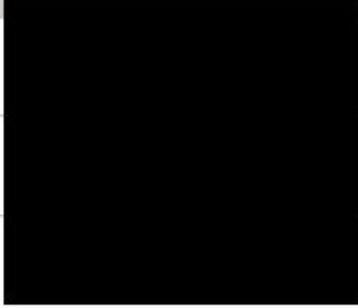


FLOOD RISK ASSESSMENT

**131-133 Minerva Street
Glasgow
G3 8LE**



Client: Nevis Properties
Date: October 2021
Project No: P14994

		SIGNATURE	DATE
Prepared by	Blane Notman		October 2021
Checked by	Gordon Hunt		October 2021
Version	1.1		

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1.0 INTRODUCTION

Goodson Associates was appointed by Nevis Properties to prepare a Stage 1 Flood Risk Assessment to supplement an application for a residential development situated in Glasgow City centre.

The following assessment has been completed in accordance with guidance presented by Glasgow City Council, and further cognisance of Scottish Planning Policy (SSP)¹, the National Planning Framework for Scotland 3 (NPF3) and the Flood Risk Management (Scotland) Act 2009.

The aim of the Stage One FRA is to assess any potential flooding to the development site from all potential sources (coastal, fluvial [watercourse], pluvial [surface water] or groundwater). This is primarily evaluated through carrying out a desktop study of available data relating to site flood risk.

In relation to the reporting, Goodson Associates carried out the following work: -

- A site walkover with the view of potentially identifying flooding information not available from the desk study and confirming the results concluded during the desktop study.
- Review of any publicly available information on flood risk for the area.
- Liaised with the Local Authority to identify any available information on historical flooding in the area.
- Consultation of the SEPA NGR Flood Maps to obtain information on flood risk specific to the development site.
- Assessed the Flood Risk from all other sources.

2.0 EXISTING SITE

The proposed residential development site is located approximately 1.5 km to the southwest of Glasgow City centre, immediately east of Minerva Street, immediately north of West Greenhill Place, and north of the River Clyde, Exhibition Centre Station, and the SSE Hydro. The total site area occupies approximately 0.22 hectares and is centred on National Grid Reference 257234, 665545.

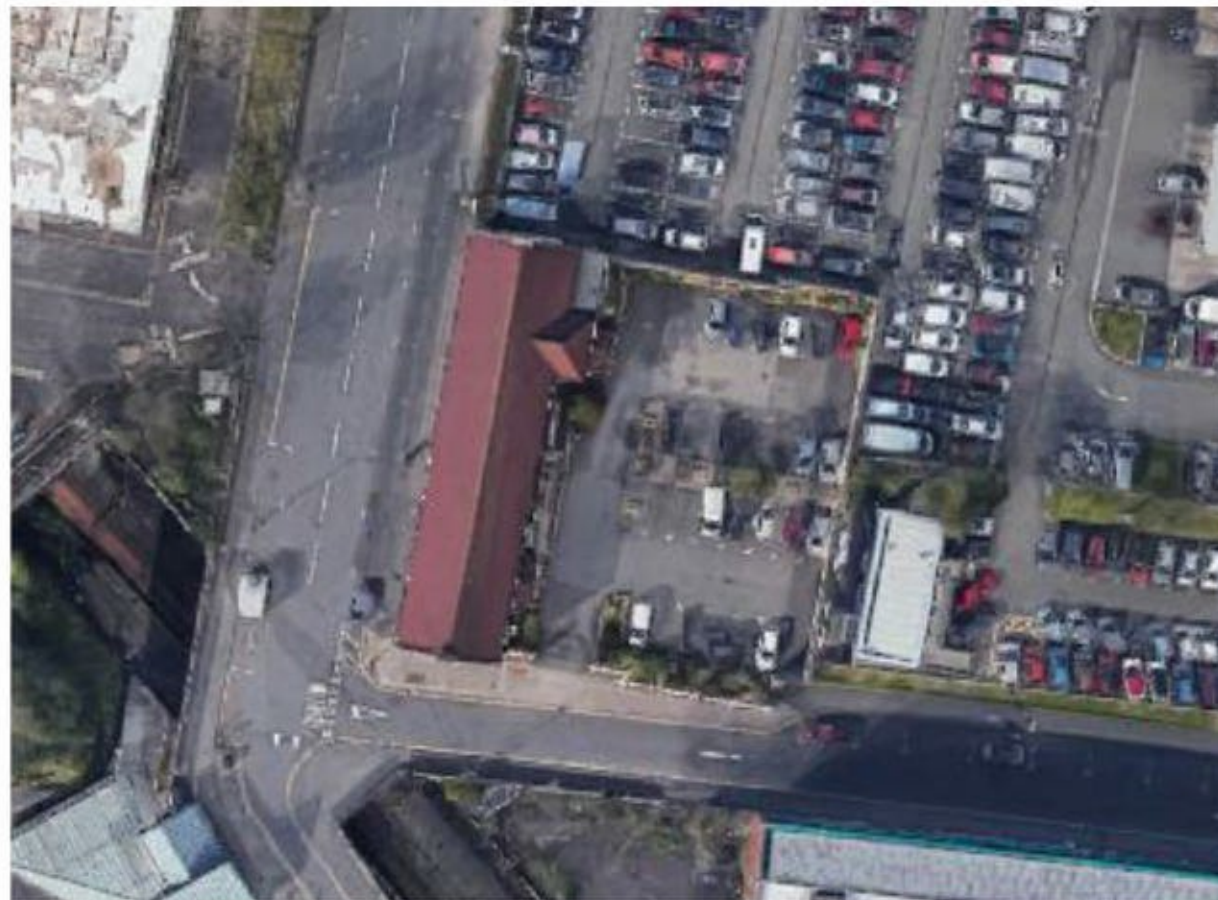
The site location plans below illustrate the extents of the boundaries of the site. The west of the site is bounded by Minerva Street, and the south of the site is bounded by West Greenhill Place. The A814 Dual Carriageway runs west-east adjacent to the southern boundary. The area is generally surrounded by commercial buildings and new residential units with the SSE Hydro located South of the A814 Dual Carriageway (Clydeside Expressway).

