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## **APPROVAL IN PRINCIPLE FOR DESIGN OF**

***Proposed Private Retaining Wall at Blue Hills  
Farm Adjacent to A58 Whitehall Road West,  
Birkenshaw***

**Structure reference: K66044**  
**Date: 19/06/2024**  
**Revision: P5**  
**Status: Final**  
**Prepared by: Tom Hogan**  
**Checked by: Paul Gill**

Information is available in large print, braille,  
audio tape, or PC disk on request

**Scheme title: A58 Whitehall Road West, Birkenshaw**  
**Structure title: Proposed Private Redi-Rock Retaining Wall**

**Struct Ref: K66044**  
**Rev P5 19/06/2024**

**DOCUMENT CONTROL**

**Structure title:** Proposed private retaining wall at Blue Hills Farm adjacent to A58 Whitehall Road West, Birkenshaw

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**Document issue record**

Issue	Status	Prepared	Date	Checked	Date	Approved	Date
P1	S2	TH	June 23	PG	June 23	EE	June 23
P2	S2	TH	June 23	PG	June 23	EE	June 23
P3	S2	TH	Sept' 23	PG	Sept' 23	EE	Sept' 23
P4	S2	TH	Nov' 23	PG	Nov' 23	EE	Nov' 23
P5	S2	TH	Jun' 24	PG	Jun' 24	EE	Jun' 24

## PROJECT DETAILS

Name of project: Blue Hills Farm, Birkenshaw

Name of Bridge or Structure: Proposed Private Redi-Rock Retaining Wall

Structure reference no: K66044

Summary:

This report is for the approval in principle submission of a proposed retaining wall. The retaining wall in question will run alongside an existing highway on the southern boundary for a proposed housing development. The proposed development is located on the A58, Whitehall Road West at Blue Hills Farm, Birkenshaw.

## 1. HIGHWAY DETAILS

### 1.1. Type of highway

#### 1.1.1. Location and OS Map / Grid reference

Location:	A58, Whitehall Road West, Birkenshaw
OS Map:	SE 210001 27688
Grid Ref (X, Y):	(420001, 427668)

### 1.2. Permitted traffic speed

30 mph.

### 1.3. Existing restrictions

None.

## 2. SITE DETAILS

### 2.1. Obstacles crossed

None.

### 3. PROPOSED STRUCTURE

#### 3.1. Description of structure and design working life

The retaining wall is to be a proprietary Redi-Rock gravity retaining wall, designed by Civilweb Consulting Engineers, to retain landscaping adjacent to a highway boundary. The retaining wall is constructed from concrete blocks that are precast to lock together.

There is to be 1.1m high steel galvanised railings on top of the wall.

The wall is located on the southern boundary of the housing estate along the A58 Whitehall Road West. Refer to drawing 09.21011-ACE-00-ZZ-DR-C-3200 Rev P13 for location on site.

The structure is to be designed to have a design working life of 120 years in accordance with CD 350.

#### 3.2. Structural type

Proprietary precast concrete blocks gravity retaining wall.

#### 3.3. Foundation type

Minimum 200mm thick well compacted Type 1 granular sub-base as permitted by within the HAPAS certificate. Formation level will be a minimum of 500mm below proposed ground levels on the lower side.

The Southern area of the site is to be drilled and grouted. It is proposed that grout holes on 6m centres for a primary grid beneath the highway. Refer to grouting and drilling specification in the appendices. Underneath the Redi-Rock wall however, additional grouting holes are proposed on 3m centres to ensure mine workings have been fully consolidated.

#### 3.4. Span arrangements

Redi-Rock retaining wall system is to span vertically as a gravity retaining wall to resist sliding and overturning forces created by retained ground. The horizontal setback between blocks shall be 41mm in accordance with the BBA certificate (Figure 2) to provide a 5-degree batter to the face of the retaining wall.

The total length of the wall parallel to the highway is 55 metres long. In the final condition the maximum retained height (difference in level between the front and back of wall) of any section of the wall on site will not exceed 3.1m. For design purposes the retained height is measured to the formation level to allow for unplanned excavation. i.e. 3.6m.

#### 3.5. Articulation arrangements

N/A.

#### 3.6. Classes and levels

##### 3.6.1 Consequence class - BS EN 1990-2002+A1-2005 B3.1

Consequence class to be CC2 (medium consequence for loss of human life, economic, social or environmental consequences considerable)

##### 3.6.2 Reliability class - BS EN 1990-2002+A1-2005 B3.2&B3.3

Reliability class is to be associated with the consequence class detailed in 3.6.1. Reliability class to be RC2. Factor for actions to be used KFI = 1,0

##### 3.6.3 Inspection level

Inspection Level 2 – Normal inspection (inspection in accordance with the procedures of the inspecting organisation).

**3.7. Road restraint systems requirements**

The stem of the retaining wall will extend a minimum of 0.1m up above the higher landscaping levels and will act as small upstand to stop materials falling onto the highway. No vehicular access is possible at the top of the wall.

Edge protection is to be provided by a 1.1m high steel railing and handrail. Refer to drawing 4035-20-AWSM-XX-XX-DR-A1032 for details.

**3.8. Proposals for Water Management**

A 150mm perforated field drain is provided to ensure the granular fill to the rear of the wall shall be drained at all times. Drainage requirements are as shown in Civilweb sections, located to the rear of the wall in appendices and connected to a site wide land drainage network.

**3.9. Proposed arrangements for future maintenance and inspection**

**3.9.1. Traffic management**

No traffic management would be required to inspect or maintain the retaining wall.

**3.9.2. Arrangements for future maintenance and inspection of structure. Access arrangements to structure.**

Future maintenance and inspection is anticipated to be required within the design life of the structure. When maintenance is required, the wall can be inspected from the front face only. In order to inspect the rear face of retaining wall, temporary works measures would be required to remove backfill material.

**3.10. Environment and sustainability**

Use of cement replacement materials such as GGBS & PFA can be used providing the specification of DS-1; AC-1; DC-1 is adhered to on site.

**3.11. Durability. Materials and finishes**

Item	Material	Finish / Location
Redi-Rock Concrete Blocks	RC40 in accordance with BS 8500-1 and BS EN 206-1. B500B Steel reinforcement in accordance with BS 4449 and BS EN 10080.	Design Sulphate class DS-1 and ACEC class AC-1. Exposure class, XF1 to BS EN 206-1:2013 for min 100 years design working life. Corresponding location on the structure.
Backfill material	Type 3 in compliance with specification for highway works, (SHW).	Backfill to structure.
Drainage (for retaining walls)	Provision of 150mm dia. PVC perforated longitudinal drain behind the wall taken to a suitable outfall.	Rear of retaining wall

**3.12. Risks and hazards considered for design, execution, maintenance and demolition. Consultation with and/or agreement from Overseeing Organisation**

Danger of falling into the deep excavation, where the retaining wall is particularly high. Suitable barriers around the excavation will be provided to mitigate this.

Danger of heavy lifting, handling or carry objects resulting in musculoskeletal injuries, therefore use of machinery to lift the blocks in place is required.

Danger of working adjacent to a live highway. After the construction of the retaining wall, no excavation must take place near the toe of the wall. The blocks must be installed in place correctly to ensure a minimum 120-year design life. The granular fill to the rear of the wall must be drained at all times via a 150mm dia land drain at the rear of the wall.

**3.13. Estimated cost of proposed structure together with other structural forms considered (including where appropriate proprietary manufactured structure), and the reasons for their rejection (including comparative whole life costs with dates of estimates)**

Cost £130,000 approx.

Initial discussions with Kirklees Highways suggested that a Redi Rock wall would be supported as a suitable alternative if supported with a HAPAS Certification. This certificate has been provided separately.

RC concrete considered but more laborious as the chosen and likely to incur higher construction costs. Other walls also considered but rejected during initial discussions due to not being deemed appropriate by Kirklees Highways are gabions, crib and Stepoc walls.

**3.14. Proposed arrangements for construction**

**3.14.1. Construction of structure**

An excavator will be used to remove the soil in the area where the retaining wall will be placed. The soil will be battered back to prevent it failing, whilst minimising impact on existing tree roots. Formation level will be proof rolled. The sub-base for the foundations will then be laid. The precast blocks will be then placed onto the foundations and constructed to the design and details provided by Redi-Rock.

**3.14.2. Traffic management**

It is anticipated that the works can be undertaken with no effect to the adjacent public highway as this at sufficient distance away from the works. Site hoarding will be installed around the perimeter of the site, including along the boundary with Whitehall Road. Should traffic management become necessary, this will first be agreed with Kirklees Council.

**3.14.3. Service diversions**

Full service survey required in existing embankment.

**3.14.4. Interface with existing structures**

Parallel to existing highway, no existing structures.

