidance note on the methods that can be used to control harmful weeds (PB7 190).
- 8.1.4. Weed control to areas of hard standing shall be carried out twice per year or as required to maintain the area in a weed free condition.
- 8.1.5. Unightly dead weeds should be removed from areas of hard standing at the request of the Overseeing Organisation.
- 8.1.6. In areas of specimen tree, mulch mats will be used to suppress weeds.
- 8.1.7. In areas woodland planting, application of mulch to suppress weeds may be used. Apply in spring before weed growth.

9 MAINTENANCE SCHEDULES

Table 9-1 – Monthly Programme of Works

OPERATION	MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Grass / Seeded Areas													
Amenity grass 4 cuts				X		X		X		X			
Wetland grass										X			
Visibility splays 10 cuts				X	X	X	XX	XX	X	X	X		
Wildflower grass (Year 1) 3 cuts									X	X	X		
Wildflower grass (Year 2 onwards) 1 cut										X			
Hedges													
Hedges 1 cut													X
Litter													
All hard & soft landscaped areas, every week or as required		X		X		X		X		X		X	
Litter bin collection, every week or as required		X		X		X		X		X		X	
Inspections													
Hard & soft landscaped areas		X			X			X		X			



Quarterly inspections during 5 year defects period – Contractor and Landscape Architect	X			X			X			X		
Annual Landscape Inspection Report during 5 year defects period									X			
Weed Control												
Injurious & invasive weeds within soft and hard landscaped areas				X	X	X	X	X	X			
Weed control to grass and wildflower areas			X						X			
Hard landscaped areas			X						X			
Trees												
Inspection of all trees, guards, ties, mulch mats and stakes			X						X			
Deadwood removal, thinning and crown-lifting requirements	X										X	X
Remulch to a depth of 50mm			X						X			

Table 9-2 – Annual Programme of Works

Planting Type	Task	5 Years Maintenance Period				
		1	2	3	4	5
Specimen Trees	A - Check tree stakes and ties for tightness and overall condition. Adjust ties as required.		•	•	•	•
	B - Inspect mulch mats and pegs. Replace damaged items shall be replaced with mulch-mats to match the originals.- biodegradable mulch-mats and pegs shall be allowed to naturally decay at the end of the 5 year maintenance period	•	•	•		
Specimen Trees, Woodland Edge Mix, Scrub, Native Shrub	C – Firming – straighten any plants to an upright position that have been subject to frost heave or wind rock and re-firm the ground	•	•	•	•	•
	D – Prune as appropriate to encourage vigour and to remove dead, dying or diseased branches. Chip small arisings on site with material over 150mm diameter.	•		•		•
	D2 – Replace dead, dying or diseased trees, plants or shrubs in planting season following identification of loss.	•	•	•	•	•
	E – Hand pull all weeds from around the base of the trees to be removed to a radius of 500mm.	•	•	•	•	•

Planting Type	Task	5 Years Maintenance Period				
		1	2	3	4	5
	F – Re-mulch to a depth of 50mm.	•	•	•	•	•
	G - Regular watering according to Landscape Institute Technical Bulletin: Watering Restrictions and Watering Specification (May 1996) during the first two growing seasons (Apr-Oct) following planting, thereafter, watering as necessary in following years.	•	•	•	•	•
	H – Review and remove tree stakes, guards and ties in Year 3,4 & 5; dispose off-site (recycle) and backfill holes with topsoil. If not ready for removal, review in Years 4 and 5 as necessary. – all tree stakes, guards and ties shall have been removed by end of year 5			•	•	•
Species Rich Grass mix, Grassed Swale & Grassed Pond Drainage (Exclude 2.5m wide verge from kerb line)	I - Cutting to according to table 9-1	•	•	•	•	•
All	J - Monitor and remove coarse weeds by hand pulling	•	•	•	•	•
All	K - Landscape Inspection	•	•	•	•	•



Kings Orchard
1 Queen Street
Bristol
BS2 0HQ

wsp.com

RESTRICTED

Appendix F

CEMP Review, Legal Requirements, Training & Site Monitoring Tables

Table F-3 - Site Monitoring Sheet

Details of Complaint	Date of Complaint	Details of Resolution	Date of Resolution

Table F-4 – Environmental Legal and Other Requirements Register

Legislation / Requirement	Regulator	Application to the Scheme	Control Measures	Responsible Person	Timeframe for Review

Appendix G

Environmental Aspects and Impacts Register

Stakeholder (or stakeholder group)	Contact Person	Interest in project	Address	e-mail address	Phone	Preferred method of communication	Dates for formal comms	Com type
Barratt Homes Northern Developer;								
Southern Consortium			The Southern Consortium (formed by The Church Commissioners for England and Hanbury Properties)					
Folly Foot Farm			Follyfoot Farm, Fontwell Avenue, Eastergate, Chichester, PO20 3RU		0203 582 3007			
Folly Foot House								
Car body repair facility (Halo)			Fordingbridge Site, Barnham Rd, Barnham, Bognor Regis PO22 0HD		01243 544500			
Fleurie Nursery;			Church La, Chichester PO20 3XD		01243 543251			
Springfield Garden Nursery			Barnham Rd, PO22 0ER Bognor Regis, West Sussex		01243 552006 – Found in google			
Wandleys Lane Caravan Park;			Wandleys Lane, Eastergate, Chichester PO20 3SE		01243 543384			
Northfields Country House			Northfields Country House, Level Mare Lane, Eastergate, Chichester PO20 3SA		01243 544478			
Claremont Lodge Care Home			Claremont Lodge, Fontwell Avenue, Chichester PO20 3RY		0845 125 6166			
Lou's Carpet Tiles			Jbs eastergate lane, Eastergate PO20 3SJ		01243 542344			
Swallowfield Nursey			Eastergate Lane, Eastergate, CHICHESTER, PO20 3SJ		01243 543427			
Fontwell & Southbourne Physiotherapy & Hydrotherapy			The Wolds, Fontwell Ave, Chichester PO20 3RU		01243 544333			
SRC Recycling			Fontwell Ave, Eastergate, Chichester PO20 3RU		01243 542380			
SPR Centre Pet Shop			Greenfields Farm, Fontwell Avenue,, Eastergate,, Chichester PO20 3RU		01243 542815			
Kings Carpets Warehouse			Fontwell Ave, Eastergate, Chichester PO20 3RU		01243 885 115			
English Heritage;								
West Sussex County Council, Mid Sussex District Council, Arun District Council;								
West Sussex County Council, - Road space team								
Environment Agency;								
Sussex Police;								
Public Transport Operators;								
Emergency Services;								
Southern Water;								
BT Openreach;								
Southern Gas Network;								
SSE.								
Barnham Primary School;			Barnham, Bognor Regis PO22 0HW		01243 552197			
St Philip Howard Catholic School.			The Bosco Trust, at:St Philip Howard Catholic School, Elm Grove South, Barnham, West Sussex, PO22 0EN		01243 552 055			
Goodwood motor and horse racing					01243 755055 - Found in google			
Fontwell Park								
Aqua Sparkle Pools Ltd			JBS yard Eastergate Lane, Chichester PO20 3SJ		7584609632	Found on google		
Fontwell & Southbourne Physiotherapy & Hydrotherapy			The Wolds, Fontwell Ave, Chichester PO20 3RU		1243544333	Found on google		
Executive Cars Taxi Service			5 Wandleys Dr, Fontwell, Chichester PO20 3SF		7787557190	Found on google		
Shell Garage			Arundel Rd, Walberton, Arundel BN18 0SB		1243543714	Found on google		
KFC Fontwell			Arundel Rd, Walberton, Arundel BN18 0SB		1243542262	Found on google		
Travelodge Arundel Fontwell			A27/A29, Fontwell, Walberton, Arundel BN18 0SB		8719846014	Found on google		
Sussex Recovery			1 Fontwell Ave, Eastergate, Chichester PO20 3JT		1243543546	Found on google		
The Croft Surgery			Barnham Rd, Barnham, Eastergate, Chichester PO20 3RP		1243543240	Found on google		
Eastmere Training Stables			Melcroft/Eastergate La, Chichester PO20 3SJ		1243543863	Found on google		
Eastergate Post Office			Nyton Rd, Eastergate, Chichester PO20 3UP		1243542117	Found on google		
Eastergate Parish Hall			Eastergate, Chichester PO20 3RP		7849356097	Found on google		
Travelodge Arundel			Fontwell Park, Fontwell Ave, Fontwell, Arundel BN18 0SY		8715591801	Found on google		
Fontwell Park								
Ormiston Six Villages Academy			Lime Ave, Westergate, Chichester PO20 3UE		1243546800	Found on google		
Eastergate C.E. Primary School			Church Ln, Eastergate, Chichester PO20 3UT		1243542297	Found on google		
Fontwell Park Racing & Events			Park Racecourse, Fontwell Ave, Fontwell, Arundel BN18 0SY		1243543335	Found on google		
Barnham Manor			150 Barnham Rd, Barnham, Bognor Regis PO22 0EH		1243551190	Found on google		
Esso Westergate garage			Nyton Rd, Westergate, Chichester PO20 3UN		1243542823	Found on google		
Aldingbourne Community Sports Centre			Olivers Meadow, Westergate, Chichester PO20 3YA		1243940138	Found on google		

