## AT 2445



The Fort Cawsand

S104 Foul Sewer Connection

Heritage Statement

Issue 2

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Client Cawsand Fort Management Directors

Date 13 April 2023

#### 1 Introduction

- 1.1 The following report accompanies an application to Cornwall Council for approval to construct a new adoptable foul sewer from The Fort at Cawsand to the existing public combined sewer system in New Road, and should be read in conjunction with the submitted Foul Sewer Plan, Long Section and Manhole Schedule.
- 1.2 The Fort, Cawsand, Torpoint, Cornwall PL10 1PL is an existing residential properties group which was originally developed in two phases. The first phase completed in the early 1980's was connected to the public combined sewer at the time. The second phase was prevented from communicating with the public sewerage system due to a sustained lack of sewerage capacity and the embargo against new connections at that time. The 18 properties of Phase 2 therefore has relied upon a local private treatment process ever since. This system comprises a macerator pumping station and control kiosk located in the raised ground between ramparts and New Road, a package treatment plant, with effluent dispersal soakaway. The whole system is reaching the end of it's useful life. A new sewer connection is required to release the residents from the burden of the failing non-mains drainage system and safeguard against possible failures and environmental issues.

Figure 1 - Google Street View 2015



#### 2 Planning History

- 2.1 The re-development and conversion to form residential dwellings in the following permissions:
- 2.1.1 Planning Permission dated 10<sup>th</sup> November 1974 5/74/0825/9. The erection of eight garages: alteration to access road and construction of sewage treatment plant on land par No 3753, Sheet SX4350 (OS Map Edition 1969.
- 2.1.2 Planning Permission dated 4<sup>th</sup> June 1979 5/79/0322. Alterations and extension to existing fort to form 12 dwellings, erection of 12 garages, provision of parking and alterations to vehicular access on land situated at Cawsand Fort.
- 2.1.3 Planning Permission dated 21<sup>st</sup> April 1989 5/88/01374/F. Erection of twelve maisonettes, six flats and twenty garages on land situated at (Grid Ref. 4334 5040) Caw sand Battery, New Road, Cawsand.

Figure 2 - Phase 1 redevelopment



Figure 3 - Phase 2 redevelopment



2.2 Other permissions made more recently by home owners relate to completed individual dwellings.

#### 3 Heritage Asset

#### 3.1 Site Address:

The Fort, Cawsand, Torpoint, Cornwall PL10 1PL Grid Ref 243369,050328

#### 3.2 Scheduled Monument (Historic England monument schedule)

Figure 4 - Scheduled Monument



#### 3.2.1 Cawsand Fort Listed on the National Heritage List for England. Official list entry

Heritage Category: Scheduled Monument

List Entry Number: 1016102
Date first listed: 31-Jul-1973
Date of most recent amendment: 21-Aug-1997

#### 3.2.2 Location

District: Cornwall (Unitary Authority)

Parish: Maker-with-Rame National Grid Reference: SX 43325 50385

#### 3.2.3 Reasons for Designation

The strategic position of Plymouth, vital to the defence of the South West and the Channel Coast and supporting a major naval dockyard, has led to the development of extensive and complex systems of fortification. Many of these systems owed their design and construction to periods of political unrest within Europe, or to specific threats of invasion, both real or imagined. Their development can also be seen as a response to the sometimes rapidly changing nature of warfare. Plymouth is one of four locations in England where there has been continuity of fortification over at least five centuries

and, of these, it has the greatest concentration of 18th and 19th century forts and batteries.

The mid-19th century fort at Cawsand, which was part of the network of defences on the western approaches to Plymouth harbour and docks, survives as a near complete example of a Palmerstonian fort. It just predates the recommendations of The Royal Commission of 1860 which engendered the construction of some 70 forts and batteries in response to the strengthening of the French navy. The available historical documentation provides a wealth of detail and War Department reports of the late-19th century give precise details of the cost of construction of the fort and its subsequent armaments over the period from 1867 to 1903. The fort retains a near complete circuit of original walling including a bastion and demi-bastion on its landward side as well as a glacis. Many features of its interior are particularly well preserved including the main magazine and many of its raised gun platforms. The fort figures as an element within the defence of one of the nation's most important naval ports and dockyards during a period in which an invasion by the French was thought to have been possible.