## 4. DESIGN CRITERIA

### 4.1. Actions

**4.1.1. Permanent actions**

All permanent actions calculated using BS EN 1991-1-1 and UK national annex.

**4.1.2. Snow, Wind and Thermal actions**

N/A.

**4.1.3. Actions relating to normal traffic under AW regulations and C&U regulations**

None. Applied load is a private footpath to a dwelling. All construction activity on site will be via mini excavator and compaction facilitated using small waka plates etc. In use – no vehicular traffic will be allowed to the top of the wall.

**4.1.4. Actions relating to General Order traffic under STGO regulations**

N/A

**4.1.5. Footway or footbridge variable actions**

A surcharge allowance of 5.0kN/m<sup>2</sup> has been allowed for pedestrian loading in the design in accordance with BS8002:2015 table 7.

**4.1.6. Actions relating to Special Order traffic, provision for exceptional abnormal indivisible loads including location of vehicle track on deck cross-section**

N/A

**4.1.7. Accidental actions**

Large machinery and plant will not be able to access behind the wall, either during construction or whilst in use. No accidental actions to be allowed for.

The adjacent proposed plots are to be traditional trench fill foundations. However, the base of the footings have similar formations so will not impose any load or undermine the Redi-Rock wall.

**4.1.8. Action during construction**

Geotechnical actions and construction loads to be in accordance with 4.3 and 4.11 of BS EN 1991-1-6 and NA to BS EN 1991-6.

The retaining wall is to be backfilled in accordance with the MCHW and surcharge loadings are to be derived based on the requirements of PD 6694-1:2011. Therefore, compaction pressures imposed on the wall during construction do not need to be considered. (PD 6694-1:2011 CL 7.3.3).

No large machinery or plant will access the back of wall area either during or post construction.

**4.1.9. Any special action not covered above**

N/A.

**4.2. Heavy or high load route requirements and arrangements being made to preserve the route, including any provision for future heavier loads or future widening**

None.

**4.3. Proposed minimum headroom provided**

N/A.

**4.4. Authorities consulted and any special conditions required**

Kirklees Council

**4.5. Standards and documents listed in the Technical Approval Schedule**

Documents referred to in the design of the structures are contained within the Technical Approval Schedule (TAS) dated October 2022 in Appendix A.

**4.6. Proposed departures from standards listed in 4.5**

None.

**4.7. Proposed departures from standards concerning methods for dealing with aspects not covered by standards listed in 4.5**

The Red-Rock retaining wall will be a private structure and as such its maintenance liability will solely rest with the adjoining properties title holder/s. This will be shown on the land registry title deeds and plans for the properties (i.e. the maintenance responsibility for the retaining walls is shown using an inverted "T" symbol). A copy of the land registry deed plan will be sent the Council's Highway Structures section for record purposes.

The Redi-Rock retaining wall has already been built and this technical approval is being sought retrospectively.

**4.8. Proposed safety critical fixings**

None.

## 5. STRUCTURAL ANALYSIS

### 5.1. Methods of analysis proposed for superstructure, substructure and foundations

The Redi-Rock retaining wall will be considered as a gravity structure analysed elastically with simple load distribution to EN1997-1:2004 incorporating Corrigendum dated February 2009 and UK National Annex incorporating Corrigendum No. 1.

The pedestrian loading and earth pressure coefficients are to be in accordance with BS 8002: 2015 and PD6694-1:2011.

### 5.2. Description and diagram of idealised structure to be used for analysis

The Redi-Rock retaining wall will be analysed as a gravity structure to resist lateral and vertical loads derived in accordance with section 4.1 above.

Hydrostatic pressure has been ignored from the calculations in this instance. This is because the structure will be backfilled with granular fill in addition to installing a longitudinal perforated drain which will allow the free flow of water behind the structure. This will prevent any significant build-up of hydrostatic pressure being applied to the wall.

### 5.3. Assumptions intended for calculation of structural element stiffness

Linear elastic analysis using gross un-cracked section properties.

### 5.4. Proposed range of soil parameters to be used in the design of earth retaining elements

Blocks to be RC40 concrete, with free draining granular backfill and a levelling pad which will be made from either compacted crushed stone or graded granular fill, as stated in the HAPAS certificate.

## 6. GEOTECHNICAL CONDITIONS

### 6.1. Acceptance of recommendations of the ground investigation report (references/dates) to be used in the design and reasons for any proposed changes

Please refer to borehole logs WS 09 & WS 10 within the ground investigation report included within the appendices. These boreholes were taken closest to the location of the proposed retaining structure.

Very Stiff Clay was noted at between 2.47m and 2.60m begl. The levels of the very stiff clay in the windowless samples were recorded at 150.990 and 151.810 respectively.

It has been noted on site that the clay at formation is consistent with the very stiff clay noted in the ground investigation and the CBR values taken at formation level of the proposed structure were all above 5% following a week of consistent rainfall. Therefore, the findings of the site investigation report have been accepted as correct.

Following commencement on site, evidence of unrecorded mine workings was found on site. These were investigated and it was concluded that there were likely to be shallow unrecorded mine workings south of the geological fault line, and grouting was recommended to mitigate the mining risk. The proposals are indicated on the grout hole location plan and grouting and drilling specification. These were Agreed with Kirklees Highways on 19<sup>th</sup> June 2024.

### 6.2. Summary of design for highway structure in the ground investigation report

The boreholes closest to the proposed retaining structure are WS09 and WS10, which indicate very stiff clays at the formation depths of the proposed Retaining structure.

In WS09 it was recorded that the SPT value was N = 50 at 150.590. In WS10 it was noted that the SPT value was N = 45 at 151.280.

SPT N values were recorded in the borehole logs as being taken in very stiff Clay.

The foundation of wall is to be founded on to the same natural very stiff Clay, with an allowable bearing pressure of > 150 kN/m<sup>2</sup> as per the Civilweb design requirements. Testing has been undertaken to confirm on site.

CBR tests have been undertaken at formation level of the proposed redi-rock wall adjacent to plots 1 and 8, providing 12% and 5.1% results respectively. Which are deemed to confirm the design and requirements stated in the HAPAS certificate.

### 6.3. Differential settlement to be allowed for in the design of the structure

N/A.

### 6.4. If the ground investigation report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations

N/A.

## 7. CHECK

**7.1. Proposed Category and Design Supervision Level**

Category 1

DSL2

**7.2. If Category 3, name of proposed Independent Checker**

N/A.

**7.3. Erection proposals or temporary works for which Types S and P Proposals will be required, listing structural parts of the permanent structure affected with reasons**

N/A.

## 8. DRAWINGS AND DOCUMENTS

### 8.1. List of drawings (including numbers) and documents accompanying the submission

#### 8.1.1. Drawings (See appendix B)

Reference	Revision	Title
09.21011-ACE-00-ZZ-DR-C-3200	P16	External Levels Phase 1, Sheet 1 of 2
00.23009-ACE-00-ZZ-DR-C-3604	C1	Southern Boundary Sections
09.21011-ACE-00-ZZ-DR-C-3205	C1	Proposed Redi-Rock Wall Levels
09.21011-ACE-00-ZZ-DR-C-3615	C1	Redi-Rock Wall Elevation with Proposed Ground Levels
5856952 Layout -1	B	Mashalls Proposed Layout Redi-Rock Retaining Wall
P0121-265-001	1	Redi-Rock Retaining Wall Detail
4035-20-ASWM-XX-XX-DR-A-1032	P5	Boundary Plan
13813-003	-	Grout Hole Layout

#### 8.1.2. Documents (See appendix C)

Reference	Title
15/H235	Redi Rock BBA Certificate
0121-265	Redi-Rock Design Report
0121-265	Redi-Rock Design Calculations
PLT_NOR23-1661-S002	Equivalent CBR Value derived from Plate Bearing Test
PLT_NOR23-1661-S003	Equivalent CBR Value derived from Plate Bearing Test
2230244	Ground Investigation Report
13813	Grouting and Drilling Specification

Designer to note that all the drawings listed above must be "As Built"

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## 9. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Design Team Leader

Signed   
Name Paul Gill  
Engineering Qualifications BEng (Hons)  
Name of Organisation Adept Consulting Engineers Ltd  
Date 27.06.2024

Check Team Leader

Signed   
Name Erol Erturan  
Engineering Qualifications BSc, MSc, BEng, MICE, MIStructE  
Name of Organisation Adept Consulting Engineers Ltd  
Date 27.06.2024

## 10. THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW

Signed   
Name Claire Richardson  
Position held Principal Engineer - Highway Structures  
Engineering Qualifications CEng MICE  
TAA Kirklees Council  
Date 28-03-2025