Environmental Hazard (Aspects) Register

No:	S0031
Date:	15/03/2021
Revision Number	A

Risk Rating R (1 → 100) = Likelihood L (1 → 10) x Severity S (1 → 10)	1 → 9	Insignificant
	10 → 24	Tolerable
	25 → 39	Undesirable
	40 → 100	Unacceptable

Emergency Resposns plan needer? Y

Residual

RL	RS	RR
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Aspect / Hazard	Activity(ies)	Material (s) / Impacts	Risk			Control(s)	Emergency Resposns plan needer? Y	Residual		
			L	S	R			RL	RS	RR
System inputs (materials used)										
Raw Materials	N/A									0
Manufactured Goods	(See timber)									0
Electricity	Not planned this phase									0
Diesel/Petrol/Oils	Site Clearance Traffic Management Site Establishment	Diesel / Use of non-renewable resource, emissions (CO ₂ , CO, NO _x and PM ₁₀), climate change, health risks.	6	5	30	<ul style="list-style-type: none"> ○ Power generation by generator supported by battery (hybrid system) ○ Right sized plant, well maintained, modern engines ○ No idling policy 		5	3	15
Timber / timber products	Site Establishment	Possible use of timber pegs for setting out / Illegal timber used.	5	5	25	All timber to be sustainably resourced PFFC/FSC		2	5	10
Tap Water	Site Establishment	Cabins using potable water / embodied carbon in water, environmental cost to purification process. (low usage)	10	2	20	Sigange to encourage switch off policy, low volume taps.		5	3	15
River/Borehole Water	None				0					0
Other	N/A				0					0

Pollution & Nuisance	Risk		Receptor(s) / Impacts	L	S	R	Control(s)	Emergency Resposns plan needer? Y	Residual		
	Source(s) (activity, material or service)	Pathway(s)							RL	RS	RR
Dust	Site Clearance Traffic Management Site Establishment	Airborne	Workforce & neighbours / silicosis, nuisance	2	4	8	Low likelihood weather dependant. Dust suppression units to be used during demolition and damping down.		2	4	8
Gas/fumes/smoke	All fossil fuel powered equipment	Airborne	Workforce, local popullation, global climate impacts / Health risk from CO, Nox and PM ₁₀ s, climate change from CO ₂	4	7	28	<ul style="list-style-type: none"> ○ Machinery to be inspected at the beginning of each shift ○ Faulty machinery to be reported and taken out of use ○ no idling - Look to utilise electric powered plant where possible. ○ logistics to avoid adding to congestion 		2	7	14
Asbestos/Fibres	Demolition of residential & commercial buildings possible asbestos.	Airborne	Workforce / public, wildlife	10	3	30	Asbestos surveyies to establish possible contamination	Y	2	7	14
Oils & fuels	Site Clearance Traffic Management Site Establishment	Oil Spills	Local drainage system, balancing ponds / Pollution	6	5	30	Spill Kits to b available at all refuelling points Drip trays or Plant Nappys to be used under all plant	Y	5	3	15
Sewage or effluents	Site Establishment, mobile welfare units	Soils or drains	Aquatic systems, groundwater / nitrification, purification costs	4	6	24	Main compound to have direct Sewage from site offices to be a direct connection. Mobile units sewage is contained in an integral septic tank. Regular emptying of septic tank as required		2	5	10