SITE LOCATION PLANS

Development Plan



Aerial Photograph





3.0 SITE TOPOGRAPHY

A site wide topographical survey was carried out in May 2021 by Pinnacle Phoenix Surveys Limited.

The topographic survey indicates that the levels within the site are generally flat, with levels ranging from 12.20m to 13.40m AOD. There is a slight fall in levels across the site from the northern boundary of the site, towards the southern boundary on West Greenhill Place.

4.0 EXISTING NATURAL DRAINAGE FEATURES

The river basin management plan (RBMP) developed by SEPA is available via the Water Classification Hub, providing resource information as to the status of classified inland and coastal water bodies within a specific RBMP catchment area.

A review of local mapping shows a watercourse 430m south of the site boundary. The watercourse, Clyde Estuary – Inner (inc. Cart) is a river in the River Clyde catchment of the Scotland River basin district. The main stem is approximately 4.4 square kilometres in area. The water body has been designated as a heavily modified water body and currently has a ‘moderate’ overall condition classification.

5.0 PROPOSED DEVELOPMENT

Development proposals are for the construction of a 9-storey block of flats, consisting of 1, 2 and 3-bed flats, for a total number of 64 flats. The development is also proposed to have a car park with a total number of 21 parking spaces, as well as amenity spaces located on areas of the roof of the flats.

6.0 FLOODING

In accordance with Glasgow City Council guidelines, SPP and PAN 69 all possible sources of flooding have been considered for the development and are discussed in the subsequent sections.

6.1 HISTORICAL FLOODING

Glasgow City Council have been consulted regarding their records for the historical flooding information for the site and its surrounding area. Glasgow City Council noted that the site has records of historic flooding occurring at the junction between Minerva Street and West Greenhill Place in 1994.

Further research into this indicated that the flooding occurred due to a burst bank on the River Kelvin. This water then flowed into an abandoned tunnel under Gibson Street, making its way towards Exhibition Centre and Glasgow Central Low Levels Stations. This is further confirmed through review of the SEPA surface water flooding map. It has been determined that the flooding therefore occurred within the railway tunnel and not within the boundary of the site.

6.2 FLUVIAL FLOODING

The Scottish Planning Policy (SPP) requires that all new developments be free from unacceptable flood risk for all flood events up to the 1 in 200-year return period. Using the GIS RBMP tool, the nearest classified surface water feature is the Clyde Estuary – Inner (inc. Cart) located approximately 430m south of the site (at its closest point).

With regards to fluvial flooding, the SEPA flood map (available at <http://map.sepa.org.uk/floodmap/map.htm>) shows that all site boundaries are away from the Clyde, and no significant out of bank flooding has been noted. The proposed site levels for the development will be approximately +12.50m, with a minimum Finished Floor Level of 13m to the proposed buildings. Both the distance and the levels of the flood plains indicate that fluvial flooding of the site will be unlikely, and that the development complies with the requirements of the SPP.

6.3 TIDAL FLOODING

According to the SEPA flood map (available at <http://map.sepa.org.uk/floodmap/map.htm>) there is no area on site which indicates that it is prone to tidal flooding. This illustrates that it is highly unlikely that tidal flooding will occur on site and again the proposed development complies with the requirements of the SPP.