For and on behalf of Kirklees Council

## **APPENDIX A**

### ***LIST OF RELEVANT DESIGN DOCUMENTS***

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## TECHNICAL APPROVAL SCHEDULE (TAS)

### Schedule of Documents Relating to Design of Highway Bridges and Structures

(All documents are taken to include revisions current as of October 2022)

The Designer is responsible for ensuring that the standards and references given in the schedule are correct and up to date. [Tick all the documents used](#) (✓)

Eurocodes (Including National Annexes)					
Eurocode Part	Title	Date	UK National Annex Publication Date	Ref	Tick if Relevant
<b>Eurocode 0</b>	<b>Basis of Structural Design</b>				
BS EN 1990	Eurocode 0: Basis of structural design	2002	2004		✓
<b>Eurocode 1</b>	<b>Actions on Structures</b>				
BS EN 1991-1-1	Actions on structures – Part 1-1: General actions – Densities, self-weight and imposed loads for buildings	2002	2005		✓
<del>BS EN 1991-1-3</del>	<del>Actions on structures – Part 1-3: General actions – Snow loads</del>	<del>2003</del>	<del>2005</del>		
<del>BS EN 1991-1-4</del>	<del>Actions on structures – Part 1-4: General actions – Wind actions</del>	<del>2005</del>	<del>2008</del>		
<del>BS EN 1991-1-5</del>	<del>Actions on structures – Part 1-5: General actions – Thermal actions</del>	<del>2004</del>	<del>2007</del>		
<del>BS EN 1991-1-6</del>	<del>Actions on structures – Part 1-6: General actions – Actions during execution</del>	<del>2005</del>	<del>2008</del>		
<del>BS EN 1991-1-7</del>	<del>Actions on structures – Part 1-7: General actions – Accidental actions</del>	<del>2006</del>	<del>2008</del>		
BS EN 1991-2	Actions on structures – Part 2: Traffic loads on bridges	2003	2008		✓
<b>Eurocode 2</b>	<b>Design of Concrete Structures</b>				
BS EN 1992-1-1	Design of concrete structures – Part 1-1: General rules and rules for buildings	2004	2005		✓
BS EN 1992-2	Design of concrete structures – Part 2: Concrete bridges – Design and detailing rules	2005	2007		✓
<del>BS EN 1992-3</del>	<del>Design of concrete structures – Part 3: Liquid retaining and containment structures</del>	<del>2006</del>	<del>2007</del>		

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<b>Eurocode 3</b>	<b>Design of Steel Structures</b>				
BS EN 1993-1-1	Design of steel structures — Part 1-1: General rules and rules for buildings	2005	2008		
BS EN 1993-1-4	Design of steel structures — Part 1-4: General rules— Supplementary rules for stainless steels	2006	2009		
BS EN 1993-1-5	Design of steel structures — Part 1-5: Plated structural elements	2006	2008		
BS EN 1993-1-6	Design of steel structures — Part 1-6: Strength and stability of shell structures	2007	2007		
BS EN 1993-1-7	Design of steel structures — Part 1-7: Plated structures subject to out of plane loading	2007	2007		
BS EN 1993-1-8	Design of steel structures — Part 1-8: Design of joints	2005	2008		
BS EN 1993-1-9	Design of steel structures — Part 1-9: Fatigue	2005	2008		
BS EN 1993-1-10	Design of steel structures — Part 1-10: General — Material toughness and through thickness properties	2005	2009		
BS EN 1993-1-11	Design of steel structures — Part 1-11: Design of structures with tension components	2006	2008		
BS EN 1993-1-12	Design of steel structures — Part 1-12: Additional rules for the extension of EN 1993 up to steel grades S700	2007	2008		
BS EN 1993-2	Design of steel structures — Part 2-1: Steel bridges	2006	2008		
BS EN 1993-5	Design of steel structures — Part 5: Piling	2007	2009		
<b>Eurocode 4</b>	<b>Design of Composite and Concrete Structures</b>				
BS EN 1994-2	Design of composite steel and concrete structures — Part 2: Bridges	2005	2007		
<b>Eurocode 5</b>	<b>Design of Timber Structures</b>				
BS EN 1995-1-1	Design of timber structures — Part 1-1: General — Common rules and rules for buildings	2004	2006		
BS EN 1995-2	Design of timber structures — Part 2: Bridges	2004	2006		
<b>Eurocode 6</b>	<b>Design of Masonry Structures</b>				
BS EN 1996-1-1	Design of masonry structures — Part 1-1: General rules for reinforced and unreinforced masonry structures.	2005	2007		

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BS EN 1996-2	Design of masonry structures — Part 2: Design considerations, selection of materials and execution of masonry.	2006	2007		
BS EN 1996-3	Design of masonry structures — Part 3: Simplified calculation methods for unreinforced masonry structures	2006	2007		
<b>Eurocode 7</b>	<b>Geotechnical design</b>				
BS EN 1997-1	Geotechnical design – Part 1: General rules	2004	2007		✓
BS EN 1997-2	Geotechnical design – Part 2: Ground investigation and testing	2007	2009		✓
<b>Eurocode 8</b>	<b>Design of Structures for Earthquake Resistance</b>				
BS EN 1998-1	Design of structures for earthquake resistance — Part 1: General rules seismic actions and rules for buildings	2005	2008		
BS EN 1998-2	Design of structures for earthquake resistance — Part 2: Bridges	2005	2009		
BS EN 1998-5	Design of structures for earthquake resistance — Part 5: Foundations, retaining structures and geotechnical aspects	2005	2008		
<b>Eurocode 9</b>	<b>Design of Aluminium Structures</b>				
BS EN 1999-1-1	Design of aluminium structures — Part 1-1: Design of Aluminium Structures — General Structural rules	2007	2008		
BS EN 1999-1-3	Design of aluminium structures — Part 1-3: Design of Aluminium Structures — Structures susceptible to fatigue	2007	2008		
BS EN 1999-1-4	Design of aluminium structures — Part 1-4: Design of Aluminium Structures — Cold-formed structural sheeting	2007	2009		

BSI Published Documents				
Document Reference	Title	Date	Ref	Tick if relevant
PD 6688-1-1	Background paper to the UK National Annex to BS EN 1991-1-1	(under preparation at the time of publication of this document)		
PD 6688-1-4	Background paper to the UK National Annex to BS EN 1991-1-4	2009		
PD 6688-1-7	Recommendations for the design of structures to BS EN 1991-1-7	2009		

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PD 6688-2	Recommendations for the design of structures to BS EN 1991-2	2011		✓
PD 6687-1	Background paper to the UK National Annexes to BS EN 1992	2006		✓
PD 6687-2	Recommendations for the design of structures to BS EN 1992	2008		✓
PD 6695-1-9	<del>Recommendations for the design of structures to BS EN 1993-1-9</del>	2008		
PD 6695-1-10	<del>Recommendations for the design of structures to BS EN 1993-1-10</del>	(under preparation at the time of publication of this document)		
PD 6695-2	<del>Recommendations for the design of bridges to BS EN 1993</del>	2008		
PD 6696-2	<del>Background paper to BS EN 1994-2 and the UK National Annex to BS EN 1994-2</del>	2007		
PD 6694-1	Recommendations for the design of structures subject to traffic loading to BS EN 1997-1:2004	(under preparation at the time of publication of this document)		✓
PD 6698	<del>Recommendations for the design of structures for earthquake resistance to BS EN 1998</del>	2009		
PD 6703	<del>Structural bearings – Guidance on the use of structural bearings</del>	(under preparation at the time of publication of this document)		
PD 6705-2	<del>Recommendations on the execution of steel bridges to BS EN 1090-2</del>	(under preparation at the time of publication of this document)		

Execution Standards				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
BS EN 1090-1	<del>Execution of steel structures and aluminium structures. Requirements for conformity assessment of structural components</del>	2009		
BS EN 1090-2	<del>Execution of steel structures and aluminium structures. Technical requirements for the execution of steel structures</del>	2008		

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BS EN 1090-3	<del>Execution of steel structures and aluminium structures. Technical requirements for the execution of aluminium structures</del>	2008		
BS EN 13670	<del>Execution of concrete structures</del>	2009		

British Standards (Non-conflicting with Eurocodes)				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
BS 8500	Concrete. Complementary British Standard to BS EN 206-1. Method of specifying and guidance for the specifier	2006		✓
BS EN 1317-1	<del>Road Restraints Systems – Terminology and general criteria for test methods</del>	1998		
BS EN 1317-2	<del>Road Restraint Systems – Performance classes, impact test acceptance criteria and test methods for safety barriers</del>	1998		
BS EN 1317-3	<del>Road Restraint Systems – Performance classes, impact test acceptance criteria and test methods for crash cushions</del>	2000		
DD ENV 1317-4	<del>Road Restraint Systems – Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers</del>	2002		
BS EN 1337-1:	Structural bearings. General design rules	2000		
BS EN 14388	<del>Road traffic noise reducing devices. Specifications.</del>	2005		
BS EN 15050	<del>Precast concrete products. Bridge Elements</del>	2007		