Chemicals & Hazardous Materials	Excavations, locating pockets of waste during works - storage of materials COSHH	Overland flows due to inclement weather	Wildlife, water courses	5	5	25	Wac testing prior to and during site excavations. Bunding for contaminated areas - COSHH lockable containers - data sheets	2	2	4
Silt	Excavations, drainage works	Overland flows due to inclement weather	Wildlife, water courses	5	5	25	Wac testing prior to site excavations. Bunding for contaminated areas	3	3	9
Waste	Refer to SWMP									0
Hazardous Waste	Refer to SWMP									0
Litter	Site Compound Generally around the site	Dropped Items by workforce and general public	Local environment, workforce / visual and if plastics, micro-plastics in aquatic environment	5	4	20	Segregated skips available for site rubbish - skips labelled for each specific type of waste generated	3	4	12
Mud	Site set up & Main works	Mud transfer from vehicles to the carriageway & surrounding areas	Local environment / nuisance, car damage, slips.	6	6	36	Wheel washing facilities at main site entrance and exit for plant and lorries. Road Brush to be deployed as required - Road sweeper on call	3	5	15
Noise	Main Works	Audible	Local residents, Workforce / nuisance, hearing loss	6	6	36	o Working hours to be adhered to o Noise protection zones to be established as required, appropriate PPE to be worn	3	5	15
Vibration	Main Works	Handheld tools / vibratory plant - Rollers - compaction of carriageway construction	Workforce only hand tools / health risk noise nuisance to local residents - possible structural damage to adjacent properties	4	5	20	Covered by ISO 18001, PMP and RAMs - Baseline noise monitoring to be established prior to start on site to form baseline to measure off of.	2	5	10
Light	Residents, general public, vehicular users	Lighting towers	Light nuisance	5	5	25	Ensure night working is kept to a minimum. When using lighting towers angle the light source to the point of work. Record LUM levels add blinkers where necessary	1	5	5
Invasive species / pathogens	N/A					0				0
Physical Changes	Source(s) (activity, material or service)		Receptor(s) / Impacts	L	S	R	Control(s)	RL	RS	RR
Natural Habitats	Site Clearance / main works		Trees, shrubs, grassland and ponds. / Loss of natural habitat	5	5	25	o Refer to CEMP and other environmental documentation see WSP Ecological and Tree plans. o Ecologist to be present during the site clearance works o Only vegetation marked to be cleared o Clearly demarcate working area	3	5	15
Protected habitats/Species	Site Clearance / Main works		Potential to encounter GCN, bats, reptiles, badger and dormice / legal issues if habitat (incl. refuges, foraging areas, migration routes and hibernacular) are damaged	4	10	40	o Refer to CEMP and other documentation see WSP Protected species mitigation information o TBT on process to follow if any species encountered to be given to all workers in advance o Ecologist to be present during the site clearance works - Badger re locating works completed	2	8	16
Ecology	Site Clearance Site Establishment - Main Works		Potential to interfere with natural habitats	6	4	24	As above	3	4	12
Rights-of-Way	Site Clearance / main works		Potential for need to close public right of way / Nuisance	6	6	36	Right of way to be maintained where possible. Alternative diversion route to be agreed	3	6	18
Agricultural Land	Temporary Site Establishment - main works		Large areas of agricultural land to be used for main works. All agreements to be in place prior to start on site	7	3	21	Only the areas agreed with the land owners to be used and reinstated landscaped after completion of works.	3	3	9
Listed Buildings	N/A					0				0
Archaeology	N/A					0				0
Opportunities	Description									
Habitat Creation	A new Badger sett has been constructed at the Northern Section of the works. A Hedgehog tunnel will also be constructed to allow unhindered movement of the existing wildlife between the Northern and Southern sections of the carriageway construction.									

Training/Educatn.	Potential to visit local schools and colleges to give a STEM lecture regarding working in the Construction Industry
Recycling/Reuse	Where possible all materials will be re used on site. Where this is not possible recycled materials will be imported and placed.
Sustainability Promotion	All excavated materials will be stockpiled and reused to provide appropriate bunding to the new carriageway and form swales for drainage purposes. All topsoil will be reused for landscaping purposes.

Appendix H

Register of Consents, Undertakings and Assurances

Table -5 - Register of Consents, Undertakings and Assurances

Environmental Topic	Consent/License/Permit Type	Description	Consent Granting Body	Responsibility	Date Required	Programme Risk	Further Comments
Noise and Vibration	Section 61 – Noise Consent (Control of Pollution Act 1974) – if required following discussions and agreement with both WSCC and Arun District Council	Section 61 of the Control of Pollution Act 1974 regulates prior consent for work on construction sites. It is commonly referred to when a contractor applies to the Local Authority for consent to carry out works which are likely to have a significant impact on the local community due to the generation of noise and vibration on site.	Local Authority	JCE Project Manager	Prior to main works.	The Local Authority has twenty-eight days to grant consent based on the application submitted.	It is important note that if any works have been carried out prior to the submission of the application, excluding any minor site preparation, the application will not be approved.
Air Quality	Section 80 – the Environmental Protection Act	Where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.	Local Authority	JCE Project Manager	Prior to main works.		There are no statutory limit values for dust deposition above which ‘nuisance’ is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

Environmental Topic	Consent/License/Permit Type	Description	Consent Granting Body	Responsibility	Date Required	Programme Risk	Further Comments
Ecology	European Protected Species: mitigation licence	A mitigation licence is required for work that will have an impact on European protected species that would otherwise be illegal (i.e. GCN or bats).	Natural England	JCE Environment Manager with WSCC	TBC (if European protected species found on site)	Allow for at least 30 working days for a licensing decision to be made.	
Ecology	The Protection of Badgers Act 1992	A licence is required if the work will have an impact on badgers that would otherwise be illegal	Natural England	JCE Environment Manager with WSCC	Prior to main works.	Allow for at least 30 working days for a licensing decision to be made.	
Ecology	The Hedgerow Regulations 1997	Anyone proposing to remove a hedgerow, or part of a hedgerow, covered by these regulations, must first notify the local planning authority by submitting a Hedgerow Removal Notice.	Natural England	JCE Environment Manager	Prior to main works.		
Water Resources and Flood Risk	Land Drainage Act 1994	Consent must be given for any permanent or temporary works that could affect the flow within an ordinary	Local Authorities and Internal	JCE Project Manager	Prior to main works.		

Environmental Topic	Consent/License/Permit Type	Description	Consent Granting Body	Responsibility	Date Required	Programme Risk	Further Comments
		watercourse under Land Drainage Authorities jurisdiction to ensure that local flood risk is not increased.	Drainage Boards				
Water Resources and Flood Risk	The Environmental Permitting (England and Wales) Regulations 2016	It is an offence to cause or knowingly permit a water discharge activity, including the discharge of polluting materials to freshwater, coastal waters, relevant territorial waters or groundwater, unless complying with an exemption or an environmental permit. The Regulations also assist in the management of flood risk and any activity which has the potential to impact on a main river will require a Flood Risk Activities Permit (FRAP).	Environment Agency	JCE Project Manager	Prior to main works.		

Appendix I

Emergency Procedures & Contact Details

Appendix J

Scheme Specific Social Value & KPI Targets

A29 Realignment Project
Jackson Project KPIs

Objective	Lead/lag	Measurement Criteria	Accountable	Reporting frequency	Target
Safety					
Accident frequency	lag	Number of accident book entries	Site Manager	Monthly	< 2 per month
Observations	lead	'Share It' reports	Site Manager	Weekly	> 5 per wk
Implementation of observation actions	lag	Close out of 'Share it' reports	Site Manager	Weekly	90%
Safety leadership	lead	Safety inspections	Contracts manager Site Manager	Monthly Monthly	1 per quarter 2 per month
Communication	lead	Tool box talks	General Foreman	Monthly	1 per week
Environment					
Preventing incidents	lead	Environment inspections	Sub Agent	Monthly	2 per month
Reducing waste to landfill	lag	Volume of waste reused or recycled	Sub Agent	Monthly	> 75 % recycled
Quality					
Quality observations	lead	Quality inspections	Site Manager	weekly	1 per wk
NCR management	lag	NCR's closed out on time	Site Manager	Monthly	90%
Programme					
Programme management	lead	PFA issued every 4 weeks	Site Manager	Monthly	100%
Compliance with programme	lag	Number of activities completed as planned	Planner	Monthly	70%
Collaboration					
Project satisfaction	Lead/lag	360 Feedback	Contracts Manager/Employer PM	2 monthly	Score > 7/10
Considerate Constructor	lag	Code of Conduct	Site manager	Each visit	Score > 40/50
Social Value/Community Relations					
School visits	lead	Talks/Visits to local schools	PLO	6 monthly	2 per annum
Dealing with complaints/comments	lag	Complaints register	PLO	Monthly	90% response within 48 hrs

