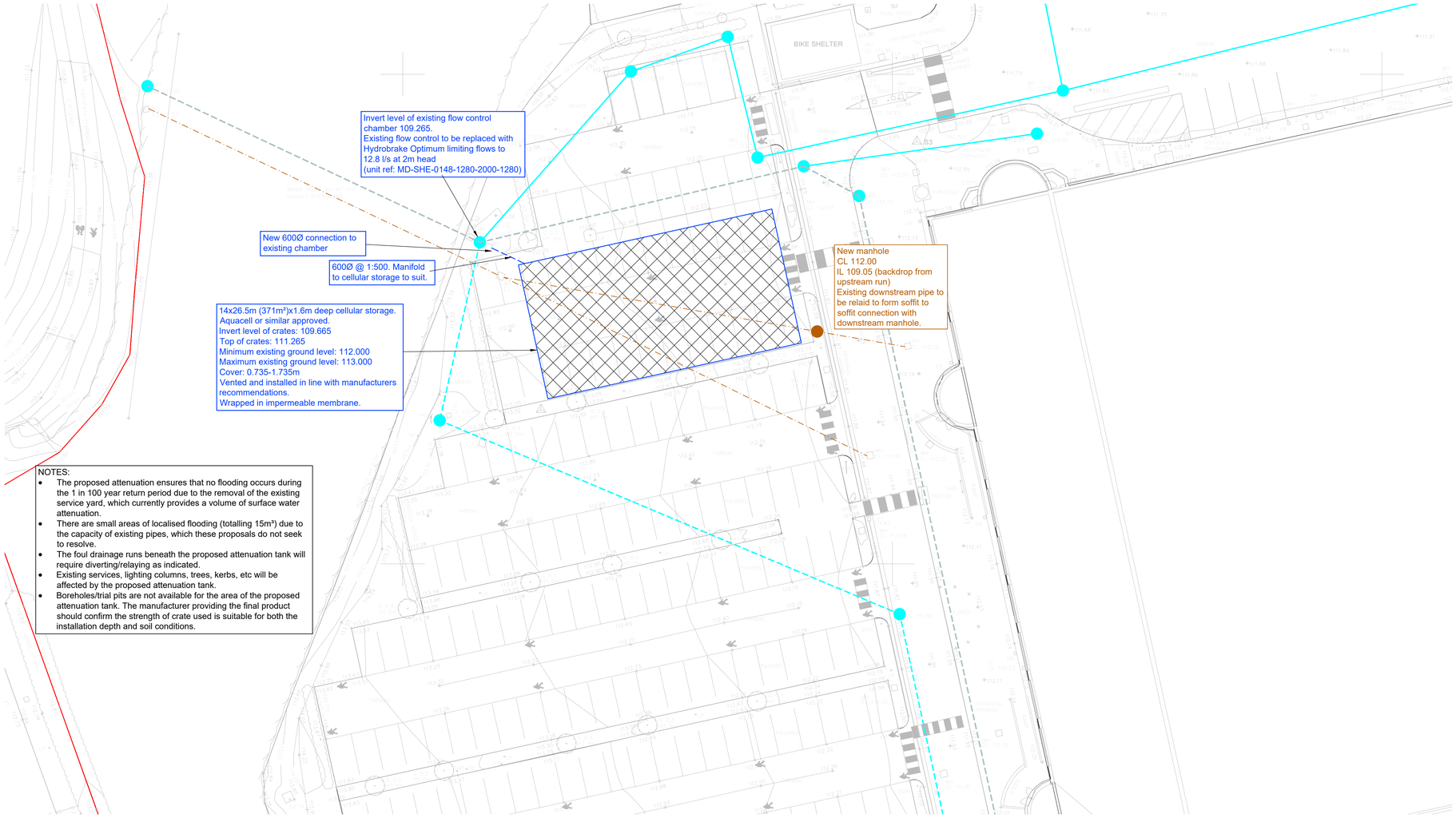
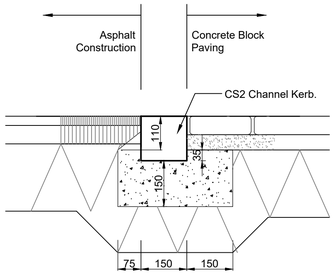