British Standards				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
BS 153 Part 3A	Specification for Steel Girder Bridges (see BE 1/77)			
BS 5268	Part 2: 1996 Structural use of Timber	1996		
BS 5390: 1976	Stone Masonry	1976		
BS 5400	Steel Concrete and Composite Bridges			
	Part 1: 1988 General Statement (see also BD 15/92)	1988		

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	Part 2: Specification for Loads (as implemented by BD37 – Appendix A)	2006		
	Part 3: 2000 CP for Design of Steel Bridges (see BD13/90)	2000		
	Part 4: 1990 CP for design of Concrete Bridges (see also BD24/92)	1990		
	Part 5: 2005 CP for Design of Composite Bridges (see BD 16/82)	2005		
	Part 9: 1983 Bridge Bearings (see BD 20/92)	1983		
	Part 10: 1980 CP for Fatigue (see BD 9/81) Part 10C: 1999 Charts for Classification of details of Fatigue	1980 1999		
BS 5628	Part 1: Code of practice for use of masonry. Structural use of unreinforced masonry (incorporating Corrigendum No. 1)	2005		
BS 5628	Part 2: Code of practice for the use of masonry. Structural use of reinforced and prestressed masonry (incorporating Corrigendum No. 1)	2005		
BS 5628	Part 3: Code of practice for use of masonry. Materials and components, design and workmanship (incorporating Corrigendum No. 1)	2005		
BS 5930: 1999	Site Investigations	1999		
BS 6031: 1981	Earthworks	1981		
BS 6651	Protection of Structures against Lightning (see BD 51/98)	2006		
BS 6779-1 1998	BS 6779 Part 1 Parapets for Vehicular Containment on Highways Including Amd No. 14290, 21 March 2003 [Annex F is Withdrawn: see IAN 44/02 Rev1 & Rev 2]	1998		
BS 6779-Part 4	Parapets for Vehicular Containment on Highways: Part 4 Masonry Parapets	1999		
BS 7818: 1995	Pedestrian Restraint Systems in Metal	1995		
BS 8002: 1994	Earth Retaining Structures	1994		
BS 8004: 1986	Foundations (see BD 74/00)	1986		
BS 8118-1: 1991	The structural use of aluminium: Code of Practice for Design	1991		
BS 8666:2005	Specification for Scheduling, Dimensioning, Bending and Cutting of Steel Reinforcement for Concrete	2005		✓
BS EN 206-1: 2000	Concrete – Part 1: Specification, performance, production and conformity	2000		
BS EN 10025-5-2004	Technical delivery conditions for structural steels with improved atmospheric corrosion resistance	2004		

Scheme title: A58 Whitehall Road West, Birkenshaw  
 Structure title: Proposed Private Redi-Rock Retaining Wall

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CP 116 Part 2	The structural use of precast concrete (see Tech Memo BE 1/73)			
BS 5395 Part 1 2000	Code of Practice for the Design Construction and Maintenance of Straight Stairs and Winders	2000		
BS 8006: 1995	Code of Practice for Strengthened/Reinforced Soils and Other Fills	1995		
BS 8081: 1989	Code of Practice for Ground Anchorages			
BS EN 10025-1:2004	Hot rolled products of structural steels. General technical delivery conditions	2004		

Miscellaneous				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
	Circular Roads no 61/72 – Routes for heavy and high abnormal vehicles			
	TRL Report 204: A Guide to Repair and Strengthening of Masonry Arch Highway Bridges (1996)			
	BRE Special Digest 1 2005 Concrete in Aggressive Ground (3rd Edition)			✓
	Traffic Management Act 2004			
	TRL Simplified tables of external loads on buried pipelines	1986		
Dept for Transport	Managing the accidental obstruction of the railway by road vehicles. Road Vehicle Incursion Risk Ranking.	Feb 2003		

The Manual of Contract Documents for Highway Works				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
Volume 1	Specification for Highway Works			✓
Volume 2	Notes for Guidance on the Specification for Highway Works			✓
Volume 3	Highway Construction Details			

Office Of Rail Regulation Publications				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
	Railway safety principles and guidance Part 1	1996		
HS(G)153/2	RSPG Part 2A – Guidance on infrastructure	1996		

STANDARDS – BRIDGES AND STRUCTURES (BD SERIES)				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
BD 2/12	Technical Approval of Highway Structures	May 2012	1.1.1	✓

Scheme title: A58 Whitehall Road West, Birkenshaw  
 Structure title: Proposed Private Redi-Rock Retaining Wall

Struct Ref: K66044  
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BD 7/04	Weathering Steel for Highway Structures	Nov 2001	2.8.3	
BD 9/81	Implementation of BS 5400: Part 10: 1980. Code of Practice for Fatigue	Dec 1981	1.3	
BD 10/97	Design of Highway Structures in Areas of Mining Subsidence	May 1997	1.3	
BD 12/01	Design of Corrugated Steel Buried Structures with Spans Greater than 0.9 Metres and up to 8.0 Metres	Nov 2001	2.2.6	
BD 13/06	Design of Steel Bridges. Use of BS 5400-3: 2000	May 2006	1.3.14	
BD 15/92	General Principles for the Design and Construction of Bridges. Use of BS 5400: Part 1: 1988	Dec 1992	1.3.2	
BD 16/82	Design of Composite Bridges. Use of BS 5400: Part 5:1979 Amendment No.1	Nov 1982 Dec 1987	1.3 1.3	
BD 20/92	Bridge Bearings. Use of BS 5400: Part 9: 1983	Oct 1992	2.3.4	
BD 21/01	The Assessment of Highway Bridges and Structures	May 2001	3.4.3	
BD 24/92	Design of Concrete Bridges. Use of BS 5400: Part 4:1990	Nov 1992	1.3.4	
BD 27/86	Materials for the Repair of Concrete Highway Structures	Nov 1986	3.3	
BD 28/87	Early Thermal Cracking of Concrete Amendment No. 1	Jul 1987 Aug 1989	1.3	
BD 29/04	Design Criteria for Footbridges	Aug 2004	2.2.8	
BD 30/87	Backfilled Retaining Walls and Bridge Abutments	Aug 1987	2.1.5	
BD 31/01	The Design of Buried Concrete Box and Portal Frame Structures	Nov 2001	2.2.12	
BD 33/94	Expansion Joints for Use in Highway Bridge Decks	Nov 1994	2.3.6	
BD 34/90	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures	Sep 1990	3.4	
BD 35/06	Quality Assurance Scheme for Paints and Similar Protective Coatings	May 2006	2.4.4	
BD 36/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures	Aug 1992	1.2.4	
BD 37/01	Loads for Highway Bridges	Aug 2001	1.3.14	
BD 41/97	Reinforced Clay Brickwork Retaining Walls of Pocket Type and Grouted Cavity type Construction Use of BS 5628: Part 2: 1995	May 1997	2.1.4	
BD 42/00	Design of Embedded Retaining Walls and Bridge Abutments	May 2000	2.1.2	

**Scheme title: A58 Whitehall Road West, Birkenshaw**  
**Structure title: Proposed Private Redi-Rock Retaining Wall**

**Struct Ref: K66044**  
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BD 43/03	The Impregnation of Reinforced and Prestressed Concrete Highway Structures using Hydrophobic Pore-Lining Impregnants	Feb 2003	2.4.2	
BD 44/95	The Assessment of Concrete Highway Bridges and Structures	Jan 1995	3.4.14	
BD 45/93	Identification Marking of Highway Structures	Aug 1993	3.1.4	
BD 46/92	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures [Stage 2 — Modern Short Span Bridges]	Aug 1992	3.4.4	
BD 47/99	Waterproofing and Surfacing of Concrete Bridge Decks	Aug 1999	2.3.4	
BD 48/93	The Assessment and Strengthening of Highway Bridge Supports	Jun 1993	3.4.7	
BD 49/01	Design Rules for Aerodynamic Effects on Bridges	May 2001	1.3.3	
BD 50/92	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures Stage 3 — Long Span Bridges	Dec 1992	3.4.2	
BD 51/98	Portal and Cantilever Signs/Signal Gantries	May 1998	2.2.4	
BD 53/95	Inspection and Records for Road Tunnels	Jul 1995	3.1.6	
BD 54/93	Post-tensioned Concrete Bridges Prioritisation of Special Inspections	Apr 1993	3.1.2	
BD 56/10	The Assessment of Steel Highway Bridges and Structures	Jun 2010	3.4.14	
BD 57/01	Design for Durability	Aug 2001	1.3.7	
BD 58/94	The Design of Concrete Highway Bridges and Structures with External and Unbonded Prestressing	Nov 1994	1.3.9	
BD 60/04	Design of Highway Bridges for Vehicle Collision Loads	May 2004	1.3.5	
BD 61/10	The Assessment of Composite Highway Bridges	Jun 2010	3.4.16	
BD 62/07	As-Built, Operational and Maintenance Records for Highway Structures	Feb 2007	3.2.4	
BD 63/07	Inspection of Highway Structures	Feb 2007	3.1.4	
BD 65/97	Design Criteria for Collision Protector Beams	Feb 1997	2.2.5	
BD 67/96	Enclosure of Bridges	Aug 1996	2.2.7	