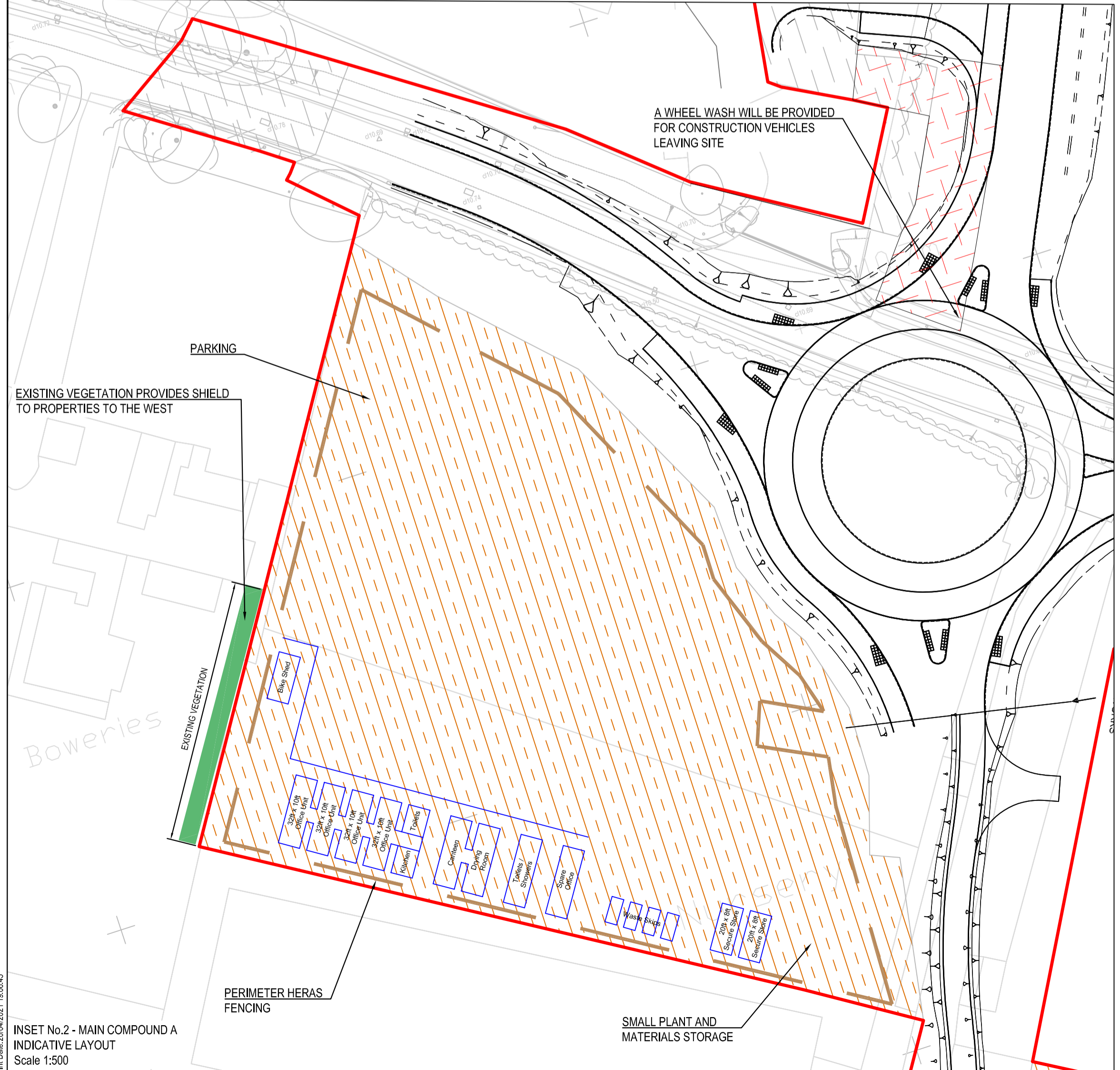
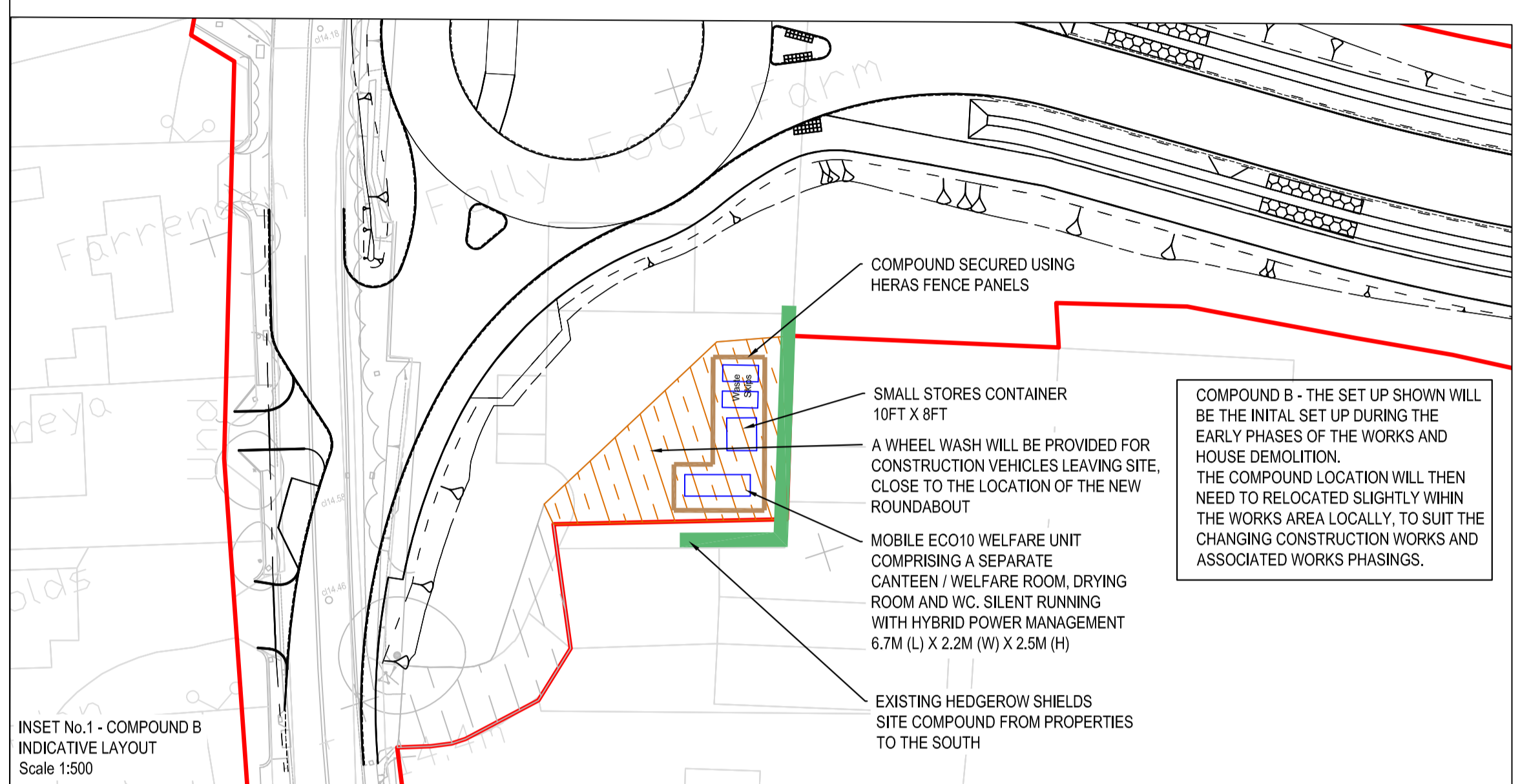
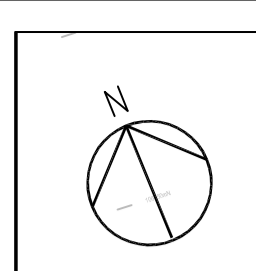
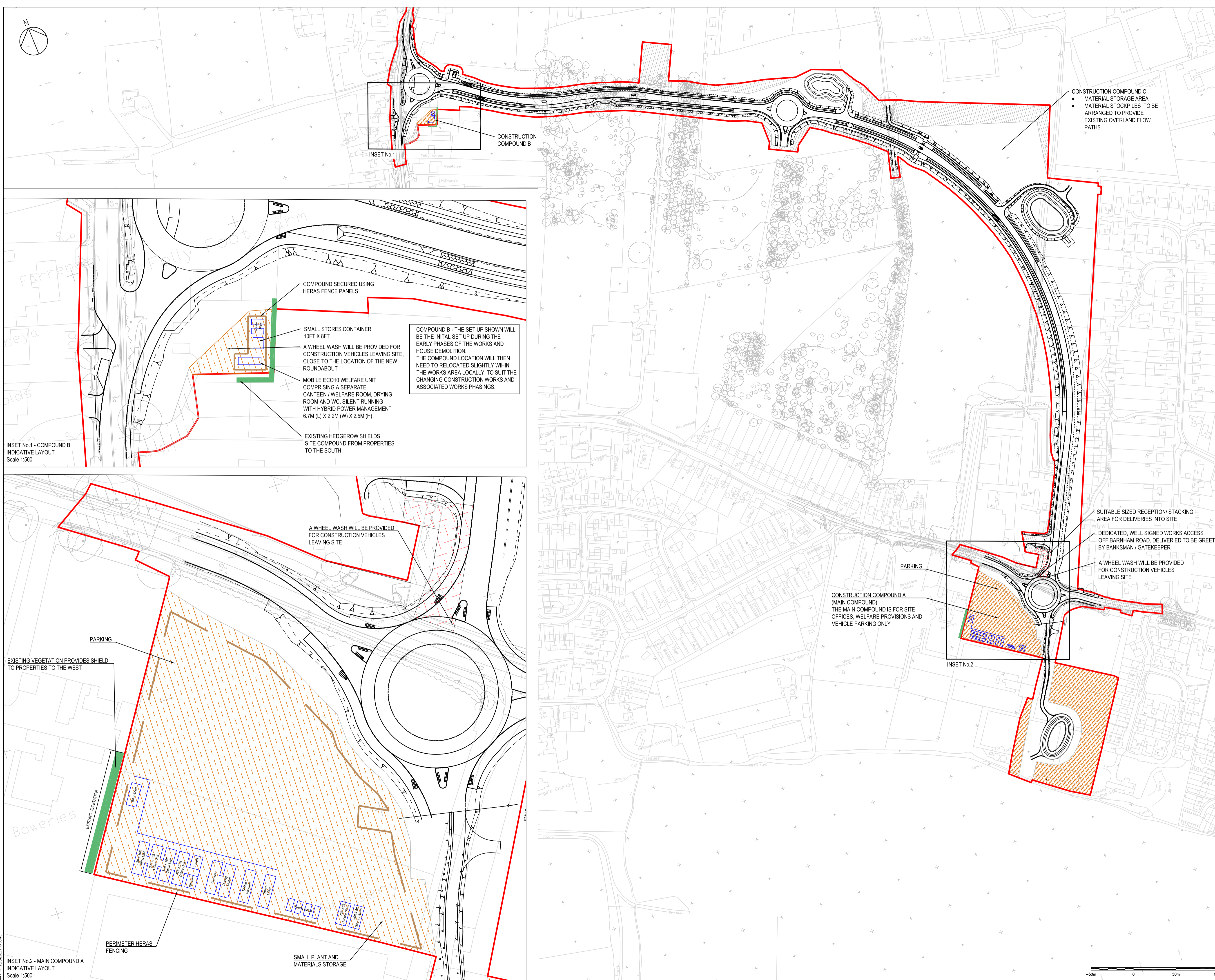
The Social Value and Employment Targets