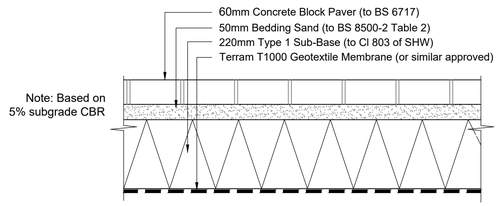
NOTES:
- The proposed attenuation ensures that no flooding occurs during the 1 in 100 year return period due to the removal of the existing service yard, which currently provides a volume of surface water attenuation.
- There are small areas of localised flooding (totalling 15m³) due to the capacity of existing pipes, which these proposals do not seek to resolve.
- The foul drainage runs beneath the proposed attenuation tank will require diverting/relaying as indicated.
- Existing services, lighting columns, trees, kerbs, etc will be affected by the proposed attenuation tank.
- Boreholes/trial pits are not available for the area of the proposed attenuation tank. The manufacturer providing the final product should confirm the strength of crate used is suitable for both the installation depth and soil conditions.

CBR (of formation)	Capping (15% CBR On Top Surface)	Sub-Base (30% CBR On Top Surface)	Sub-Base Alternative (No Capping)	
			If Subgrade Material Is Non-Frost Susceptible	If Subgrade Material Is Frost Susceptible
1% - 2%	600 mm	150 mm	-	-
2%	450 mm	150 mm	-	-
3%	350 mm	150 mm	300 mm	300 mm
4%	300 mm	150 mm	270 mm	270 mm
5% - 8%	250 mm	150 mm	220 mm	240 mm
8% - 15%	210 mm	150 mm	190 mm	240 mm
>15%	-	150 mm	150 mm	240 mm

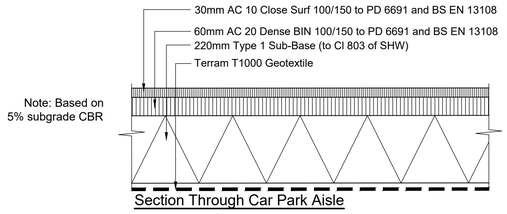
Capping and Sub-Base Thickness Design (based on Volume 7 Section 2 Part 2 of DMRB)



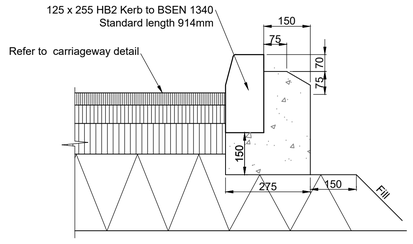
Junction Between Flexible Surface and block paving
Scale 1:10



Section Through Parking Bays
Scale 1:10



Section Through Car Park Aisle
Scale 1:10



Section Through HB2 Kerb
Scale 1:10

NOTES:
- The drainage design indicated on this drawing is preliminary only and subject to approval by the LPA, LLFA and sewerage undertaker.
- The contractor is responsible for obtaining Section 106 approval from the sewerage undertaker for making connections to the public sewer network.
- Pipe sizes to be confirmed following receipt of syphonic drainage details and foul drainage flow rates.
- The pumping station for the foul drainage is required to have 24 hour emergency storage, to be sized following receipt of further foul drainage information.
- The detention basin has been sized so as to accommodate all flows up to the 1 in 100 year return period with a 20% allowance for climate change.
- All foul drainage pop ups and rwp positions are subject to confirmation by the architect.
- Pipes with less than 900mm cover in trafficked areas are to be provided with a 150mm concrete surround.

Drainage Construction Notes Continued:

6. The proposed foul and surface water drainage systems including the connections to the existing public sewer system shall be subject to the approval of all relevant Authorities.

7. Pipe runs near buildings
If trench fill is within 1 m of the building the trench shall be filled with concrete up to its lowest level of the building.
If trench is greater than 1 m from the building the trench shall be filled with concrete up to a level below the building equal to the distance from the building less 150mm.

8. All connections to be turned in direction of flow using pipe bends.

9. Manhole covers and frames to be ductile iron medium duty grade D400 double triangular to BS EN124 and are to be grade A standard in vehicular trafficked areas.

Manhole covers and frames to be ductile iron medium duty grade B125 circular or rectangular to BS EN124 positions outside vehicular trafficked areas. Unless stated otheriwse in the manhole schedule.

10. The Principal Contractor shall be responsible for checking the existing line and invert levels of any connection points for both the foul and surface water systems, prior to undertaking installation of any new drainage works. Any deviation to the levels and positions indicated on the drawing should be brought to the attention of the Project Engineer.

11. Internal inspection chambers and access fittings to be provided with lockable double sealed manhole cover and frames grade A15, B125 or D400 to BSEN124 to suit loading conditions.

12. All polypropylene inspection chambers shall be in accordance with BS EN 13598-2:2009.

13. All drains to be tested prior to backfilling, after backfilling and upon completion of hard landscaping, in addition all drains to be inspected by CCTV methods prior to hard landscaping.