Scheme title: A58 Whitehall Road West, Birkenshaw  
 Structure title: Proposed Private Redi-Rock Retaining Wall

Struct Ref: K66044  
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BD-68/97	Crib Retaining Walls	Feb-1997	2.1.3	
BD-70/03	Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments Use of BS8006: 1995, incorporating Amendment No.1 (Issue 2 March 1999)	May-2003	2.1.5	
BD-74/00	Foundations	May-2000	2.1.8	
BD-78/99	Design of Road Tunnels	Aug-1999	2.2.9	
BD-79/13	The Management of Sub-standard Highway Structures	Feb-2013	3.4.18	
BD-81/02	Use of Compressive Membrane Action in Bridge Decks	May-2002	3.4.20	
BD-82/00	Design of Buried Rigid Pipes	Aug-2000	2.2.10	
BD-84/02	Strengthening of Concrete Bridge Supports Vehicle Impact Using Fibre Reinforced Polymers	Aug-2002	1.3.16	
BD-85/08	Strengthening Highway Structures Using Externally Bonded Fibre Reinforced Polymer	Nov-2008	1.3.18	
BD-86/07	The Assessment of Highway Bridges and Structures For The Effects of Special Types General Order (STGO) and Special Order (SO) Vehicles	Nov-2007	3.4.19	
BD-87/05	Maintenance Painting of Steelwork	May-2005	3.2.2	
BD-89/03	The Conservation of Highway Structures	Nov-2003	3.2.4	
BD-90/05	Design of FRP Bridges and Highway Structures	May-2005	1.3.17	
BD-91/04	Unreinforced Masonry Arch Bridges	Nov-2004	2.2.14	
BD-93/09	Structural Assessment of Bridges with Deck Hinges	Feb-2009		
BD-94/07	Design of Minor Structures	Feb-2007	2.2.4	
BD-95/07	Treatment of Existing Structures on Highway Widening Schemes	Aug-2007		
BD-97/12	The Assessment of Scour and Other Hydraulic Actions at Highway Structures	May-2012		
BD-101/11	Structural Review and Assessment of Highway Structures	Nov-2011	3.4.2 2	

ADVICE NOTES – BRIDGES AND STRUCTURES (BA SERIES)				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
BA 9/81	The Use of BS 5400: Part 10: 1980. Code of Practice for Fatigue	Dec 1981	4.3	
	Amendment No. 1	Nov 1983		
BA 16/97	The Assessment of Highway Bridges and Structures.	May 1997	3.4.4	
	Amendment No. 1	Nov 1997		
	Amendment No. 2	Nov 2001		
BA 19/85	The Use of BS 5400: Part 3: 1982	Jan 1985	4.3	
BA 24/87	Early Thermal Cracking of Concrete	Jul 1987	4.3	
	Amendment No. 1	Aug 1989		
BA 26/94	Expansion Joints for Use in Highway Bridge Decks	Nov 1994	2.3.7	
BA 28/92	Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures	Aug 1992	4.2.2	
BA 30/94	Strengthening of Concrete Highway Structures Using Externally Bonded Plates	Feb 1994	3.3.1	
BA 34/90	Technical Requirements for the Assessment and Strengthening Programme for Highway Structures	Sep 1990	3.4	
BA 35/90	Inspection and Repair of Concrete Highway Structures	Jun 1990	3.3	
BA 36/90	The Use of Permanent Formwork	Feb 1991	2.3	
BA 37/92	Priority Ranking of Existing Parapets	Oct 1992	2.3.2	
BA 38/93	Assessment of the Fatigue Life of Corroded or Damaged Reinforcing Bars	Oct 1990	3.4.5	
BA 39/93	Assessment of Reinforced Concrete Half-joints	Apr 1993	3.4.6	
BA 40/93	Tack Welding of Reinforcing Bars	Apr 1993	4.3.4	
BA 41/98	The Design and Appearance of Bridges	Feb 1998	4.3.11	
BA 42/96	The Design of Integral Bridges [Incorporating Amendment No.1 dated May 2003]	Nov 1996	4.3.12	
BA 43/94	Strengthening, Repair and Monitoring of Post-tensioned Concrete Bridge Decks	Dec 1994	3.3.2	
BA 44/96	Assessment of Concrete Highway Bridge and Structures	Nov 1996	3.4.15	
BA 47/99	Waterproofing and Surfacing Concrete Bridge Decks	Aug 1999	2.3.5	

Scheme title: A58 Whitehall Road West, Birkenshaw  
 Structure title: Proposed Private Redi-Rock Retaining Wall

Struct Ref: K66044  
 Rev P5 19/06/2024

BA 50/93	Post-tensioned Concrete Bridges: Planning, Organisation and Methods for Carrying Out Special Inspections	Jul 1993	3.1.3	
BA 51/95	The Assessment of Concrete Structures Affected by Steel Corrosion	Feb 1995	3.4.13	
BA 52/94	The Assessment of Concrete Highway Structures Affected by Alkali Silica Reaction	Nov 1994	3.4.10	
BA 53/94	Bracing Systems and the Use of U-Frames in Steel Highway Bridges	Dec 1994	1.2.13	
BA 54/94	Load Testing for Bridge Assessment	Apr 1994	3.4.8	
BA 55/06	The Assessment of Bridge Substructures and Foundations, Retaining Walls and Buried Structures	May 2006	3.4.9	
BA 57/01	Design for Durability	Aug 2001	1.3.8	
BA 58/94	Design of Bridges and Concrete Structures with External Unbonded Prestressing	Nov 1994	1.3.10	
BA 59/94	Design of Highway Bridges for Hydraulic Action	May 1994	1.3.6	
BA 67/96	Enclosure of Bridges	Aug 1996	2.2.8	
BA 68/97	Crib Retaining Walls	Feb 1997	2.1.4	
BA 72/03	Maintenance of Road Tunnels	May 2003	3.2.3	
BA 74/06	Assessment of Scour at Highway Bridges Replaced by BD 97/12	Aug 2006	3.4.21	
BA 80/99	Use of Rock Bolts	Feb 1999	2.1.7	
BA 82/00	Formation of Continuity Joints in Bridge Decks	Nov 2000	2.3.7	
BA 83/02	Cathodic Protection for Use in Reinforced Concrete Highway Structures	Feb 2002	3.3.3	
BA 84/02	Use of Stainless Steel Reinforced in Highway Structures	Feb 2002	1.3.15	
BA 85/04	Coatings for Concrete Highway Structures & Ancillary Structures	May 2004	2.4.3	
BA 86/06	Advice Notes on the Non-destructive Testing of Highway Structures	Aug t 2006	3.1.7	
BA 87/04	Management of Corrugated Steel Buried Structures Correction No.1	Aug 2004 Feb 2006	3.3.4 3.3.5	
BA 88/04	Management of Buried Concrete Box Structures	Aug 2004	3.3.3	

**Scheme title: A58 Whitehall Road West, Birkenshaw**  
**Structure title: Proposed Private Redi-Rock Retaining Wall**

**Struct Ref: K66044**  
**Rev P5 19/06/2024**

BA 92/07	The Use of Recycled Concrete Aggregates in Structural Concrete	May 2007	2.3.9	
BA 93/09	Structural Assessment of Bridges with Deck Hinges	Feb 2009	3.1.5	

<b>TECHNICAL MEMORANDA – BRIDGES (BE SERIES)</b>				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
BE 13	Fatigue Risk in Bailey Bridges	Apr 1968	3.4	
BE 23	Shear Key Decks Amendment No. 1 to Annex	Nov 1970 Jun 1971	4.3	
BE 5/75	Rules for the Design and Use of Freyssinet Concrete Hinges in Highway Structures	Mar 1975		
BE 7/04	Departmental Standard (Interim) Motorway Sign/Signal Gantries	Aug 2004	2.2.8	