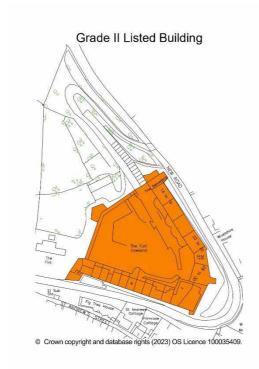
#### 3.2.4 Details

The monument includes the remains of a late-18th century battery, superseded by and incorporated within a mid-19th century fort and battery with associated glacis. The monument is situated at the eastern end of a spur which lies between the villages of Kingsand and Cawsand overlooking Cawsand Bay on the Cornish side of the coastal approach to Plymouth. Historical sources provide details of the battery of 1779 and the construction of the fort and battery in 1860 following a recommendation of 1858 that it should be constructed to defend against ships entering the bay to enfilade the shore. An extant boundary stone on the north east side of the fort, one of a number which indicated the extent of the War Department property, reads W-D 1867 and has been taken as indicating that the fort was completed in that year although parliamentary reports record it as complete in 1863. It was abandoned as a military installation in 1926 following which it has been used for private residences in between periods of dereliction. A pair of granite sett gun platforms located just to the east of the highest ground within the fort provide the only visible remains of the battery of 1779, although below ground remains will survive. The fort of 1860 includes a substantial loopholed curtain wall of monumental limestone ashlar. This mostly survives for its entire circuit defining an area near triangular in shape. Entry was gained by way of two entrances, one through the north wall and one through the south wall. The main entrance way to the fort on its north west landward face was approached by a curving trackway. Much of this entrance way has been destroyed and then rebuilt in the 1990s. This wall was defended by a pair of musketry canopiers at the northern corner, a further two along the sea face, and another at the south corner. The landward face had the additional protection of a loopholed bastion, demi-bastion, and a dry moat which is now infilled over much of its length. Inside the fort are seven gun positions on the seaward face, most retaining elements of their racer rails and two retaining central pivots of reused cannon. These guns would have fired en-barbette over the parapet wall in front of them and over the outer curtain wall. Lying within the array of gun positions is a partly sunken earth covered expense magazine with surviving alcoves and shelving; it has a new stairway built over it. A further expense magazine lies just to the south of the seaward gun positions; this may have served gun positions to the south east which have now been removed. It is now used as a workshop. The main underground

magazine is located in the centre of the fort under a traverse and cavalier. The major element of this magazine is the shell store which is surrounded by a lamp passage with splayed lamp windows which retain some of their original fittings and thickened glass fragments. The magazine also retains other original features such as timber battens and door surrounds. A passage way, totally covered by the traverse, gave access to the magazine and connects the inner walkways on both the north and south sides of the fort. The magazine is also accessed via a spiral stairway from the cavalier, the entrance being covered by an iron trapdoor. The main magazine served, by way of a hoist, those gun positions mounted on the cavalier. Still surviving are many elements of the hoist which at its upper level feeds into a recess in a purpose built part sunken stone built expense magazine which retains some wooden fragments of its original door frame. Mounted on top of the cavalier are four granite gun platforms, revetted with brick walling, facing the landward side of the fort and thus placed to cover the glacis and hillside to the west. The guns fired through limestone ashlar embrasures beyond which splays have been cut in the earthen rampart. The southern curtain wall of the fort has incorporated on its inner face a row of former barracks, which are Listed Grade II, and have been converted into dwellings as has the demi-bastion and caponier on the south west corner. An original entrance way through the barracks in the southern curtain wall survives as does the exterior ramp which served it. The fort has associated land within the original War Department boundary marked by boundary stones, one of which survives at the northern corner of the glacis whilst another dated 1867 lies on the north east corner of the fort. The land exterior to the fort itself comprises a glacis and a long curving approach road leading from the original military road to the entrance at the north. A number of features are excluded from the scheduling, these are; the row of barracks (now converted to housing, Nos 1-12) lying against the inner face of the south west curtain wall, all modern structures and buildings built after 1926 including all private dwelling houses, second expense magazine, used as a workshop, all garages, modern fencing, gates, gateposts and stiles, builders' waste dumps, soil dumps, benches and fittings, modern surfacings of paths, roads and hardstanding areas, and the retaining wall at the south west exterior of the dry moat; although the ground beneath all these features is included except that below the four most westerly garages. Totally excluded from the scheduling are the four most westerly garages lying east-west, opposite the northern exterior curtain wall of the fort. Also totally excluded is a septic tank and the ground beneath it located behind the row of east-west garages in the area of the glacis.

#### 3.3 Listed Building (Historic England listing)

Figure 5 - Grade II Listed Building



# 3.3.1 Cawsand Battery, Cawsand Battery, New Road listed on the National Heritage List for England. Official list entry

Heritage Category: Listed Building

Grade:

List Entry Number: 1329146
Date first listed: 26-Jan-1987

List Entry Name: CAWSAND BATTERY

Statutory Address 1: CAWSAND BATTERY, NEW ROAD

#### 3.3.2 Location

District: Cornwall (Unitary Authority)