14. All drainage works within retained tree canopy are to be constructed in accordance with BS 5837:2012, the NHBC Standards and the tree preservation officers requirements.

15. Where any pipe work that is shown to be retained is found to be defective, as shown on the drainage survey, or during the course of the works, it hsould be repaired or replaced as neccssary.

Contractual Notes:

1. It is the responsibility of the contractor to locate any service apparatus in the vicinity of the works. HSP Consulting Engineers Ltd will accept no claims whatsoever in respect of any losses or damage caused in respect of such apparatus

2. It is the responsibility of the contractor to execute the works at all times in strict accordance with the requirements of the Health And Safety At Work Act 1974, and the C.D.M Regulations 2015. The Contractor will be deemed to have allowed for full compliance, including full liaison with the Principal Designer, with his rates.

3. The contractor is responsible for ensuring that all works are to the satisfaction of the engineer, and shall be deemed to have included within his rates for any necessary testing.

4. The contractor will be responsible for providing all necessary de-watering and trench support to execute the works in a satisfactory manner, and shall be deemed to have allowed for the same within his rates.

5. The contractor must ensure that the gradients indicated on the longitudinal sections are checked between the levels shown, prior to laying pipes. At no time must the contractor proceed with pipe laying by dialing the gradient shown into a laser without checking. Any discrepancy in this respect must be reported to the engineer prior to pipe laying.

6. The contractor shall check his pipe gradients by means of boning rods and traveler to verify the laser gradients

7. In the event of the above procedures not being followed, HSP Consulting Engineers Ltd will accept no responsibility whatsoever for any consequent loss or damage.

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX
THE HAZARDS NOTED ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPE OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS
- Existing Services
- Excavations near existing structures
- Surface water accumulation in trenches
- Deep excavations
- Unforseen ground conditions/contaminants

MAINTENANCE/ CLEANING RISK
- Detention basin - risk of deep water

DEMOLITION RISKS
-

General Notes

1. Do not scale.

2. This drawing is to be read in conjunction with Architects, Engineers & Specialist Contractors Details.

3. Should there be any discrepancy between details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction on site.

4. Until technical approval has been obtained from the relevant Authorities it should be understood that all drawings issued are preliminary and NOT for construction. Should the contractor start site work prior to approval been given, it is entirely at his own risk.

5. All dimensions shown are in metres unless noted otherwise.

6. This drawing is based on Lovelock Mitchell Architects Drawing Number 1471 MTW-LMA-SI-XX-DR-A-1200 P07 , dated 01.12.17.

7. All survey information is provided by the surveying company and HSP cannot accept any liability for any discrepancies there in. All survey information to be verified on site by contractor. Should discrepancies be identified, HSP to be notified immediately.

8. It is assumed that the Owner or Occupier of the development will provide notice to the local sewerage undertaker of the intention to communicate flows to the public sewer, as required by The Water Industry Act (1991) as amended.

Key to Proposals

Existing Surface Water Drainage

Surface Water Drainage

Drainage Construction Notes:

1. For details of ground conditions refer to the Ground Investigation Report.

2. In the absence of any other Specification, all drainage works shall be carried out in accordance with WSA Sewers for Adoption (6th Edition) and Civil Engineering Specification for the Water Industry (6th Edition). All adoptable sewer works and materials to be in accordance with "Sewers For Adoption" 6th edition and the local water companies requirements regarding sewers for adoption.

3. The position of all RWP's and foul outlets are to be confirmed by the Architect.

4. All work is to be carried out in accordance with the current British and or European standards, BS codes of Practice & Building Regulations

5. The position, line and diameter of all existing drainage apparatus should be confirmed on site prior to the commencement of the works. Any discrepancies should be reported to the engineer in writing immediately.

REV	BY	DATE	DETAILS	CKD
D	RH	21.01.19	Drawing status revised to FINAL CONSTRUCTION	RH
C	RH	10.04.18	Tank position amended. Construction details added	RH
B	RH	12.02.18	Amended in line with Kier comments	GC
A	RH	24.01.18	Amended in line with Kier comments	GC

STATUS: FINAL CONSTRUCTION

CLIENT
Kier Construction

PROJECT
Muller
Telford

TITLE
Proposed Drainage
Sheet 3 of 3

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SCALE	SHEET SIZE	
1:250	A1	
DATE	DRAWN	CHECKED
23.01.18	RH	GC
PROJECT NO.	DRAWING NO.	REV
C2737	104	D