<b>STANDARDS – TRAFFIC ENGINEERING AND CONTROL (TD SERIES)</b>				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
TD 9/93	Highway Link Design As amended by TD 19/06	June 1993	6.1.1	
	Amendment No.1	Feb 2002		
TD 19/06	Requirement for Road Restraint Systems Correction No.1	Aug 2006 Feb 2008	2.2.8	
TD 27/05	Cross Sections and Headrooms	Feb 2005	6.1.2	
TD 36/93	Subways for Pedestrians and Pedal Cyclists Layout and Dimensions	July 1993	6.3.1	
TD 89/08	Use of passively Safe Signposts, Lighting Columns and Traffic Signal Posts to BS-EN 12767	May 2008	8.2.2	

<b>ADVICE NOTES – TRAFFIC ENGINEERING AND CONTROL (TA SERIES)</b>				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
TA 92/03	Crossover and Changeover Design	Nov 2003	8.4.6	

Scheme title: A58 Whitehall Road West, Birkenshaw  
 Structure title: Proposed Private Redi-Rock Retaining Wall

Struct Ref: K66044  
 Rev P5 19/06/2024

ADVICE NOTES – HIGHWAYS (HA SERIES)				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
HA 65/94	Environmental barriers. Design for environmental barriers.	July 1994	40.5.1	
HA 66/95	Environmental Barriers – Technical Requirements As amended by TD 19/06	Sept 1995	40.5.2	
HA 84/01	Nature Conservation and Biodiversity	Feb 2001	40.4.1	
HA 59/92	Mitigating against effects on Badgers	Feb 1997	40.4.2	
HA 80/99	Nature Conservation Advice in Relation to Bats	May 1999	40.4.3	
HA 81/99	Nature Conservation Advice in Relation to Otters	May 1999	40.4.4	
HA 97/01	Nature Conservation Advice in Relation to Dormice	Feb 2001	40.4.5	
HA98/01	Nature Conservation Advice in Relation to Amphibians	Feb 2001	40.4.6	
HA 116/05	Nature Conservation Advice in Relation to Reptiles and Roads	May 2005	40.4.7	
HA213/08	Noise and Vibration	Aug 2008	41.3.7	
	Environmental Assessment: Ecology and Nature Conservation		41.3.4	

STANDARDS – HIGHWAYS (HD SERIES)				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
HD 19/03	Road Safety Audits	Nov 2003	5.2.2	
HD 22/08	Managing Geotechnical Risk	Aug 2008	4.1.2	

STANDARDS – GENERAL REQUIREMENTS (GD SERIES)				
Document Reference	Title	Date of Issue	Ref	Tick if relevant
GD 02/08	Quality Management Systems for Highway Design	May 2008	0.2.4	
GD 03/08	Implementation and Use of the Standards Improvement System	May 2008	0.2.2	

**Scheme title: A58 Whitehall Road West, Birkenshaw**  
**Structure title: Proposed Private Redi-Rock Retaining Wall**

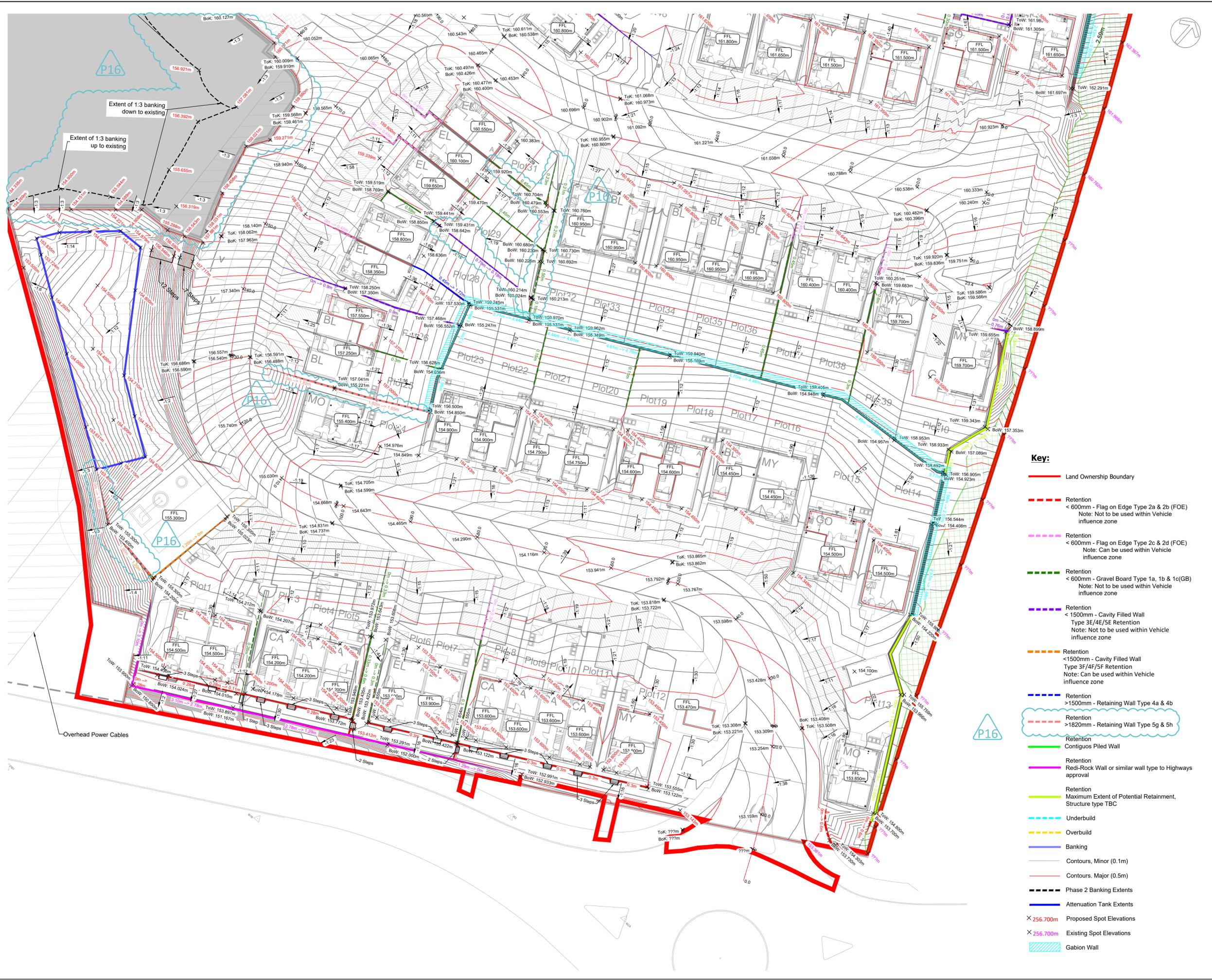
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**Struct Ref: K66044**  
**Rev P5 19/06/2024**

## **APPENDIX B**

### ***DRAWINGS***

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Do Not Scale			
DESIGN REVIEW			
Design review by:	**	Checked by:	**
Residual hazards:			
Health, Safety & Environmental Notes			

**NOTES**

**General Notes**

Architectural Site Plan  
Acanthus WSM  
4035.20.1000.P16 - Site Layout

Existing Topographical Survey  
Blue Hill topo survey 3D

- All Coordinates relate to Topographical survey coordination
- All Dimension in mm unless notified otherwise
- All Levels in mAOD in relation to Topographical survey coordination unless notified otherwise

**Residential External Works**

We believe the proposed gradients meet the guidance set out in Building Regulations Part M. If the client's or DDA Consultant's requirements are more onerous Adept should be informed so alterations can be made to comply with their requirements.

Typical Gradients used:-

Paths/Patios	Ideal 1/21-1/60	Steepest 1/12	Flattest 1/80
Car Parking/Driveways	1/21-1/60	1/12	1/80
Gardens/Landscaping	>1/21	1/10	N/A

All levels around dwellings have been designed with level access to all elevations unless noted with overbuild which is measured from FFL to proposed external levels. Facing brick work will need to be extended down in overbuild areas to ensure engineering bricks or blocks are not visible.