Parish: Maker-with-Rame National Grid Reference: SX4333550365

#### 3.3.3 Details

SX 45 SW MAKER-WITH-RAME NEW ROAD, Cawsand 9/231 Cawsand Battery

GV II

Fort. Dated 1867 on foundation stone to north east, built over 2 years and with later additions. Coursed limestone rubble with limestone copings to parapets. Situated on a spur with steep sides, cut off on the landward side by a moat, the fort is roughly triangular in plan, with barrack blocks along the south front to New Road, a curtain wall with ravelin to the landward (western) side, with gun emplacements on the north east(seaward) side. On the southern side, the barrack block is 2-storey to the outside, single storey inside. To the outside are 3 sets of 3 windows, formerly sashes, with door and paired

loops. C20 raised walkway to upper ground floor level, parapet ramped up to end right with 6 loops at upper level, 2 segmental-headed lights at first floor and door to right and left. The barrack blocks were not furnished with bombproof roofs as they were supposedly in "dead ground" from fire. Curtain walls along seaward side, perforated by loops at regular intervals, of unusual form for firing horizontally and at an angle of 45 degrees downwards. On the inner side are 2 gun emplacements, with semicircular pivot tracks and magazine between them. Within the fort, between the north and south sides, a splayed limestone tunnel with segmental-headed door to vaulted chamber to one side. On the landward side, the curtain wall has a fire-step and loops, rising up the spur and culminating in a looped ravelin on the summit. The north east side of the fort was formerly entered through an archway which has now gone. The interior of the fort is honeycombed with an extensive tunnel system. The Battery is 130 feet above high water mark. The aim was to prevent a landing in Cawsand Bay, and was armed with 6 pounders as well as 7 inch and 8 inch breech loading rifled guns. These guns were considered powerful enough to assist Picklecombe Fort (q.v.) should the enemy invade the sound. The cost was £16,171. It is said that the guns were only fired once, causing houses in Cawsand village to fall down. Ancient Monument No. 911. Sources: Rawlings, K.: Defence Works Plymouth Area 1300-1983. 1984).

Listing NGR: SX4333750358

- 4 Proposed Adoptable Foul Sewer Connection
- 4.1 This new connection will take 18 residential dwellings from reliance upon the failing private non-mains sewage treatment and add the foul only flow to the public combined sew er.
- 4.2 This new foul sewer connection has technical approval from South West Water for adoption under Section 104 and is justly appropriate under Section 106 of the Water Industry Act 1991.
- 4.3 The new foul sewer connection is shown in detail on the following plans (Appendix A):
  - AT2445 01 Location Plan
  - AT2445 02B S104 Foul Sewer Adoption Plan
  - AT2445 03A S104 Foul Sewer Adoption Long Section and Manhole Schedule
- 4.4 The new sewer will divert existing foul drains from the present macerator pumping station located outside the ramparts passing through the raised ground at relatively shallow depth to the edge of the New Road highway carriageway. Once in the highway the works remain clear of the Schedule Area. The existing public combined sewer is situated in New Road to the south and west of The Fort. The new sewer will be approximately 137m in total length. Approximately 35m within the Scheduled Area and curtilage of the Grade II Listed Building, but no works are proposed within or to the Listed Building itself.

Figure 6 - Macerator pump station and control kiosk



4.5 The existing macerator pumping station and control kiosk will become redundant and removed.

- 5 Pre-Application Advice
- 5.1 Historic England
- 5.1.1 Pre-application advice obtained from Mr Phil McMahon, Inspector of Ancient Monuments at Historic England as follows:

"To sum up our discussion, it was evident that ground levels had been built up significantly in the area where the sewer connection pipe is proposed. The pipe's nominal 900mm depth is therefore unlikely to impact upon any archaeological remains associated with the fort which may survive beneath the made ground.

As the proposal is within the scheduled area you will need to apply for Scheduled Monument Consent (SMC) but will not need to have the works monitored and supervised by an archaeologist."

5.1.2 Scheduled Monument Consent will be applied for concurrent with this application for planning permission and Listed Building Consent.

- 6 Impact on the Heritage Asset
- 6.1 No works are proposed within or to the Listed Building itself. Approximately 35m of the sewer construction is within the Scheduled Area and curtilage of the Grade II Listed Building.
- 6.2 Operations to construct the new sewer will comprise the mechanical excavation of a trench 0.45m wide and approximately 0.9m deep within the made up ground forming the mound at the eastern side of The Fort. The original ground levels are thought to have been more closely related to the present New Road highway levels, having been raised by up to 3.0 4.0m with excavated material resulting from the original phases of re-development in the late 1980's. The excavation depth is therefore unlikely to impact upon any archaeological remains associated with the fort which may survive beneath the made ground.

