

Project Title: South Wokingham Strategic Development
Location Phase 2B

Project No/ Document Reference: A398-TN002C

Date: 30 July 2024

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Condition 10 – Ground and Building Levels

1. Introduction

- 1.1. Abley Letchford Partnership (ALP) has been requested by Miller Homes and Kier Venture Ltd to provide this Technical Note in support of development within Phase 2B of the South Wokingham Strategic Development Location (SDL).
- 1.2. The Site lies to the southeast of Wokingham. Montague Park lies to the northeast, with the railway line running across the northern boundary. Easthampstead Road bisects the middle of the Site with Holme Green to the south. The Site forms Phase 2B of the SDL.
- 1.3. This Technical Note is presented in order to discharge Condition 10 under planning application reference 191068.

2. Ground and Building Levels

- 2.1. Condition 10 requires that:

“Before submission of the first application for reserved matters a strategy for levels across the site, consistent with the SuDS Strategy to comply with condition 29 and highway design shall be submitted to and approved in writing by the Local Planning Authority. These shall establish the range of levels within each parcel and demonstrate continuity across the site and with the South Wokingham Distributor Road (SWDR).”

- 2.2. Condition 29 is dealt with under a separate Technical Note, albeit it requires that:

“Before or concurrent with submission of the first application pursuant to reserved matters or commencement of development within the SANG (whichever is earlier), a Strategy demonstrating coordination with the wider Strategic Development Location (the SuDS Strategy), based on Phase 2 of the South Wokingham SDL Flood Risk Assessment, Ref No: 70001684-FRA-SDL-001 (August 2020) (Environmental Statement Phase 2 Addendum Volume 2) and including drainage calculations, details of the layout, position and size of attenuation basins, and principles for locally based treatments such as



rain gardens, filter strips and swales shall be submitted to and approved in writing by the Local Planning Authority.”

- 2.3. The proposed development platform, ground and dwelling levels are principally governed by the surface water drainage strategy which ensures the surface water runoff will be captured by the proposed drainage system and discharged into the surrounding network of existing and proposed watercourses.
- 2.4. Dwelling levels within parcels reflect the proposed topography and where appropriate will be increased so that they lie above the flood level suggested within the approved Flood Risk Assessment.
- 2.5. Where dwellings are adjacent to principal infrastructure roads and the South Wokingham Distributor Road (SWDR), these will be raised as appropriate at their interface in order to remove any steps down or up into the development parcels.

3. Existing Topography

- 3.1. The Site is approximately 36 hectares (Ha), divided into parcels (Parcels R4, R5, R7, R8, R9, R10, R11, R13 and the Local Centre/School Site) and can accommodate up to 1,434 dwellings (**Figure 1**). A 3D ground profile model of the Site has been set up based on a site-specific topographical survey supported by LiDAR data.
- 3.2. The ground profile model shows that existing ground levels at the Site generally fall from north to south and from west to east. The maximum and minimum ground levels on the Site are approximately 68.50m above Ordnance Datum (m AOD) at the northeast corner of Parcel R10 to 48.99m AOD the lowest point of the Emm Brook within the site boundary to the immediate south of R5.
- 3.3. A copy of the WSP Topographical Survey drawing which supported the Outline Application is included as **Appendix A**.

Figure 1 – Site Wide Masterplan



4. Design Guidance

Manual for Streets (2007) and (2010)

- 4.1. Manual for Streets 2 (MfS2) forms the basic national design standard, acting as a companion guide for Manual for Streets 1 (MfS1) (2007). It provides key guidance on the design of residential and urban streets. Whilst both documents are now somewhat dated, they are still used as the key technical reference for residential road design, with latter documents and building regulations expanding on this guidance.