Levels fall away from the dwellings

Retaining Wall Types:  
FOE = Flag on Edge (0-600mm)  
GB = Gravel Board (0-600mm)  
GAB = Gabion Wall (>600mm\*)  
RW = Brick Retaining Wall (450-1500mm\*)  
RC = Reinforced Concrete Wall (>1000mm\*)

\* heights shown are typical and certain wall types may not be suitable due to location, loading and ground conditions & Boundary Treatment type

**Key:**

- Land Ownership Boundary
- - - Retention < 600mm - Flag on Edge Type 2a & 2b (FOE)  
Note: Not to be used within Vehicle influence zone
- - - Retention < 600mm - Flag on Edge Type 2c & 2d (FOE)  
Note: Can be used within Vehicle influence zone
- - - Retention < 600mm - Gravel Board Type 1a, 1b & 1c (GB)  
Note: Not to be used within Vehicle influence zone
- - - Retention < 1500mm - Cavity Filled Wall Type 3E/4E/5E Retention  
Note: Not to be used within Vehicle influence zone
- - - Retention < 1500mm - Cavity Filled Wall Type 3F/4F/5F Retention  
Note: Can be used within Vehicle influence zone
- - - Retention > 1500mm - Retaining Wall Type 4a & 4b
- - - Retention > 1820mm - Retaining Wall Type 5g & 5h
- Retention Contiguous Piled Wall
- Retention Redi-Rock Wall or similar wall type to Highways approval
- Retention Maximum Extent of Potential Retainment, Structure type TBC
- - - Underbuild
- Overbuild
- Banking
- Contours, Minor (0.1m)
- Contours, Major (0.5m)
- - - Phase 2 Banking Extents
- Attenuation Tank Extents
- x 256.700m Proposed Spot Elevations
- x 256.700m Existing Spot Elevations
- ▨ Gabion Wall

Date	Description	By	Chk	Rev
27.03.24	Banking gradient to existing levels changed to 1 in 3. Wall type around pump station, between plot 24/25 changed & between plot 28/29 changed and Gabion basket changed to gravel board at plot 32	OCB	TT	P16
06.12.23	Levels added to drawing above attenuation tank. Gravel Boards removed from gabion baskets and Gabion Basket extents extended down plot 14's gable	OCB	TT	P15
27.10.23	Drawing updated following comments from client	OCB	AL	P14
29.09.23	Levels updated due to plots 1-12 moving	OCB	AL	P13
05.09.23	Wall type along plot 1-12 updated. Redi-Rock wall extent amended	OCB	RP	P12
01.09.23	Drawing updated to suit new Redi-Rock design	OCB	AL	P11
16.08.23	Redi-Rock wall levels updated	OCB	JZG	P10
29.06.23	Plot 24 FFL updated	OCB	JS	P9
20.06.23	Drawing updated to reduce overbuild from tank. For previous revision notes see previous drawing revisions	OCB	JS	P8

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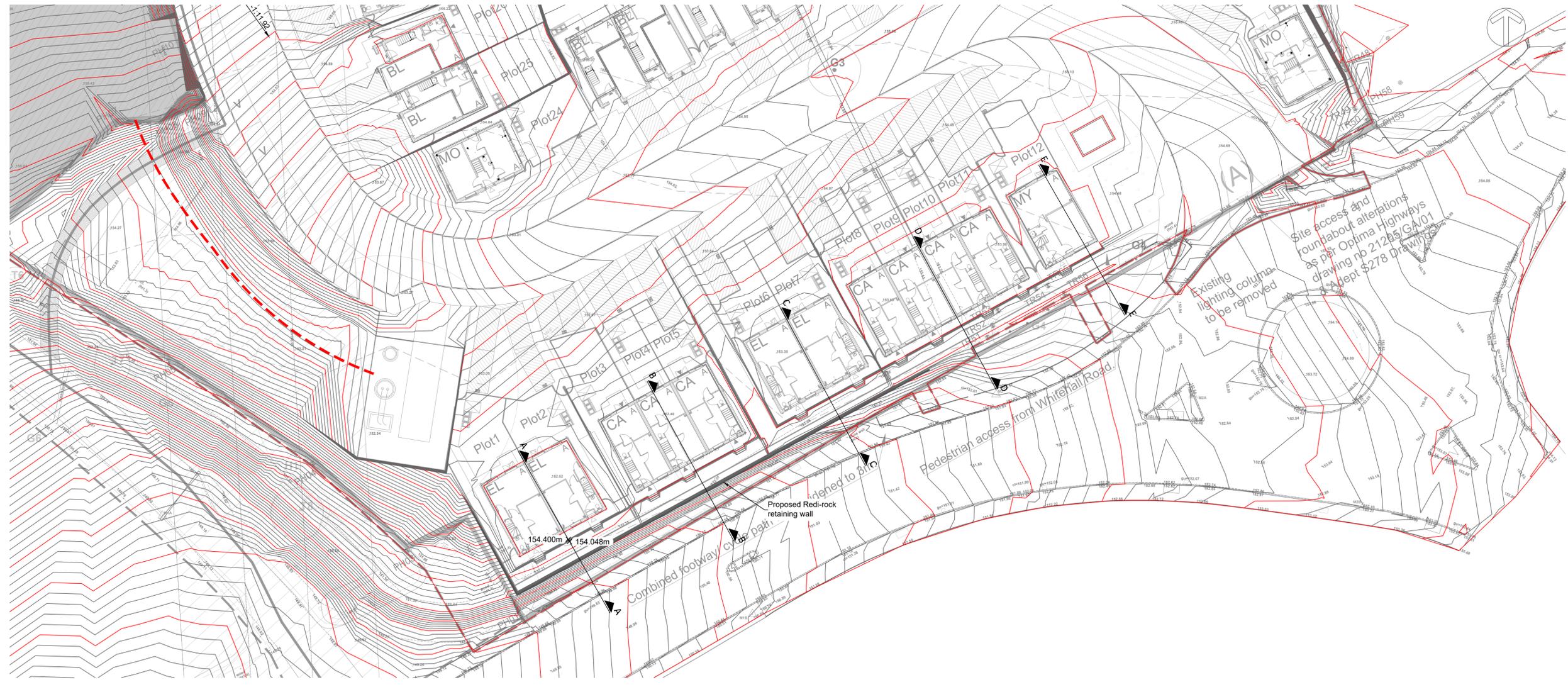
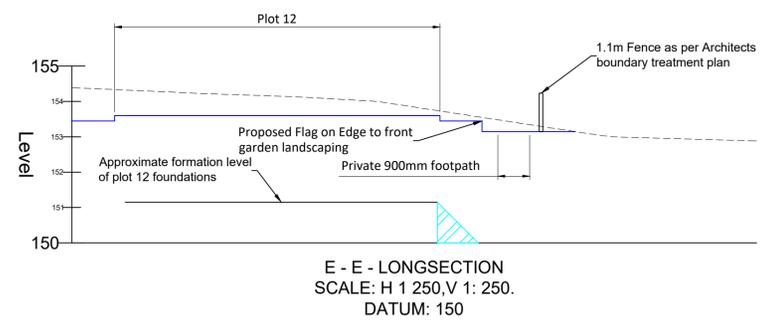
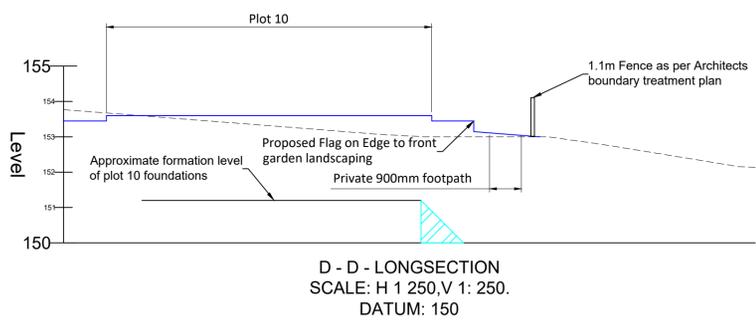
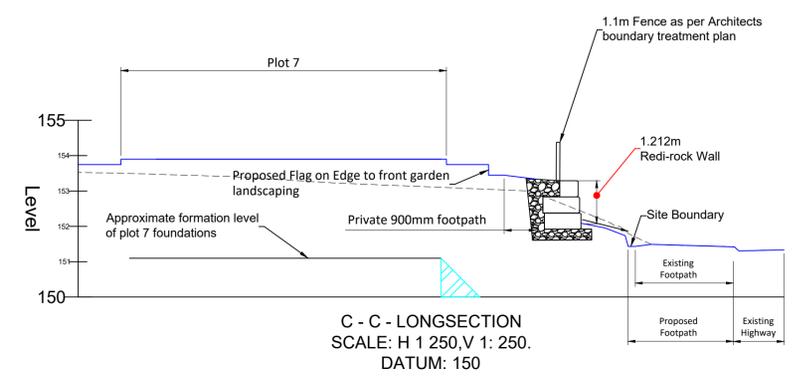
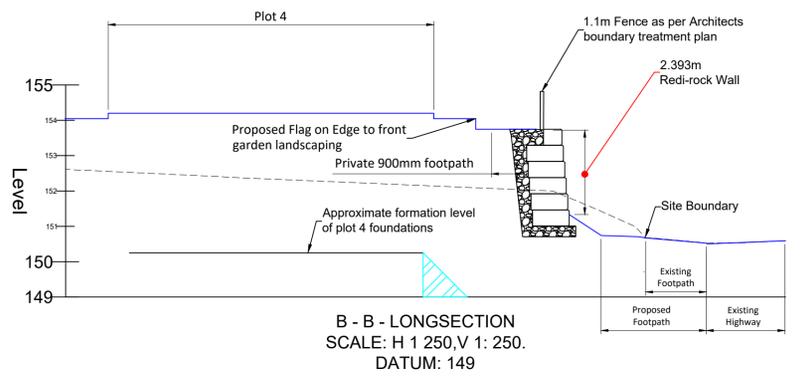
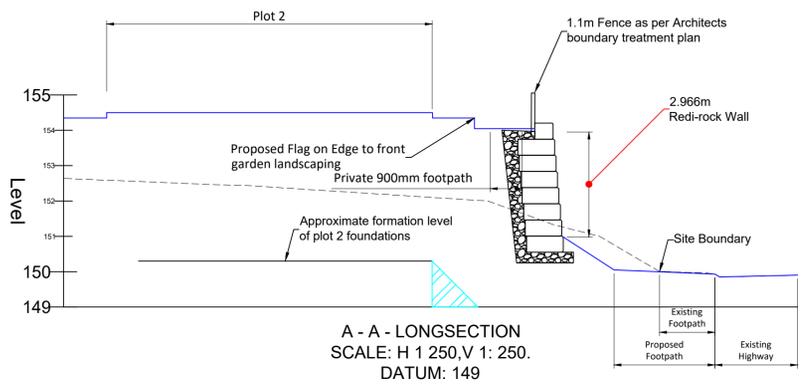
Originating Office: 1312 Mills, Sunny Bank Mills, Farsley, Leeds, LS28 5UJ