A29 Improvements Scheme

Ref No.	Employment and Skills Areas	Measured by	Method	Contractor Target
1				
1.1	Work Experience over 16 years	No. of Individuals	The Contractor shall approach local secondary schools and colleges local to the site to offer work experience placements for students interested in a career in Civil Engineering, subject to any H&S requirements being met.	1
2				
2.1	Visits to Primary Schools	No. of Visits	The Contractor shall approach local primary schools to offer a visit from members of the site team. Activities will be dependent on the requirements of the individual school but may include a safety talk/ assembly or classroom activity relating to civil engineering and specifically relating to the scheme.	1
2.2	Visits to Secondary School/Colleges	No. of Visits	The Contractor shall approach the local secondary schools and colleges to offer a visit from members of the site team and/or a visit to the site. Activities will be dependent on the requirements of the individual school or college but may include a safety talk/assembly or classroom activity relating to civil engineering and specifically relating to the scheme.	2
2.3	Secondary School/College Visits to site	No. of Visits	The Contractor shall approach local secondary schools/colleges to offer a visit for students who are interested in civil engineering or construction.	1
3				
3.1	Number of opportunities created for local people	No. of individuals appointed	The Contractor is encouraged to make job opportunities available for local people throughout the period of the Contract and all vacancies arising from the project should be advertised locally. The Contractor shall work with the Council, local Job Centre Plus and local employment agencies to ensure that they are capitalising on local provision.	1
4				
4.1	Number of opportunities created	No. of Individuals	The Contractor is encouraged to employ trainees, apprentices or graduates during the period of the contract.	1
4.2	Weeks on site	Weeks on site per new trainee, apprentice or graduate	The Contractor is encouraged to employ trainees, apprentices or graduates during the period of the contract.	4
5				
5.1	Use of local SME's	No. of Local SME's	The Contractor shall use the locally based sources to employ local SME's (based within WSCC or within 12.5 mile beyond WSCC boundary) for the supply of materials, services and resources for the project, where appropriate.	4
5.2	Use of local Third Sector Organisation (TSO's)	No. of Local TSO's	The Contractor shall use the locally based sources to employ local TSO's (based within WSCC or within 12.5 mile beyond WSCC boundary) for the supply of materials, services and resources for the project.	1
6				
6.1	Volunteering Events	No. of volunteering person days	During the period of the contract the Contractor shall arrange volunteering days (can be split into part days) to support the local community. This should involve the Client team as well as Contractor's staff.	2
6.2	Community Projects	No. of Projects	The Contractor shall engage with the local community to identify opportunities and implement projects/works that would enhance the local community and/or the local environment.	1

Appendix K

Site Compound Location & Details



- NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
 2. ALL DETAILS ARE OUTLINE AND SHOWN INDICATIVELY.
 3. NUMBER OF SITE CABINS AND WELFARE ARRANGEMENTS SUBJECT TO COVID-19 REQUIREMENTS AT TIME OF WORKS.