Inclusive Mobility Guidance (2021)

- 4.2. The Inclusive Mobility Guidance published by the Department for Transport and referenced in paragraph 2.17 above is dated 2005. This document has been superseded by Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure (2021) (CDRef 7.6). Section 4.3 of this document provides detailed guidance on gradients. In this section it is explicitly written that:

LTN 1/20 - Cycle Infrastructure Design (July 2020)



- 4.3. LTN 1/20 is a national design guide which provides recommendations to local authorities based on overarching design principles and summary principles. The document now exists as the basis for designing high quality cycle provision that encourages cycling and improves safety.

Building Regulations: Part M – Access to and use of buildings (2015, amended 2016).

- 4.4. Building Regulations help ensure that new buildings are going to be safe, healthy, and high performing. Part M of the Building Regulations sets out how to achieve accessible or wheelchair user compliant housing via requirement M4(2) of Schedule 1.
- 4.5. Requirement M4(2) known as Category 2: Accessible and adaptable dwellings, sets a standard for accessible homes, which is broadly equivalent to the former Lifetime Homes Standard. For a property to be M4(2) compliant it must provide additional features for example having a living area at entrance level and step-free access to all entrance level rooms and facilities, wider doorways, and corridors as well as clear access routes to reach windows.

5. Highways design / gradients

- 5.1. In general highway design terms, presented longitudinal road gradients are no steeper than 1:20 (5%) along the centreline. A 1:20 (5%) road provides an optimum grade for all users, both vehicular and non-vehicular, especially in terms of adjacent footway provisions which often adjoin the carriageway, and is compliant with the various Design Guidance documents under Section 4.
- 5.2. Earthwork requirements within Parcels R4 and R5 would reduce by raising development platform levels by increasing longitudinal gradients marginally above 1:20. Such opportunities can be furthered as part of a future Reserved Matters Application.
- 5.3. From a vehicular user perspective, longitudinal gradients can be steepened without undue affect, and gradients of 1:10 (10%) to 1:16 (6.25%) are prevalent across more undulating parts of the country.
- 5.4. Service and Emergency vehicles can comfortably negotiate steeper sections of carriageway, albeit it is clearly advantageous to keep such sections to a minimum.
- 5.5. However, steepening road gradients beyond 1:20 (5%) introduces issues for non-vehicular uses, especially when in combination with tight centreline radii. Footways and cycleways abutting the carriageway on the inside of a radius become particularly steep in relation to the carriageway due to the shorter distance over which the level variation is developed. 1:6 (16.66%) longitudinal gradients can easily result along adjacent footpaths/cycleways on steeper road profiles such as 1:10 (10%).
- 5.6. These footpath gradients are of particular importance in the context of the more vulnerable or less-able user. The Disability Discrimination Act 1995 (DDA) places expectations on Designers to provide fully accessible and pedestrian friendly environments for disabled people wherever practicable. Under Building Regulations, British Standard documentation is more focussed upon internal circulation spaces,



and their immediate access points from car parking spaces etc, as opposed to the development as a whole, however, the principal that steep gradients should be limited to very short distances is clear, with 1:12 (8.3%) identified as an absolute maximum.

- 5.7. In a similar vein, LTN 1/20 Cycle Infrastructure Design stipulates maximum longitudinal gradients and lengths over which they should be provided. Steeper gradients for cyclists can lead to high speeds for descending cyclists or low speeds for climbing cyclist, which can create hazards for all users.

6. Development Parcels / Platforms

- 6.1. Whilst these documents offer useful reference, the implications of localised steeper longitudinal gradients must be considered across the development parcel. Where development ignores existing ground profiles, this can lead to excessive excavation or construction build-ups, with resultant changes to the character of the Site and its relationship with wider landscape. This not only increases construction vehicle movements, costs and engineering difficulties attributed to its creation, but more significantly, it can produce a less than attractive environment if not dealt with correctly.
- 6.2. In terms of interfacing with existing ground from the proposed development platforms, preference would be given to earth embankments at a maximum slope of 1:3 in order that such features work in combination with landscaping to form an aesthetically pleasing built-form, and provides opportunity to soften the infrastructure whilst minimising their footprint. This gradient has been slackened to 1:5 where possible to provide a more suitable area for landscaping purposes.
- 6.3. Within the development parcels, proposed ground gradients would be no steeper than 1:20 (5%) in order to maximise the usability of gardens, open space and ancillary areas.