Figure 7 - Ground made up at time of the redevelopment

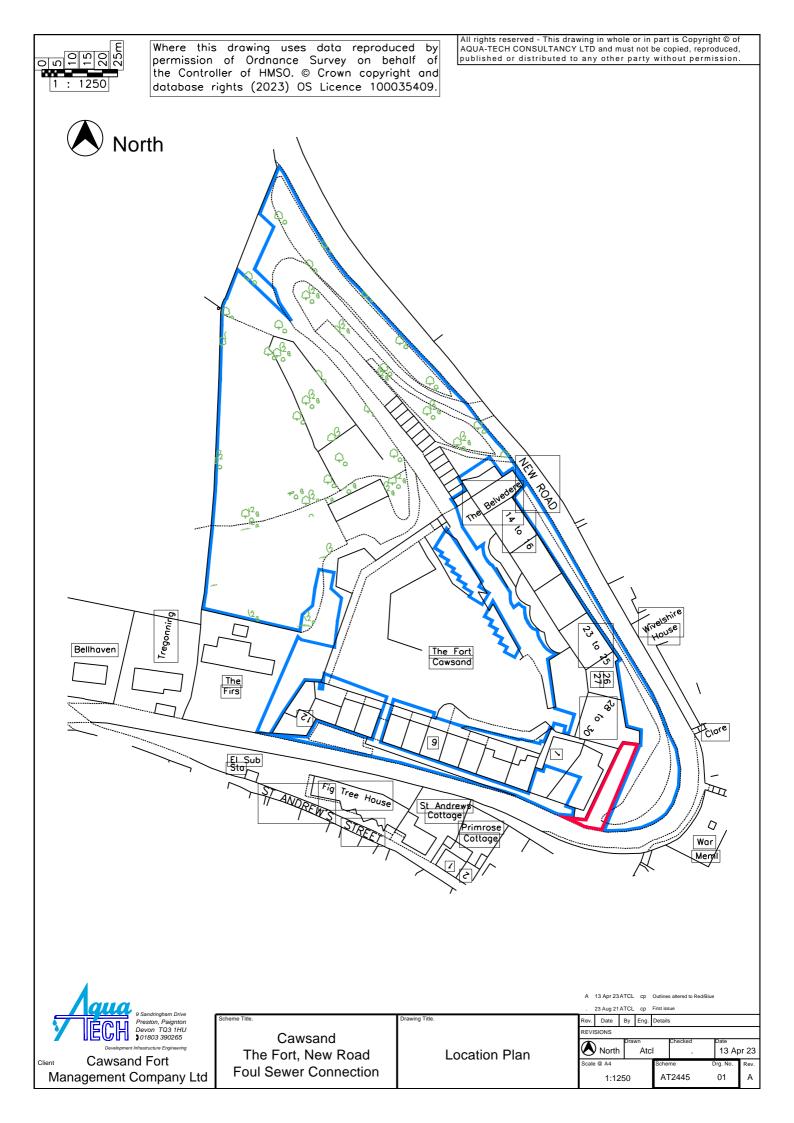


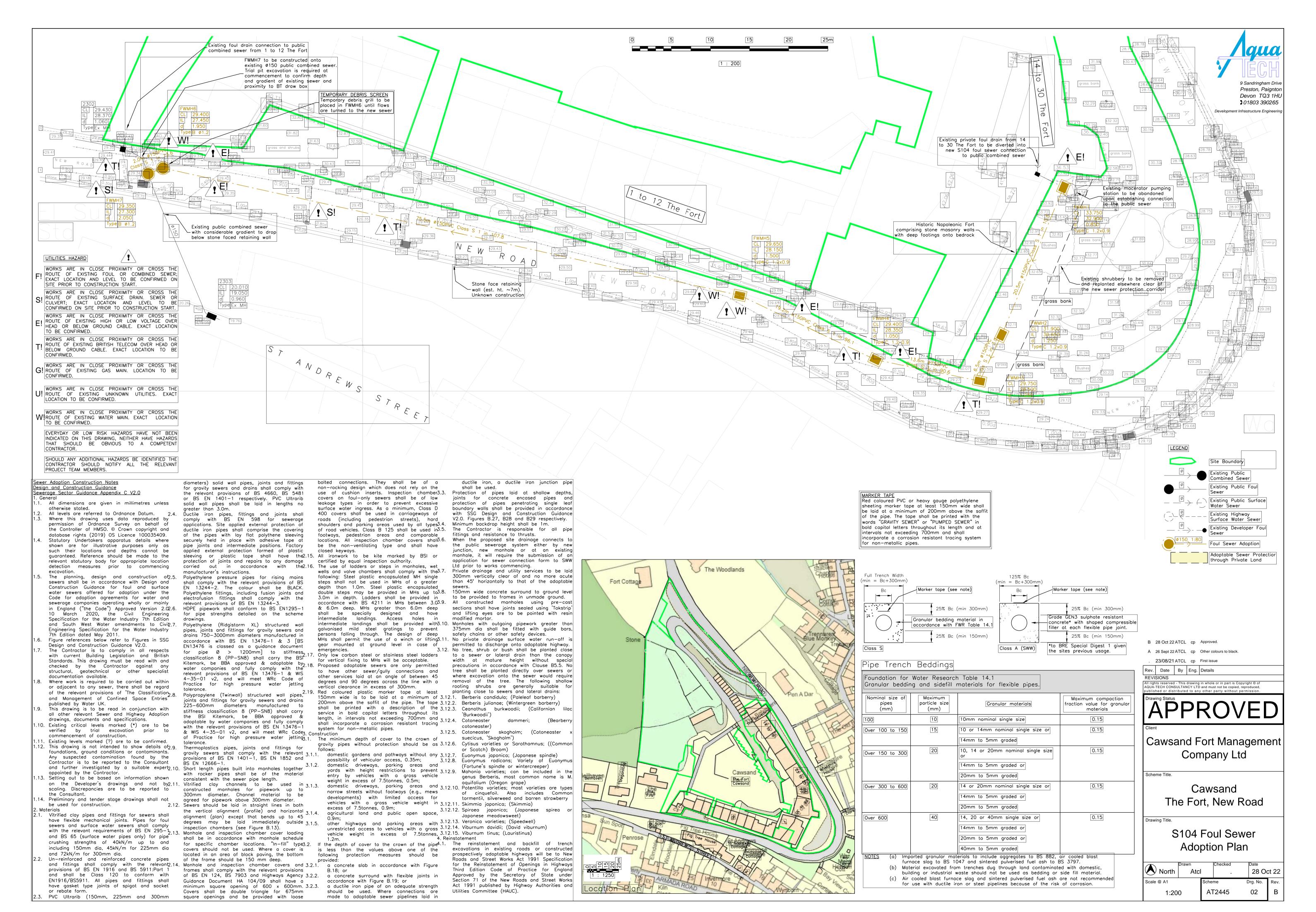
6.3 The new sewer will have no negative impact upon the Scheduled Monument and Listed Building. Upon completion of the works the present macerator pumping station and controls kiosk will be abandoned. The kiosk housing the controls will be removed from setting of the Listed Building, providing an immediate visual improvement.