- KEY:
- REDLINE BOUNDARY
 - TEMPORARY USED LAND, TO BE REINSTATED LAND BACK TO EXISTING.
 - TEMPORARY USED LAND, TO BE LEFT IN A TIDY STATE, NO NEED TO REINSTATE

P01	KS	FIRST ISSUE	20.04.2021
Rev	Drawn	Checked	Date
		Approved	Description
Purpose of Issue			S0
For Planning			
Classification			Public
Client			



Project
A29 Realignment Scheme

Drawing
Outline Construction Compound Plan

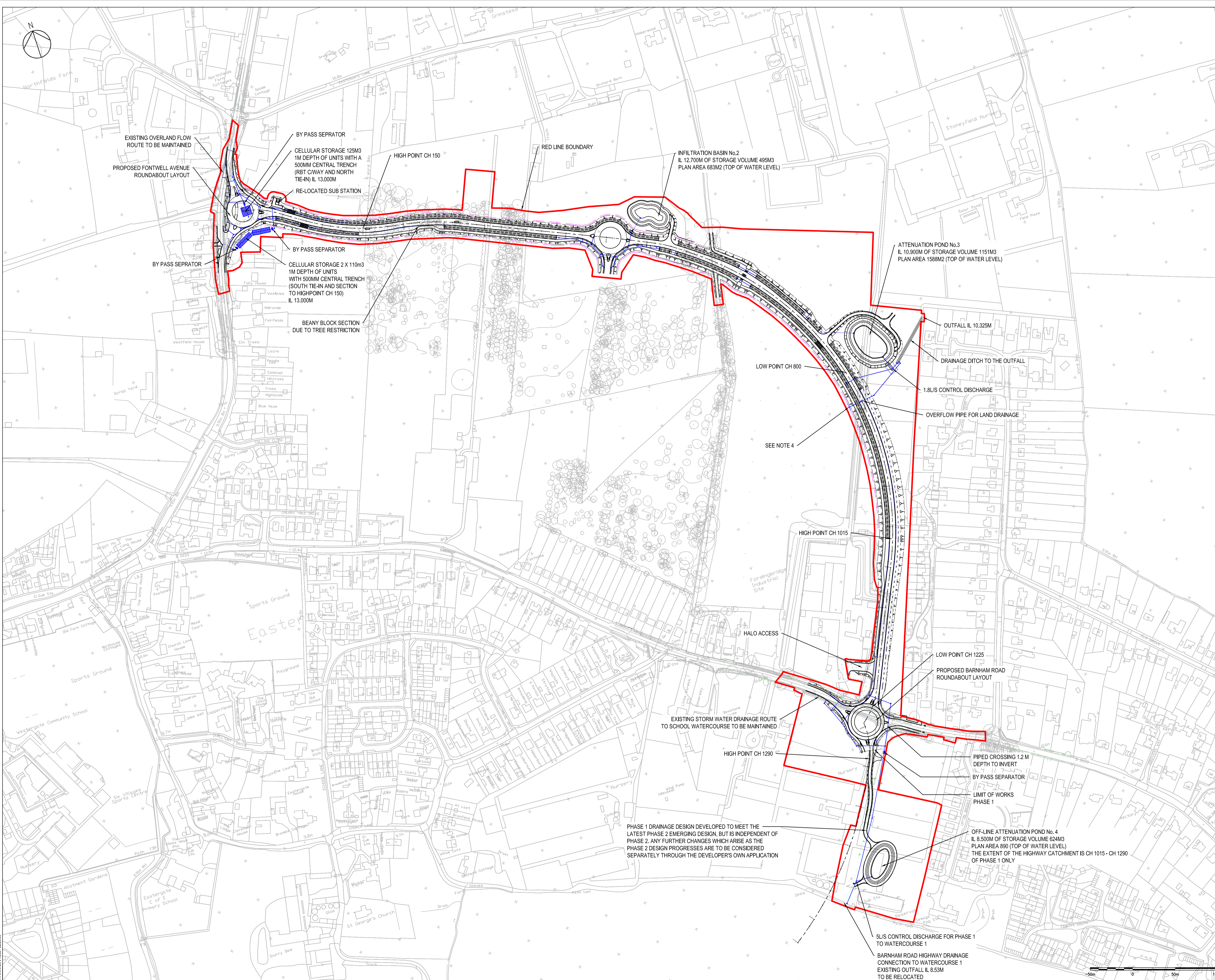
Scale @ A1	Drawn	Checked	Approved
1:1250	KS		
Project No.	Date		
CS099505	16.04.2021		

Drawing Identifier
Project - Originator - Zone - Level - File Type - Role - Number
A29-CAP-HPN-00-DR-C-0245 P01

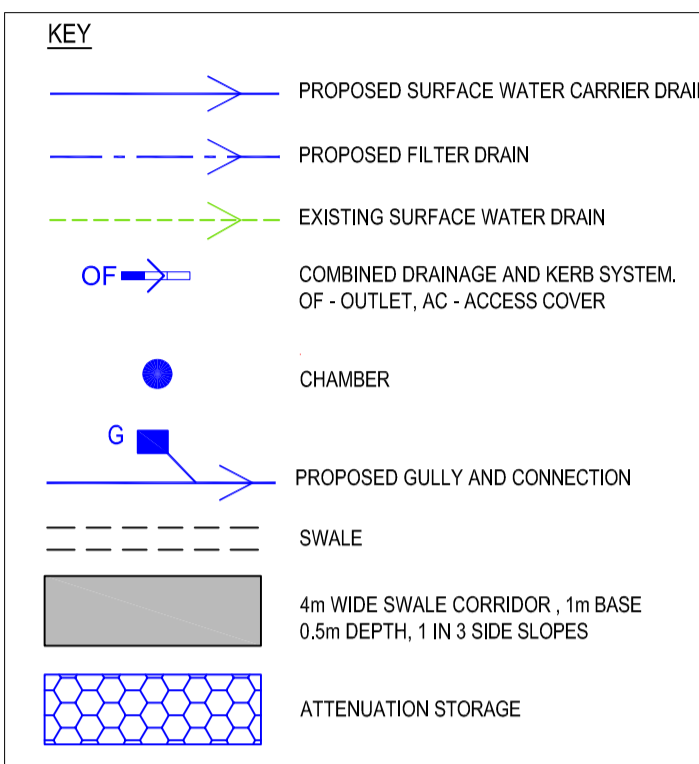
CAPITA
Highways
Capita House, Wood Street, East Grinstead, RH19 1UU
01342 327161
www.capitaproperty.co.uk
Capita Property and Infrastructure Ltd.