7. Design Development Parcel by Parcel

- 7.1. In accordance with the requirements of Condition 10, upon appointment, ALP was tasked with developing the site wide levels against that of the overall drainage strategy. The aim was to provide a balanced development in respect to excavation or placement of fill materials in the context of the overall scheme, whilst respecting the natural contours and gradients of the Site. This would have the benefit of minimising the amount of earthworks, and resultant reduction in construction vehicles required and associated emissions, whilst also integrating the proposals into the existing landscape.
- 7.2. It became apparent very early on within the assessment process that a balanced scheme was impossible due to the relationship of the proposed SWDR and adjacent development parcels. Indeed, the original Outline Application envisaged site wide increases in levels across the development as a whole (Ref WSP Flood Risk Assessment Surface Water Strategy Sheets 1-9).



- 7.3. Coupled with the requirement to provide positive hydraulic falls to surface water outfall points across the Site, the ability to generate an excavation neutral design would not be possible. The task therefore would be to minimise earthwork movements wherever possible.
- 7.4. Having completed the site wide level strategy, an overall Earthworks Assessment was produced, copies of which are appended to this Technical Note (Drawing numbers A389-013 to 015). An overview of the Assessment is included as **Figure 2** overleaf.

- 7.5. Areas of cut as shown in blue, with areas of fill being denoted in orange.

Figure 2 – Earthworks Assessment Overview



Parcel R4

- 7.6. This parcel is defined at its southern edge by the levels of the SWDR with its northern levels determined by a maximum road gradient of 1:20. The interface to the north of the parcel with the allotments and strategic pedestrian link are to be finalised as part of the Reserved Matters application. Surface water drainage is not a limiting aspect of the parcel level design.
- 7.7. This parcel is predominantly in cut and is likely to create around 11,000 cubic metres of excess material.
- 7.8. As mentioned within para 4.2 above. Earthworks would be reduced marginally if road gradients were increased.

Parcel R5

- 7.9. Parcel R5 has its northern levels fixed by the SWDR corridor with the southern boundary fixed by a maximum gradient of 1:20 on the parcel roads. The southern boundary will interface with the adjacent open space via an embankment with maximum gradient of 1:3. Pedestrian links will be located in areas of minimum level difference to avoid the need for ramps or steps. Surface water drainage is not a limiting aspect of the parcel design.
- 7.10. This parcel is predominantly in fill and will require approximately 39,000 cubic metres of material.
- 7.11. As mentioned within para 4.2 above. Earthworks would be reduced marginally if road gradients were increased.



Parcel R7

- 7.12. This parcel is generally similar to existing ground levels with any ground raising on the northern edge limited by the diverted SWDR watercourse. Raising of the parcel is required in order to enable R7 to drain into said SWDR watercourse network.
- 7.13. This parcel is relatively material neutral with a requirement for approximately 4,000 cubic metres of fill material.

Parcel R8

- 7.14. Parcel R8's levels are fixed by the SWDR to the south and existing levels to the north. Levels will need to be raised to enable the parcel to drain from east to west in line with the agreed outline strategy. The attenuation basins to the west of the parcel have their invert levels fixed by the outfall beneath the SWDR.
- 7.15. This parcel is relatively material neutral with a requirement for approximately 3,500 cubic metres of fill material.

Parcel R9

- 7.16. Parcel R9 has its levels fixed by the SWDR embankment to the east and the outfall to the existing ditch network to the west. This existing ditch then drains into a proposed attenuation basin before discharge to the diverted SWDR watercourse.
- 7.17. This parcel is relatively material neutral with a requirement for approximately 3,500 cubic metres of fill material.