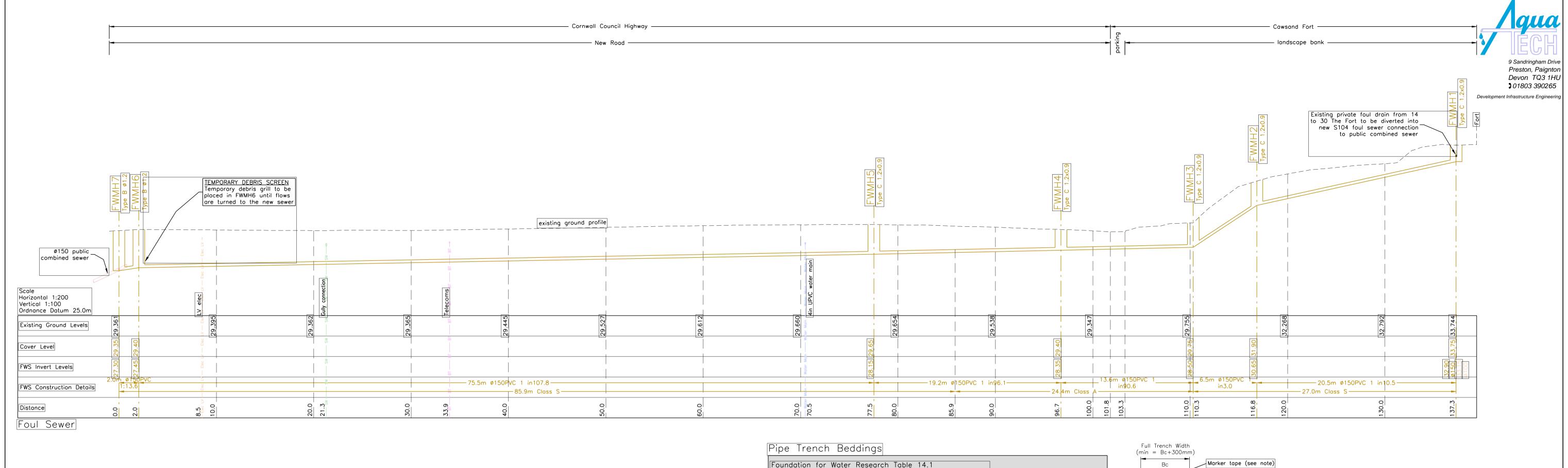
## **Appendices**

Appendix A – Drawings

AT2445 01A Location Plan AT2445 02B S104 Foul Sewer Adoption Plan AT2445 03A S104 Foul Sewer Adoption Long Section and Manhole Schedule







### Sewer Adoption Construction Notes <u>Design and Construction Guidance</u> Sewerage Sector Guidance Appendix C V2.0

1.1. All dimensions are given in millimetres unless otherwise stated. All levels are referred to Ordnance Datum.

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Statutory Undertakers apparatus details where shown are for illustrative purposes only as guaranteed. Reference should be made to the relevant statutory body for appropriate location detection measures prior to commencing excavation.