Project  
**Blue Hills Farm, Birkenshaw**

Title  
**External Levels Phase 1, Sheet 1 of 2**

Client  
**Vistry Partnerships**

Scale @ A1	Initial author	Initial checker	Approver	Initial Date
1:250	RLP	JS	RP	Jun 22
Status	Purpose	Adopt Ref		
S2	Preliminary	09.21011		
Project Number	Originator	Volume	Level	Type
09.21011-ACE-00-ZZ-DR-C-3200	P16			



**Do Not Scale**

DESIGN REVIEW			
Design review by:	**	Checked by:	**

Residual hazards:

**Health, Safety & Environmental Notes**

NOTES

Key:

Proposed Surface	
Existing Surface	
Zone of Influence	

20.10.23	Sections updated following comments from Kirklees As Built Issue	OCB	AL	C1
29.09.23	Sections updated to suit new site layout	OCB	AL	P5
09.05.23	Section updated following client comments	OCB	JS	P4
05.05.23	Redi-rock wall added to drawing	OCB	JS	P3
03.03.23	Gabion Details added to drawing	OCB	JS	P2
22.02.23	Initial Issue	OCB	JS	P1
Date	Description	By	Chk	Rev

**ADEPT**  
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Originating Office: Leeds 1912 Mills, Sunny Bank Mills, Farsley, Leeds, LS28 5JJ | Tel: 0113 239 4518

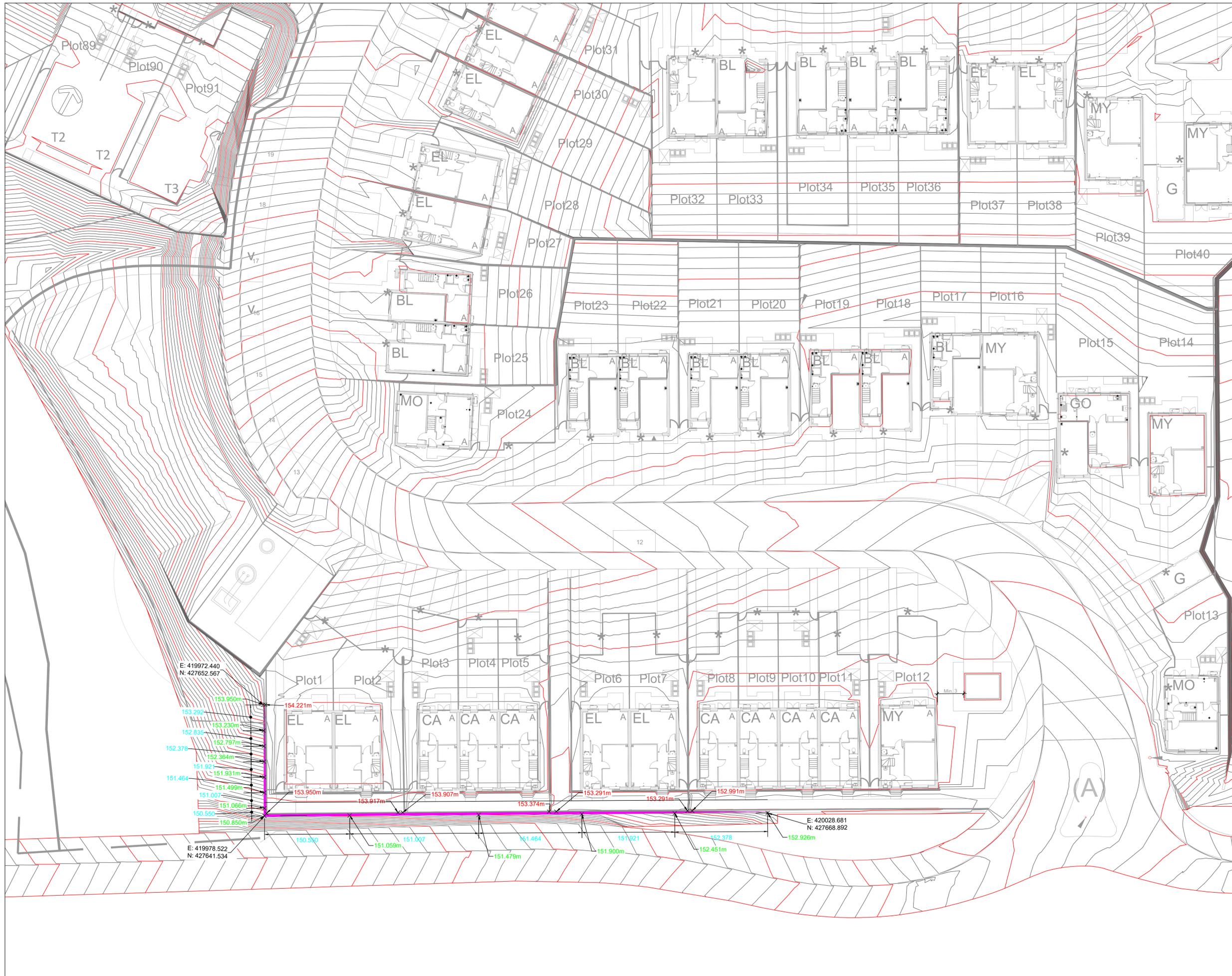
Project  
**Blue Hills Farm, Birkenshaw**

Title  
**Southern Boundary Sections**

Client  
**Vistry Partnerships**

Scale @ A1	Initial author	Initial checker	Approver	Initial Date
1:250	OCB	JS	RP	Feb' 23
Status	Purpose	As Built	Adopt Ref	
A			00.23009	

Project Number	Originator	Volume	Level	Type	Role	Orig. No.	Rev.
00.23009	ACE-00	ZZ-DR	C-03604				C1



DESIGN REVIEW

Design review by: **	Checked by: **
Residual hazards:	

Health, Safety & Environmental Notes

NOTES

- Key:**
- Retention Redi-Rock Wall
  - x 256.700m Proposed Spot Elevations - Top of Wall
  - x 256.700m Proposed Spot Elevations - Bottom of Wall
  - 100,000 Level to Underside of Redi-rock Block
  - Co-ordinates at face of wall

20.10.23	As Built Issue	OCB	AL	C1
22.08.23	Levels updated following new Redi-Rock design & Co-ordinates added	OCB	RP	P4
18.08.23	Levels to underside of blocks added to drawing	OCB	JZG	P3
17.08.23	Levels updated to suit new wall levels	OCB	RP	P2
16.08.23	Initial Issue	OCB	AL	P1

Date	Description	By	Chk	Rev
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Project  
**Blue Hills Farm,  
Birkenshaw**

Title  
**Redi-Rock Wall Levels**

Client  
**Vistry  
Partnerships**

Scale @ A1	Initial author	Initial checker	Approver	Initial Date
1:200	OCB	AL	RP	Aug 23

Status	Purpose	Adopt Ref
A	As Built	09.21011

Project Number	Originator	Volume	Level	Type	Role	Orig. No.	Rev.
09.21011	ACE	00	ZZ	DR	C	3205	C1