Parcel R10

- 7.18. This parcel has the northern SWDR and associated earthworks along its western edge, including the highway attenuation basin. An existing ditch runs through the centre of the parcel which is being deepened and retained as part of the adjacent R14 parcel. Levels are raised in areas to enable outfall to the existing watercourse via attenuation basins.
- 7.19. There is a shortfall of material for this parcel with approximately 10,000 cubic metres of fill material required.

Parcel R11

- 7.20. This large parcel has limited restrictions at its boundary with the exception of retained trees that are sporadically located around the extent of the development area. The surface water strategy for R11 requires a split into 3 catchments, Catchment 1 drains south-east to the existing ditch with all levels



fixed by the level of this ditch, Catchment 2 drains north and is fixed by the level of the SWDR watercourse, Catchment 3 drains northwest and is also fixed by the level of the SWDR watercourse.

- 7.21. Due to the surface water strategy, this parcel is predominantly in fill with a maximum fill of around 2.0m in the southwest corner. An embankment is proposed around the perimeter with a gradient of 1:5 in most cases, except where adjacent to existing trees, where a 1:3 embankment is proposed.
- 7.22. R11 requires the placement of around 27,000 cubic metres of fill material.

Parcel R13

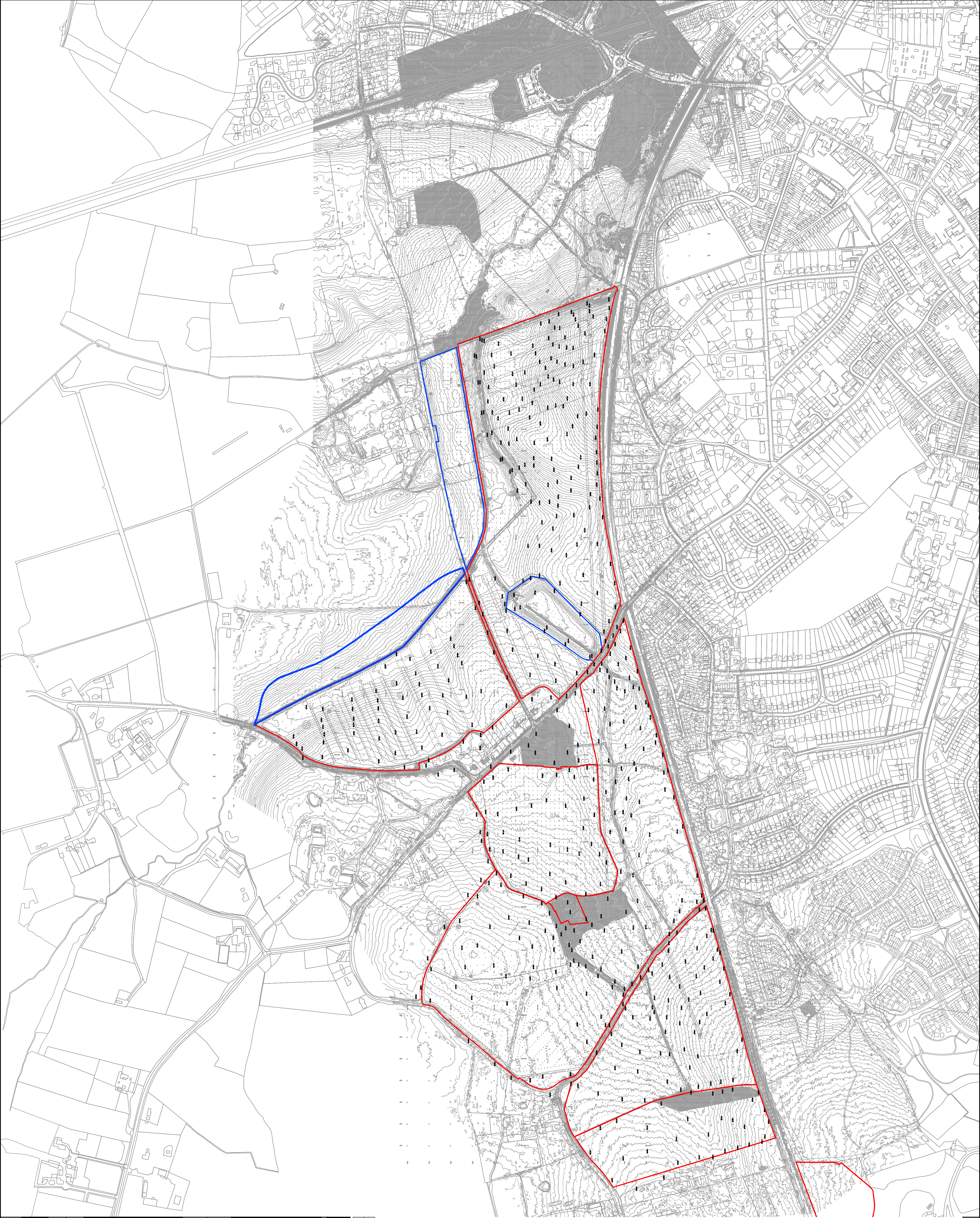
- 7.23. Parcel R13 has its levels on the southern boundary fixed by the Heathlands Road Link. Parcel levels are predominantly driven by the surface water strategy which drains to the north via an attenuation basin into the SWDR watercourse.
- 7.24. To achieve the surface water outfall level, R13 has a shortfall of approximately 82,000 cubic metres.