6.4 SEWER FLOODING

Scottish Water asset plans illustrate that there is a combined sewer network located under Minerva Street and West Greenhill Place, which serves the site and the surrounding area. The closest manhole is located at approximately 10m from the site boundary. If localised flooding was to occur during a combined sewer surcharge event, the anticipated levels indicate that the development is considered to be of sufficient distance and elevation to not be at risk from flooding of this type.

6.5 GROUND WATER FLOODING

Groundwater measurements obtained during a historical site investigation, containing 4 trial pits, indicates that no groundwater was encountered in any of the trial pits. It is likely that the groundwater level on the site sits below the level of 3m. A site investigation of the site opposite indicates that no groundwater was encountered up to depths of around 5m. We would therefore recommend that flooding from this source also be discounted.

6.6 PLUVIAL FLOODING

Surface water flooding, otherwise referred to as pluvial flooding, can be defined as flooding which occurs due to rainfall causing overland flow and temporary ponding prior the runoff entering any watercourse, drainage, or sewer system.

Review of the SEPA Indicative River and Coastal Flood Map (available at <http://map.sepa.org.uk/floodmap/map.htm>) indicates that there is no risk of localized surface water flooding within the site.

In order to prevent any overland flooding on site, surface water flows from the new development will be treated and attenuated before discharging to the existing combined sewer. Attenuation will be in the form of ACO drains, gullies and combined treatment and storage systems, as appropriate for the location and the level of treatment required. In order to reduce the peak discharge to combined sewers an underground storage tank will also be constructed. For a more in-depth description of the drainage proposals please refer to our Drainage Strategy Plan.

6.7 CLIMATE CHANGE

The nature of climate change at a regional level will vary; for the UK more frequent short-duration high intensity rainfall and more frequent period of long-duration rainfall might be expected.

In compliance with Glasgow City Council Flood Risk Requirements the development will be designed to ensure that it is not at risk of flooding from a 1 in 200 plus 40% climate change event.

The proposed surface water drainage network shall be designed to contain flood flows generated up to and including the 1 in 200-year plus climate change storm events within the site, without damage to buildings, essential services or neighbouring developments.

7.0 CONCLUSIONS

In conclusion, the guidelines in the latest planning policies and advice notes have been observed and consideration of all possible sources of flooding made. Historical flood records have been consulted and it has been concluded that any future flooding will pose no threat to the proposed development. Flood maps have been used to determine the location of fluvial and tidal flood plains under extreme flood events and it has been determined that the proposed site is located outside these zones. Borehole information has been checked and groundwater is not considered to be an issue. Finally, the surface water drainage for the scheme has been designed to ensure that pluvial, or overland, flooding does not occur. It has therefore been concluded that the flood risk of the proposed site is negligible.

Appendix 1 – Borehole Records

SIMPSON MINING & GEOTECHNICAL LIMITED										105		TRIAL PIT	
CLIENT THE HOLMES PARTNERSHIP					SITE MINERYA STREET, GLASGOW								
ENGINEER HARLEY HADDOW					LOGGED BY WS		GROUND LEVEL m.A.O.D.		REF. NO. 105/WS				
EXCAVATION METHOD BACKACTER					START COMPLETE 22-1-92 22-1-92		SHEET 1 of 1		TRIAL PIT NO. 2				
SCALE 1:50													
LABORATORY TESTS						Soil Sample Type	Depth (m)	Insitu Tests	STRATA DESCRIPTION	Depth (m)	O.D. Level m.A.O.D.	L. Level	
M	BD	C	ϕ	LL / PL	CGS								
									CONCRETE	0-10			
									Broken BRICK				
									Medium-dense ASH FILL.				
										1-25			
									Medium-dense, brown, silty SAND.				
										3-00			
KEY									REMARKS				
N(X) - Standard Penetration Test Result U - Undisturbed 100mm dia. Sample B - Bulk Disturbed Sample D - Small Disturbed Sample W - Water Sample M - Moisture Content (%) BD - Bulk Density (Kg/m ³) C - Immediate Undrained Cohesion (kN/m ²)									Trial Pit Dry				

SIMPSON MINING & GEOTECHNICAL LIMITED

105

TRIAL PIT

CLIENT THE HOLMES PARTNERSHIP	SITE MINERVA STREET, GLASGOW
ENGINEER HARLEY HADDOW	LOGGED BY WS
EXCAVATION METHOD BACKACTER	GROUND LEVEL m.A.O.D.
	REF. NO. 105/WS
	START COMPLETE 22-1-92 22-1-92
	SHEET 1 of 1
	SCALE 1:20
	TRIAL PIT NO. 3