Appendix L

Scheme Drainage Strategy



- NOTES**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND SPECIFICATION APPENDIX 500 SERIES DOCUMENT NO A29-CAP-HDG-00-DR-C-0047.
 - THE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH REQUIREMENTS OF WSSC.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE TECHNICAL NOTES:
 - A29-CAP-HDG-00-AN-D-0052 DRAINAGE STRATEGY
 - A29-CAP-HDG-00-AN-D-0058 SUDS MANAGEMENT TRAIN
 - AS A TEMPORARY SITUATION UNTILL THE SITE DEVELOPED WITH BARRATTS PROPOSED SUDS WHICH WILL MANAGE ALL DRAINAGE WITHIN THE SITE, A FRENCH DRAIN IS PROPOSED TO ALLOW ANY EXCESS FLOWS THAT CANNOT INFILTRATE, TO DISCHARGE TO THE SOUTH WEST SIDE OF THE A29 REALIGNMENT EMBANKMENT AS LAND DRAINAGE. AN OVERFLOW PIPE CROSSING IS PROVIDED BENEATH THE EMBANKMENT AT CHAINAGE CH 840, WHICH CONNECTS INTO THE PROPOSED DRAINAGE DITCH TO THE EXISTING BARNHAM LANE DITCH / RIFE.



Location Key Plan (Not to Scale)

Rev	Drawn	Checked	Appd	Description	Date
P11	KS	KS	AB	SCALE BAR ADDED, DRG PURPOSE CHANGED	23.04.2021
P10	JD	KS	AB	NEW LOCATION FOR SUB STATION AND RED LINE BOUNDARY AMENDED, NOTE 4 ADDED, POND 4 ROTATED AND MOVED, FONTWELL AV RBT AND RED LINE BOUNDARY UPDATED	08.04.2021
P09	KS	RP	AB	POND 2 AND 4 OUTFLINE AMENDED, BUS STOP AREAS ADDED AND RBL UPDATED	14.10.2020
P08	KS	RP	AB	NOTE 3 ADDED, RED LINE BOUNDARY ADDED	11.09.2020
P07	KS	RP	AB	NOTE 3 ADDED, RED LINE BOUNDARY ADDED	31.07.2020
P06	KS	RP	AB	POND IL LEVELS UPDATED, POND 3 CHANGES TO OFF-LINE	15.07.2020
P05	KS	KS	AB	POND 2 AND 4 OUTFLINE AMENDED AND RBL UPDATED	18.05.2020
P04	KS	RP	AB	POND IL ADDED, DRAINAGE AMENDED TO SUIT PROPOSED RBT, SWALE DETAILS TO KEY ADDED	16.03.2020
P03	KS	RP	AB	POND SIZES REVISED, PROPOSED RBT LAYOUT ADDED	12.03.2020
P02	KS	RP	AB	POND LOCATIONS AMENDED, MIDDLE RBT RELOCATED	06.03.2020
P01	CS	RP	AB	FIRST ISSUE	13.02.2020

Purpose of Issue
For Planning S0

Classification
Public

Client

Project
A29 Realignment Scheme

Drawing
Drainage Strategy Layout

Scale @ A1	Drawn	Checked	Approved
1:1250	CS	RP	KS

Project No. CS099505 Date 12.02.20

Drawing Identifier A29-CAP-HDG-00-DR-C-0047 5S1192 Consultant revision P11



Capita House, Wood Street, East Grinstead, RH19 1UU
 01342 327161
 www.capitaproperty.co.uk
 Capita Property and Infrastructure Ltd.

Appendix M


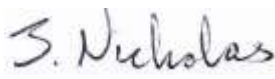

Hydrogeological Detailed Quantitative Risk Assessment

Hydrogeological Detailed Quantitative Risk Assessment for A29 Realignment

March 2021



Quality Management

Job Number	CS/099505		
Client	Jackson Civil Engineering		
Project	A29 Realignment		
Location	Eastergate, West Sussex		
Document Title	Hydrogeological Detailed Quantitative Risk Assessment Report		
Document BIM Ref	A29-CAP-HGT-00-RP-GE-077		
Revision / Status	P01		
File Reference	F:\Highways\CS099505 A29\03 Delivery\HGT Geotech\04 Reports\DQRA		
Version Date	March 2021		
Prepared By	Nicola Robinson	Signature	 pp
Checked By	James Nicholas	Signature	
Authorised By	Neil Greenwood	Signature	

Revision Status / History

Rev	Date	Status/ Purpose	Prepared	Checked	Authorised
Rev1	1/03/21	For EA acceptance	NR	JN	NG

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Whilst care has been taken in the construction of this report, the conclusions and recommendations which it contains are based upon information provided by third parties ("Third Party Information"). Capita has for the purposes of this report relied upon and assumed that the Third Party Information is accurate and complete and has not independently verified such information for the purposes of this report. Capita makes no representation, warranty or undertaking (express or implied) in the context of the Third Party Information and no responsibility is taken or accepted by Capita for the adequacy, completeness or accuracy of the report in the context of the Third Party Information on which it is based.

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Drawings

A29-CAP-HGT00-DR-GR-0040 P04 Exploratory Hole Location Plan
A29-CAP-HGT00-DR-GR-00227 P02 Remediation Action Plan

Appendices

Appendix A – Input Parameters for Northern Sector
Appendix B – Borehole Logs

1. Introduction

Subsequent to initial ground investigations for the A29 realignment road scheme, additional investigation in the area of the future Fontwell Avenue roundabout has encountered contaminated soils. This area was previously inaccessible to the initial site investigation and this initial work did not originally find any land quality issues, though desk studies had highlighted the presence of an infilled gravel pit in the area this report is concerned with.

This document outlines the hydrogeological conceptual model and modelling methodology and results of the modelling to derive soil site specific target levels (SSTLs) for the specific area in question and which will allow validation of the remediation in this sector. Specifically, the SSTLs will be used to validate remediation in the area of the Fontwell Avenue roundabout where there is a former gravel pit containing elevated concentrations of polyaromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). The methodology uses the Environment Agency remedial targets worksheet (P20) to derive SSTLs. Consideration has been given as to how soakage infiltration tanks, to be located in the centre and to the south of the roundabout, will impact the concentration of potential contaminants arriving in groundwater and hence inform SSTLs. Background information on the geological and hydrogeological setting of the site and results of the recent ground investigation can be found in the Capita Ground Investigation Report (GIR, Oct 2020).

The initial ground investigation was undertaken by WSP (WSP, 2018) and the most recent ground investigation, which has involved boreholes drilled at the Fontwell Avenue roundabout, was undertaken by Nicholls Colton in 2020 (NC, 2020).

2. Hydrogeological Conceptual Site Model

A key element of undertaking an environmental risk assessment is the development of a conceptual model of the site that describes the environmental features of the site together with the expected interaction of potential contamination sources with the environment. This is done by undertaking a Source – Pathway – Receptor analysis of the site:

- Sources (S) are potential or known contaminant sources e.g. a former fuel storage area;
- Pathways (P) are environmental systems through which a contaminant could migrate e.g. air, groundwater; and
- Receptors (R) are sensitive environmental receptors that could be adversely affected by a contaminant e.g. site occupiers, groundwater resources.