1.5. The planning, design and construction of 2.5. sewers shall be in accordance with Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code") Approved Version 2.02.6. HDPE pipework shall conform to BS EN1295-1 March 2020, the Civil Engineering Specification for the Water Industry 7th Edition and South West Water amendments to Civi2.7. Engineering Specification for the Water Industry 7th Edition dated May 2011.

Figure references below refer to Figures in SSG Design and Construction Guidance V2.0. The Contractor is to comply in all respects with current Building Legislation and British Standards. This drawing must be read with and checked by the Contractor against any structural, geotechnical or other specialist

documentation available. Where work is required to be carried out within or adjacent to any sewer, there shall be regard of the relevant provisions of 'The Classification<sub>2.8</sub>. and Management of Confined Space Entries published by Water UK.

This drawing is to be read in conjunction with all other relevant Sewer and Highway Adoption drawings, documents and specifications. 1.10. Existing critical levels marked (\*) are to be

verified by trial excavation prior to commencement of construction. 1.11. Existing levels marked (?) are to be confirmed

1.12. This drawing is not intended to show details of 2.9. foundations, ground conditions or contaminants. Any suspected contamination found by the Contractor is to be reported to the Consultant and further investigated by a suitable expert2.10. Short length pipes built into manholes together appointed by the Contractor.

1.13. Setting out to be based on information shown scaling. Discrepancies are to be reported to

1.14. Preliminary and tender stage drawings shall not be used for construction. 2. Materials

2.1. Vitrified clay pipes and fittings for sewers shall have flexible mechanical joints. Pipes for foul sewers and surface water sewers shall comply with the relevant requirements of BS EN 295-12.13. and BS 65 (surface water pipes only) for pipe crushing strengths of 40kN/m up to and including 150mm dia, 45kN/m for 225mm dia and 72kN/m for 300mm dia. 2.2. Un-reinforced and reinforced concrete pipes

provisions of BS EN 1916 and BS 5911:Part 1 and shall be Class 120 to conform with EN1916/BS5911. All pipes and fittings shall have gasket type joints of spigot and socket or rebate form. 2.3. PVC Ultrarib (150mm, 225mm and 300mm

diameters) solid wall pipes, joints and fittings for gravity sewers and drains shall comply with the relevant provisions of BS 4660, BS 5481 or BS EN 1401-1 respectively. PVC Ultrarib solid wall pipes shall be laid in lengths no areater than 3.0m.

Ductile iron pipes, fittings and joints shall comply with BS EN 598 for sewerage applications. Site applied external protection of ductile iron pipes shall comprise the covering of the pipes with lay flat polythene sleeving securely held in place with adhesive tape at pipe joints and intermediate positions. Factory sleeving or plastic tape shall have the 2.15. All ironwork to be kite marked by BSI or protection of joints and repairs to any damage carried out in accordance with the 2.16.

manufacturer's instructions. Polyethylene pressure pipes for rising mains shall comply with the relevant provisions of BS EN 13244-2. The colour shall be BLACK. Polyethylene fittings, including fusion joints and electrofusion fittings shall comply with the relevant provisions of BS EN 13244-3. for pipe strengths detailed on the scheme

Polyethylene (Ridgistorm XL) structured wall pipes, joints and fittings for gravity sewers and drains 750-3000mm diameters manufactured in accordance with BS EN 13476-1 & 3 [BS EN13476 is classed as a guidance document for pipe  $\emptyset > 1200$ mm] to stiffness classification 8 (PP-SN8) shall carry the BSF Kitemark, be BBA approved & adoptable by water companies and fully comply with the relevant provisions of BS ÉN 13476-1 & WIS 4-35-01 v2, and will meet WRc Code of

Practice for high pressure water jetting tolerance. Polypropylene (Twinwall) structured wall pipes; joints and fittings for gravity sewers and drains 225-600mm diameters manufactured to stiffness classification 8 (PP-SN8) shall carry the BSI Kitemark, be BBA approved & adoptable by water companies and fully comply with the relevant provisions of BS EN 13476-1 & WIS 4-35-01 v2, and will meet WRc Codez. Construction

Practice for high pressure water jetting3.1 tolerance. Thermoplastics pipes, joints and fittings for gravity sewers shall comply with the relevant 3.1.1. provisions of BS EN 1401-1, BS EN 1852 and BS EN 12666-1.