Local Centre and Primary School Sites

- 7.25. The Local Centre and Primary School sites have its northern levels fixed by the SWDR corridor with the southern boundary tied into the existing landscaping. The parcels adjoin Parcel R5 on its western boundary. The proposed levels are marginally above existing ground level and the fill level increases slightly alongside its western boundary.
- 7.26. As part of the SWDR Works, a new diverted Thames Water surface water twin culvert system will be constructed within the parcel which will run from north to south. Additional fill material will be needed to provide an appropriate depth of cover to said culvert.
- 7.27. There is a shortfall of material for this parcel with approximately 16,500 cubic metres of fill material required.



Appendix A - Topographical Survey (WSP)



DO NOT SCALE

KEY:
— MASTERPLAN BOUNDARY
— ADDITIONAL LAND FORMING PART OF APPLICATION

DRAWING STATUS:	
S0 - WORK IN PROGRESS	

REV	DATE	BY	DESCRIPTION	CHK	APP
PO1	01/07/1991	XXX	FIRST ISSUE	XXX	XXX

					
Mountham House, Baddly View, Basingstoke, RG21 4HL, UK					
T: +44 (0) 1256 318 800, F: +44 (0) 1256 318 700					
wsp.com					

CLIENT:	SOUTH WOKINGHAM SDL CONSORTIUM				
ARCHITECT:					
SITE/PROJECT:					