Where a source, relevant pathway, and receptor (S-P-R) are present, a pollutant linkage is considered to exist whereby there is a circumstance through which environmental harm could occur and a potential environmental liability is considered to exist. Information presented in the Capita GIR (2020) has been used to compile a conceptual site model (CSM) identifying potential contaminant sources and receptors together with plausible pathways that may link them. The assessment considers risk to controlled waters only from the soil and groundwater sources identified on-site from the 2018 WSP and Nicholls Colton site investigations. Off-site sources have not been considered in this conceptual model.

2.1 Contaminant Source

A summary of the findings of the different phases of investigation at the site are given below in order to determine which of the potential contaminants of concern (CoC) should be taken forward to the modelling phase. The summary also provides evidence for the size of the source areas associated with the different potential CoC in soil. To identify the contaminants of concern, groundwater and leachate concentrations from samples obtained from all the investigations have been compared with both environmental quality standards (EQS) to be protective of surface water receptors (drains leading to the Lidsey Rife), and also drinking water standards (DWS) to be protective of groundwater receptors (the Secondary A aquifer of the Head Deposits).

2.1.1 Soil

Two sets of soils data have been taken at the highway scheme relating to the following dates and investigation locations:

- WSP (October/November 2018 BH04 – BH09, TP's 2, 7, 12, 16 and 18); and
- Nicholls Colton (July/August 2020 TP101 through to TP105, DCS101 through to DCS128, BH101).

A composite exploratory hole plan is provided as Drawing A29-CAP-HGT00-DR-GR-0040 P04. Table 1 below presents the leachate data that exceed the relevant water quality standards when compared to the July and August 2020 data. It can be seen that there are some exceedances for the metals, specifically chromium and copper but the most significant exceedances were for

polyaromatic hydrocarbons (PAH) in DCS111 at 0.9 m below ground level (bgl), DCS124 at 0.1 m bgl and DCS125 at 0.5 m bgl. DCS125 is located approximately 15 m east of the proposed Fontwell Avenue roundabout. Material to a depth of 1.2 m will be removed at this location, and hence this particular area is not considered to act as a source zone. Leachate testing in BH101, despite total elevation in the soils (140 mg/kg total PAH at 0.3 m) did not record any exceedances of the adopted criteria (although detection limits were not low enough for certain PAH species to provide total confidence in absence of source). The exceedances in DCS124 are recorded in very shallow soils (0.1 m bgl) and they will be removed as part of topsoil strip. DCS111 is located at the site of the proposed eastern roundabout, due south of the proposed balancing pond in what is thought to be 'virgin' ground, with no obvious cause for the slightly elevated readings. Concentrations of PAHs up to a total of 0.2 to 2 mg/kg are considered to be typical of rural soils in England (Environment Agency, 2007) and hence represent background concentrations. The locations discussed above in this paragraph are above these background concentrations.

Table 1: Leachate data from 2020 site investigation compared to WQS

Contaminant of Concern	EQS µg/l	DWS µg/l	Maximum concentration µg/l	Exceedances/Notes
Chromium (Cr III assumed)	4.7	50	590 in BH101 at 2 m depth	420 DCS128 at 1 m depth also.
Copper	1	2000	20 in DCS128	BH101, DCS101, DCS111, DCS124 also.
Phenanthrene	0.003	-	0.08 in DCS111	Only 1 exceedance

The EQS for phenanthrene is not a formal EQS but rather a predicted no effect concentration (PNEC) (WRc plc (2002), R&D Technical Report P45) and therefore will not be taken forward for modelling.

As noted in the Capita GIR, the Limit of Detection (LoD) for cadmium (Cd), mercury (Hg), benzo(a)anthracene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, and phenanthrene are all greater than their EQS screening values. As such, there is a 'grey area' between the EQS and LoD in which a CoC may be in exceedance of the EQS but not detected due to instrument analysis limitations.

Whilst copper concentrations are above EQS, the margin of exceedance is not great. The soil concentrations that give rise to these leachate concentrations are below average natural background copper concentrations (62 mg/kg, Defra, 2012) with the exception of one out of 43 samples in BH101 at 3 m depth. The average copper soil concentration across the site is 20.7 mg/kg. However, given that BH101 appears to be in region of the main source zone of the former gravel pit this potential contaminant has been taken forward into the modelling.

Given that the leaching data, which employs routinely available detection limits for PAHs, cannot give complete assurance on absence of source, it is recognised that maximum soil concentrations can give an indication of where on-site soil sources may lie. This has been discussed in more detail in the Capita Ground Investigation Report. Specifically, elevated PAH concentrations were recorded in:

- five samples within BH101 between 0.10 and 2.00 m bgl;
- two samples within DCS125 at 0.20 m bgl and 0.50 m bgl;

- one sample in TP4 at 0.50 m bgl;
- one sample in TP5 at 0.50 m bgl;
- one sample in DCS128 at 1.00 m bgl; and
- three samples in DCS101 0.10, 0.70 and 1.50 m bgl.

BH101 and DCS128 are located in a region of the site that has been identified as a former gravel pit and the backfill here contains pieces of tarmac. The outline of the gravel pit is marked by 'teeth' markings on drawing A29-CAP-HGT00-DR-GR-0040 P04. DCS125 is located due east of the current A29 roadway, adjacent to the east of the proposed location for the western roundabout. TP4 and TP5 are located towards the southeast of the proposed realignment and represent bund material. The contamination in the bund is recognised in the earthworks specifications and impacted material will not be reused in the scheme so following completion of earthworks this material will no longer present a source to controlled waters.

The remediation strategy is to remove and appropriately dispose of a large portion of materials as part of achieving the line and level of the road scheme. Post road construction this would leave a soil source zone that has a maximum thickness of 1.2 m in the vicinity of the Fontwell Avenue roundabout within the filled gravel pit area (with the exception of the area immediately surrounding BH101 which will have 3 m of material removed) plus a small area in the vicinity of DCS101 at 0.8 m soil depth.

Based on Table 1 of leachate concentrations and the prevalence of PAHs in soil, combined with the fact that some PAHs may exceed EQS, the following CoC have been taken forward into the controlled waters risk assessment modelling for potential to impact the surface water receptors from the soil source in the vicinity of the Fontwell Avenue roundabout:

- Chromium;
- Copper;
- Benzo(a)pyrene;
- Benzo(b) fluoranthene;
- Benzo(k) fluoranthene; and
- Benzo (ghi)perylene.

The five PAHs in the list above have been added to represent the elevated soil PAH concentrations. Based on Table 1 of leachate concentrations and the prevalence of PAHs in soils (TPH was not analysed in leachate), the following CoC have been taken forward into the controlled waters risk assessment modelling for potential to impact the groundwater resource from the soil source:

- Chromium;
- Benzo(a)pyrene to represent PAHs;
- Aromatic TPH C16-C21 to represent heavier PAH compounds such as indeno(1,2,3-cd)pyrene; and