with rocker pipes shall be of the material consistent with the sewer pipe length. on the Developer's drawings and not by2.11. Vitrified clay channels to be used in 3.1.3. constructed manholes for pipework up to 300mm diameter. Channel material to be agreed for pipework above 300mm diameter. 2.12. Sewers should be laid in straight lines in both the vertical alignment (profile) and horizontal 3.1.4. alignment (plan) except that bends up to 45 degrees may be laid immediately outside 3.1.5. inspection chambers (see Figure B.13). Manhole and inspection chamber cover loading shall be in accordance with manhole schedule

located in an area of block paving, the bottom of the frame should be 150 mm deep. and fittings shall comply with the relevant2.14. Manhole and inspection chamber covers and 3.2.1. frames shall comply with the relevant provisions of BS EN 124, BS 7903 and Highways Agency 3.2.2. a concrete surround with flexible joints in Guidance Document HA 104/09 shall have a minimum square opening of 600 x 600mm. 3.2.3. a ductile iron pipe of an adequate strength Covers shall be double triangle for 675mm square openings and be provided with loose made to adoptable sewer pipelines laid in

covers should not be used. Where a cover is

bolted connections. They shall be of a non-rocking design which does not rely on the use of cushion inserts. Inspection chamber3.3. covers on foul-only sewers shall be of low leakage types in order to prevent excessive surface water ingress. As a minimum, Class D 400 covers shall be used in carriageways of roads (including pedestrian streets), hard shoulders and parking areas used by all types 3.4. of road vehicles. Class B 125 shall be used in 3.5. footways, pedestrian areas and comparable locations. All inspection chamber covers shalb.6. When the proposed site drainage connects to be the non-ventilating type and shall have

certified by equal inspection authority. The use of ladders or steps in manholes, wet wells and valve chambers shall comply with the 3.7. following: Steel plastic encapsulated MH single steps shall not be used in MHs of a greater depth than 1.0m. Steel plastic encapsulated double steps may be provided in MHs up to 3.8. 3.0m in depth. Ladders shall be provided in accordance with BS 4211 in MHs between 3.03.9. & 6.0m deep. MHs greater than 6.0m deep shall be specially designed and have intermediate landings. Access holes in intermediate landings shall be provided with 3.10 galvanised mild steel gratings to prevent persons falling through. The design of deep MHs shall permit the use of a winch or lifting 3.11.

emergencies. Only low carbon steel or stainless steel ladders for vertical fixing to MHs will be acceptable. Proposed adoptable sewers are only permitted to have other sewer/gully connections and other services laid at an angle of between 45 degrees and 90 degrees across the line with a vertical clearance in excess of 300mm. 2.19. Red coloured plastic marker tape at least

gear mounted at ground level in case of

200mm above the soffit of the pipe. The tape 3.12.2. Berberis julianae; (Wintergreen barberry) shall be printed with a description of the 3.12.3. Ceanothus burkwoodii; (Californian lilac service in bold capital letters throughout its length, in intervals not exceeding 700mm and 3.12.4. Cotoneaster shall incorporate a corrosion resistant tracing system for non-metallic pipes. The minimum depth of cover to the crown of

gravity pipes without protection should be as 3.12.6. Cytisus varieties or Sarothamnus; ((Common domestic gardens and pathways without any 3.12.7. Euonymus japonica; (Japanese spindle) possibility of vehicular access, 0.35m; domestic driveways, parking areas and yards with height restrictions to prevent 3.12.9. Mahonia varieties; can be included in the entry by vehicles with a gross vehicle weight in excess of 7.5tonnes, 0.5m; domestic driveways, parking areas and 3.12.10. Potentilla varieties; most varieties are types

narrow streets without footways (e.g., mews developments) with limited access for vehicles with a gross vehicle weight in 3.12.11. Skimmia japonica; (Skimmia) agricultural land and public open space, other highways and parking areas with 3.12.13. Veronica varieties; (Speedwell) unrestricted access to vehicles with a gross 3.12.14. Viburnum davidii; (David viburnum)

vehicle weight in excess of 7.5tonnes, 3.12.15. Viburnum tinus; (Lauristinus) 4. Reinstatement for specific chamber locations. "In-fill" type3.2. If the depth of cover to the crown of the pipe4.1. The reinstatement and backfill of trench is less than the values above one of the following protection measures should be a concrete slab in accordance with Figure

should be used. Where connections are

accordance with Figure B.19; or

Protection of pipes laid at shallow depths, joints for concrete encased pipes and protection of pipes penetrating single leaf boundary walls shall be provided in accordance with SSG Design and Construction Guidance V2.0. Figures B.27, B28 and B29 respectively. Minimum backdrop height shall be 1m. The Contractor is responsible for all pipe fittings and resistance to thrusts. the public sewerage system either by new iunction, new manhole or at an existina manhole, it will require the submission of an

shall be used.

ductile iron, a ductile iron junction pipe

application for sewer connection form to SWW Ltd prior to works commencing. Private drainage and utility services to be laid 300mm vertically clear of and no more acute than 45° horizontally to that of the adoptable 150mm wide concrete surround to ground level to be provided to frames in unmade ground. All constructed manholes using pre-cast

sections shall have joints sealed using 'Tokstrip'

and lifting eyes are to be pointed with resin

modified mortar. . Manholes with outgoing pipework greater than 375mm dia shall be fitted with guide bars, safety chains or other safety devices. . No private drainage surface water run-off is permitted to discharge onto adoptable highway. 3.12. No tree, shrub or bush shall be planted close to a sewer or lateral drain than the canopy width at mature height without special precautions in accordance with Clause B5.5. No tree shall be planted directly over sewers or where excavation onto the sewer would require removal of the tree. The following shallow

rooting shrubs are generally suitable for planting close to sewers and lateral drains: 150mm wide is to be laid at a minimum of 3.12.1. Berberis candidula; (Paleleaf barberry)