PRELIMINARY DRAINAGE STRATEGY				
TOPOGRAPHICAL SURVEY				

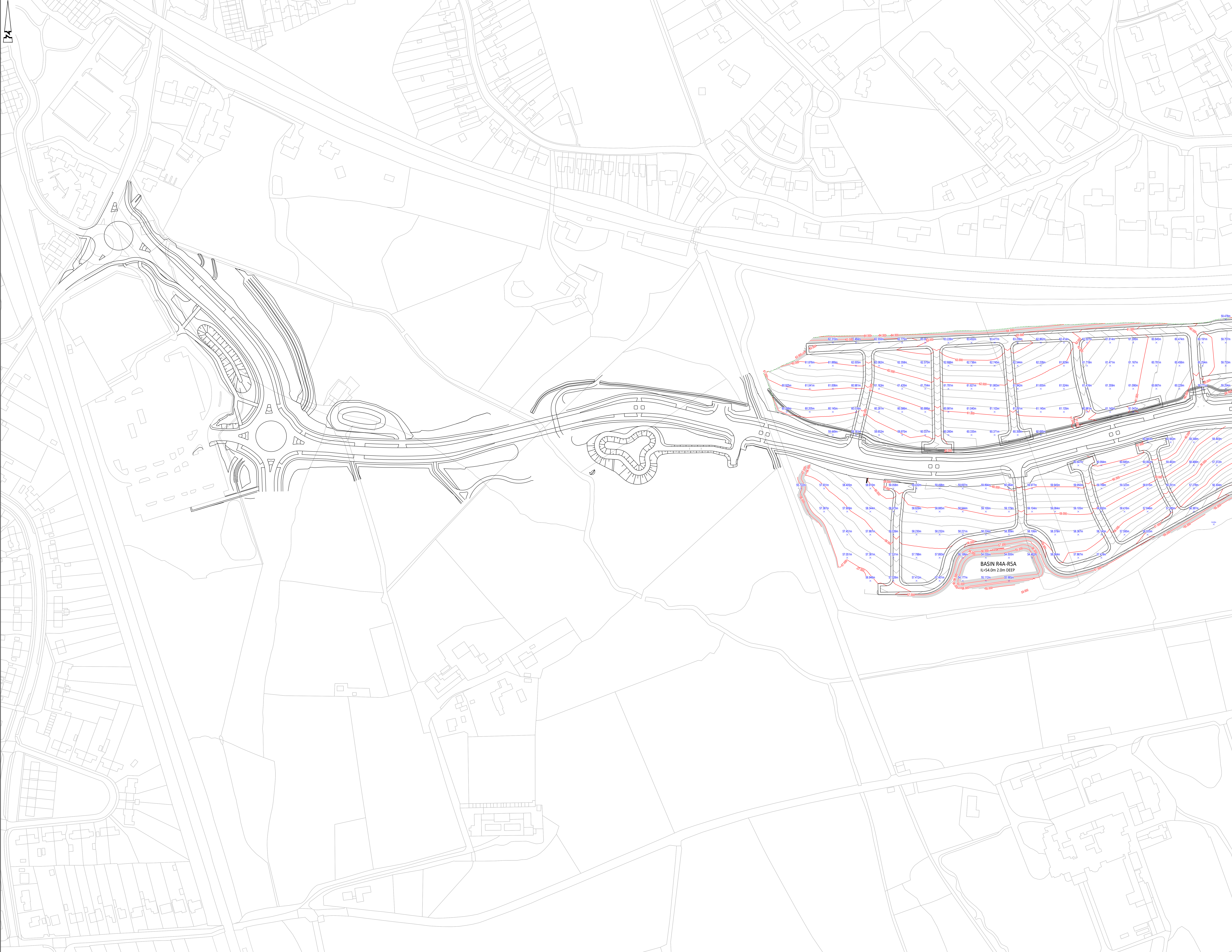
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70001684	CP	14.11.18		
DRAWING NO:			REV:	
70001684-D-018				PO1

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Appendix B - Site Wide Levels Plans



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GENERAL NOTES:
1. Do not scale.
2. Refer to all other Project Drawings and supporting notes.
3. Services to be located on site.

KEY:
1m Contours
250mm Contours
62.50m Proposed Levels on 20m orthogonal grid
Extent of earthworks.
Gradient Varies.

P2	07/24	Basins Update	KW	SM
PL	11/22	First Issue	JA	KW

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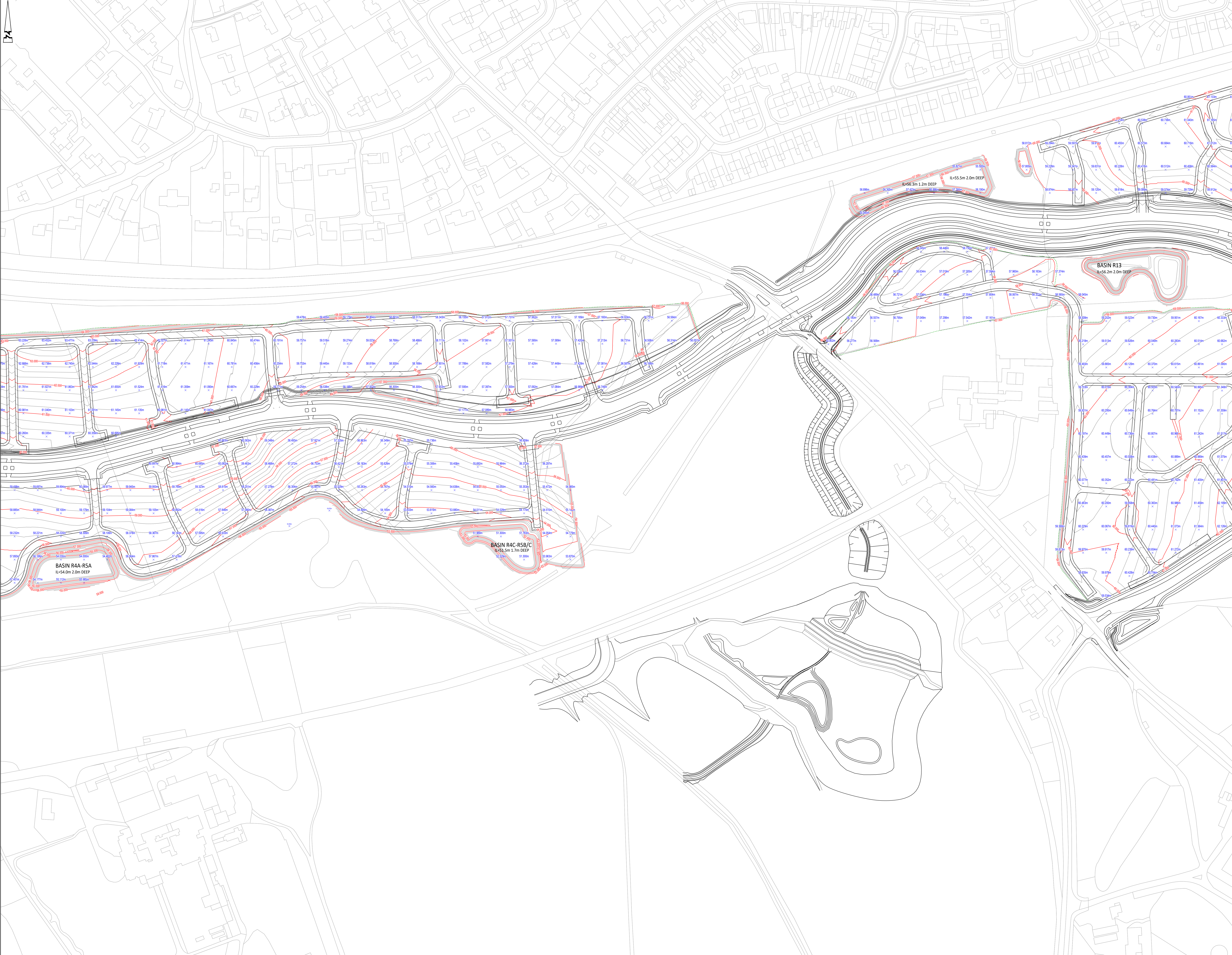
Client
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Project
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Title
**SITEWIDE LEVELS PLAN
SHEET 1**

Status

Scale 1:1000 @ A0	Date 11/22	Drawn JA	Checked KW
Drawn by A389-013	Revised	Revised	P2



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Extent of earthworks.
Gradient Varies.

P2	07/24	Basins Update	K.W.	SM
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File:
SITETWIDE LEVELS PLAN
SHEET 2