'Burkwoodii') dammeri: (Bearberry cotoneaster) 3.12.5. Cotoneaster skogholm; (Cotoneaster suecicus, 'Skogholm')

or Scotch) Broom) 3.12.8. Euonymus radicans; Variety of Euonymus (Fortune's spindle or wintercreeper) genus Berberis, most common name is M. aquifolium (Oregon grape) of cinquefoil. Also includes Common tormentil, silverweed and barren strawberry

Japanese meadowsweet)

excavations in existing roads or constructed prospectively adoptable highways will be to New Roads and Street Works Act 1991 Specification for the Reinstatement of Openings in Highways Third Edition Code of Practice for England Approved by the Secretary of State under Section 71 of the New Roads and Street Works Act 1991 published by Highway Authorities and Utilities Committee (HAUC).

Nominal size of pipes (mm)	Maximum particle size (mm)	Granular materials	Maximum compaction fraction value for granular materials	
100	10	10mm nominal single size	0.15	
Over 100 to 150	15	10 or 14mm nominal single size or	0.15	
		14mm to 5mm graded		
Over 150 to 300	20	10, 14 or 20mm nominal single size or	0.15	
		14mm to 5mm graded or		
		20mm to 5mm graded		
Over 300 to 600	20	14 or 20mm nominal single size or	0.15	
		14mm to 5mm graded or		
		20mm to 5mm graded		
Over 600	40	14, 20 or 40mm single size or	0.15	
		14mm to 5mm graded or		
		20mm to 5mm graded or		
		40mm to 5mm graded		

(a) Imported granular materials to include aggregates to BS 882, air cooled blast furnace slag to BS 1047 and sintered pulverised fuel ash to BS 3797. (b) Material excavated from trenches dug through land contaminated with domestic. building or industrial waste should not be used as bedding or side fill material. (c) Air cooled blast furnace slag and sintered pulverised fuel ash are not recommended

for use with ductile iron or steel pipelines because of the risk of corrosion.

25% Bc (min 300mm) Granular bedding material in accordance with FWR Table 14.1 25% Bc (min 150mm) Class S

(min = Bc + 300mm)Marker tape (see note) 25% Bc (min 300mm) Grade GEN3 sulphate resistant concrete\* with shaped compressible filler at each flexible pipe joint. 25% Bc (min 150mm) \*to BRE Special Digest 1 given the sites previous usage.

MARKER TAPE
Red coloured PVC or heavy gauge polyethylene sheeting marker tape at least 150mm wide shall be laid at a minimum of 200mm above the soffit of the pipe. The tape shall be printed with the words "GRAVITY SEWER" or "PUMPED SEWER" in bold capital letters throughout its length and at intervals not exceeding 700mm and shall lincorporate a corrosion resistant tracing system for non-metallic pipes.

M.H. Ref	Plan	Cover Level (m)	Invert Level (m)	Depth (m)	Туре	Dimensions	Pipe Diameter (mm)			Cover Grade	Remarks
	1 1011	Covel (r	Invert (r	Dept	Ţ	Billionolono	Main inlet	Branch Inlet(s)	Outlet	Cover	rtomano
FWMH1	X-150 PVC A-100	107.150	105.550	1.600	Type C	1.2x0.9	150		150	D400 1220x685	
FWMH2	X-150 PVC A A-150 PVC	106.400	104.800	1.600	Type C	1.2x0.9	150		150	D400 1220x685	
FWMH3	X-150 PVC A-150 PVC	105.100	103.500	1.600	Туре С	1.2x0.9	150		150	D400 1220x685	
FWMH4	X-150 PVC ↓ A-150 PVC	103.850	102.150	1.700	Туре С	1.2x0.9	150		150	D400 1220x685	
FWMH5	X-150 PVC ↓ A-150 PVC	99.500	97.550	1.950	Type C	1.2x0.9	150		150	D400 1220x685	
FWMH6	X-150 PVC A-150 PVC	95.150	92.950	2.200	Туре В	Ø1.2	150		150	D400 600x600	
FWMH7	X-150 PVC	90.800	88.350	2.450	Туре В	Ø1.2	150	150	150	D400 600x600	

Pipe orientation shown is diagrammatic only

A 28 Oct 22 ATCL cp Approved

23/08/21 ATCL cp First issue

Rev. Date By Eng. Details

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# APPROVED

Cawsand Fort Management Company Ltd

Scheme Title.

Cawsand The Fort, New Road

S104 Foul Sewer Adoption Long Section and Manhole Schedule

North		Checked •	Date 28 O	ct 22
Scale @ A1	Scheme [		Drg. No.	Rev.
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