Drawn:
1:1000 @ A0

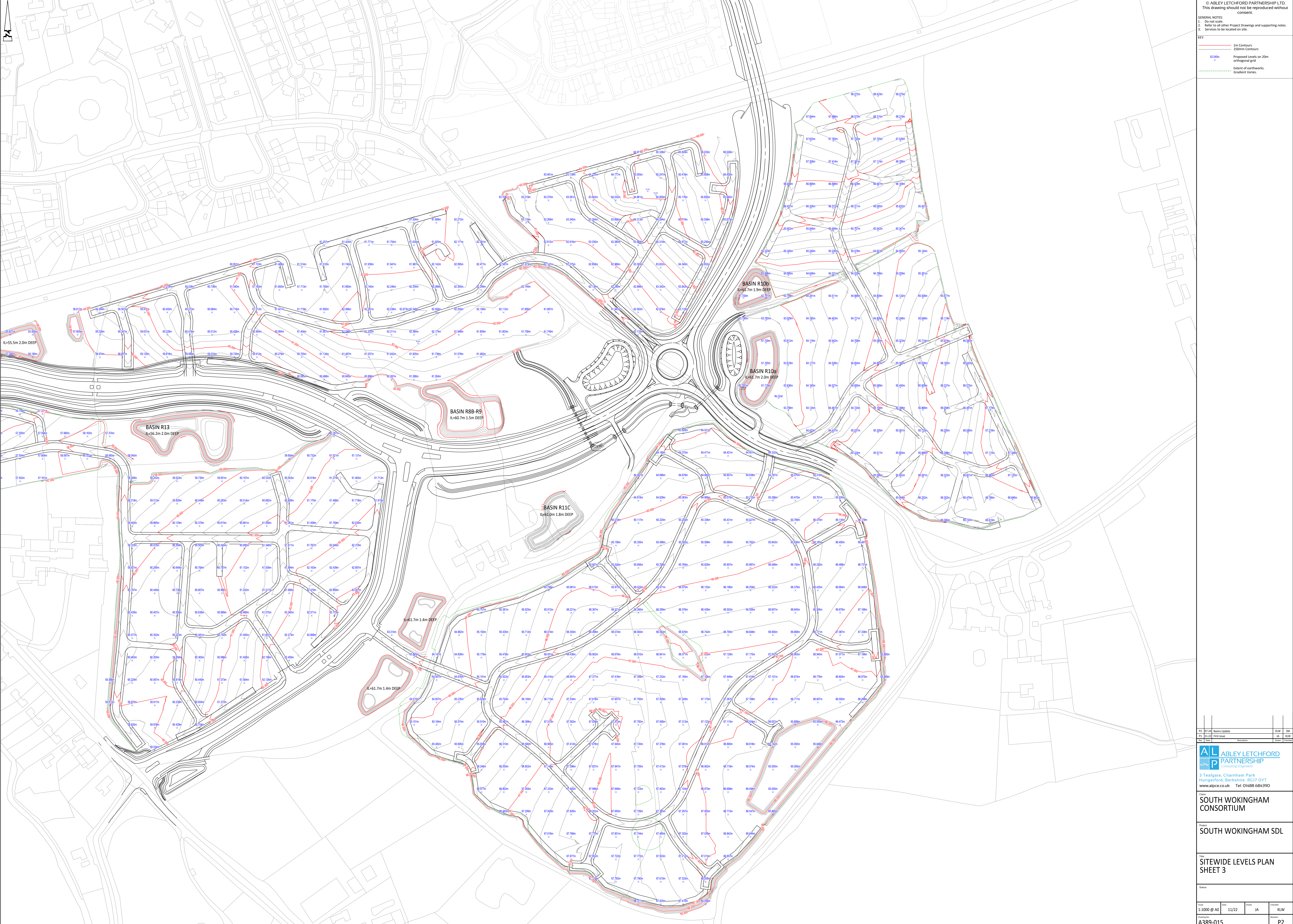
Date:
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JA

Checked:
K.W.

Drawn by:
A389-014

Project:
P2



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KEY:
1m Contours
250mm Contours
Proposed Levels on 20m orthogonal grid
Extent of earthworks.
Gradient Varies.

P2	07.24	Basins Update	KW	SM
P1	11.22	First Issue	JA	KW

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Client:
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Project:
SOUTH WOKINGHAM SDL

Title:
SITEWIDE LEVELS PLAN SHEET 3

Scale:
1:1000 @ A0

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