LABORATORY TESTS						Soil Sample Type	Depth (m)	Insitu Tests	STRATA DESCRIPTION	Depth (m)	O.D. Level m.A.O.D.	Lenses
M	BD	C	ρ	LL / PL	CGS							
									CONCRETE	0-10		
									Broken BRICK	0-20		
									Medium - dense ASH FILL.			
										+25		
									Medium - dense, brown, silty SAND			
										3-00		

- KEY
- N(X) - Standard Penetration Test Result
 - U - Undisturbed 100mm dia Sample
 - B - Bulk Disturbed Sample
 - D - Small Disturbed Sample
 - W - Water Sample
 - M - Moisture Content (%)
 - BD - Bulk Density (Kg/m³)
 - C - Immediate Undrained Cohesion (kN/m²)

REMARKS
Trial Pit Dry.

SIMPSON MINING & GEOTECHNICAL LIMITED										TRIAL PIT		
CLIENT THE HOLMIES PARTNERSHIP					SITE MINERVA STREET, GLASGOW							
ENGINEER HARLEY HADDOW					LOGGED BY WS		GROUND LEVEL m.A.O.D.		REF. NO. 105/WS			
EXCAVATION METHOD BACKACTER					START COMPLETE 22-1-92 22-1-92		SHEET 1 of 1		TRIAL PIT NO. 4			
LABORATORY TESTS												
M	BD	C	ϕ	LL / PL	CGS	Soil Sample Type	Depth (m)	In situ Tests	STRATA DESCRIPTION	Depth (m)	O.D. Level m.A.O.D.	Notes
									CONCRETE	0-10		
									Broken BRICK	0-20		
									Medium - dense, ASH FILL.	1-50		
									Medium - dense, brown, silty SAND.	3-00		
KEY										REMARKS		
N(X) - Standard Penetration Test Result U - Undisturbed 100mm dia. Sample B - Bulk Disturbed Sample D - Small Disturbed Sample W - Water Sample M - Moisture Content (%) BD - Bulk Density (Kg/m ³) C - Immediate Undrained Cohesion (kN/m ²)										Trial Pit Dry.		

SIMPSON MINING & GEOTECHNICAL LIMITED

105

TRIAL PIT

CLIENT THE HOLMES PARTNERSHIP	SITE MINERVA STREET, GLASGOW
ENGINEER HARLEY HADDOW	LOGGED BY WS
EXCAVATION METHOD BACKACTER	GROUND LEVEL m.A.O.D.
START COMPLE 22-1-92 22-1-92	REF. NO. 105/WS
	SHEET 1 of 1
	SCALE 1:20
	TRIAL PIT NO. 5


LABORATORY TESTS						Soil Sample Type	Depth (m)	In situ Tests	STRATA DESCRIPTION	Depth (m)	O.D. Level m.A.O.D.	L. Level
M	BD	C	D	LL / PL	CGS							
									CONCRETE.	0-15		0.0
									Broken BRICK			
									ASH FILL, medium-dense.			
									Medium-dense, brown, silty SAND.	1-45		
										3-00		

- KEY
- N(X) - Standard Penetration Test Result
 - U - Undisturbed 100mm dia Sample
 - B - Bulk Disturbed Sample
 - D - Small Disturbed Sample
 - W - Water Sample
 - M - Moisture Content (%)
 - BD - Bulk Density (Kg/m³)
 - C - Immediate Undrained Cohesion (kN/m²)

REMARKS
TRIAL PIT Dry.

Appendix 2 – Development Layout

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-  Apartment Privacy Zone
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-  Title Boundary
-  Adopted Pathway

Rev	Description	Date	Drawn	Check
P04	Windows Added, Apartment Types Amended	24/09/21	HG	CH
P03	Escape Routes Updated. Service Risers Amended. B.O.H. Areas Revised. Apartment types updated. Internal Layouts omitted.	17/09/21	CH	EPM
P02	Updated to reflect Elevation Concept	10/09/21	HG	CH
P01	Updated to M&E requirements. Drawing series amended	24/08/21	HJ	CH
P00	First Issue	11/08/21	HJ	CH

Client
Nevis Properties

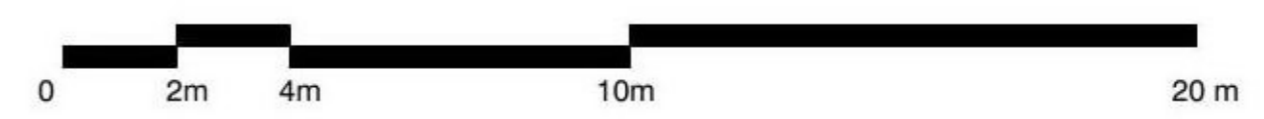
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 Glasgow**

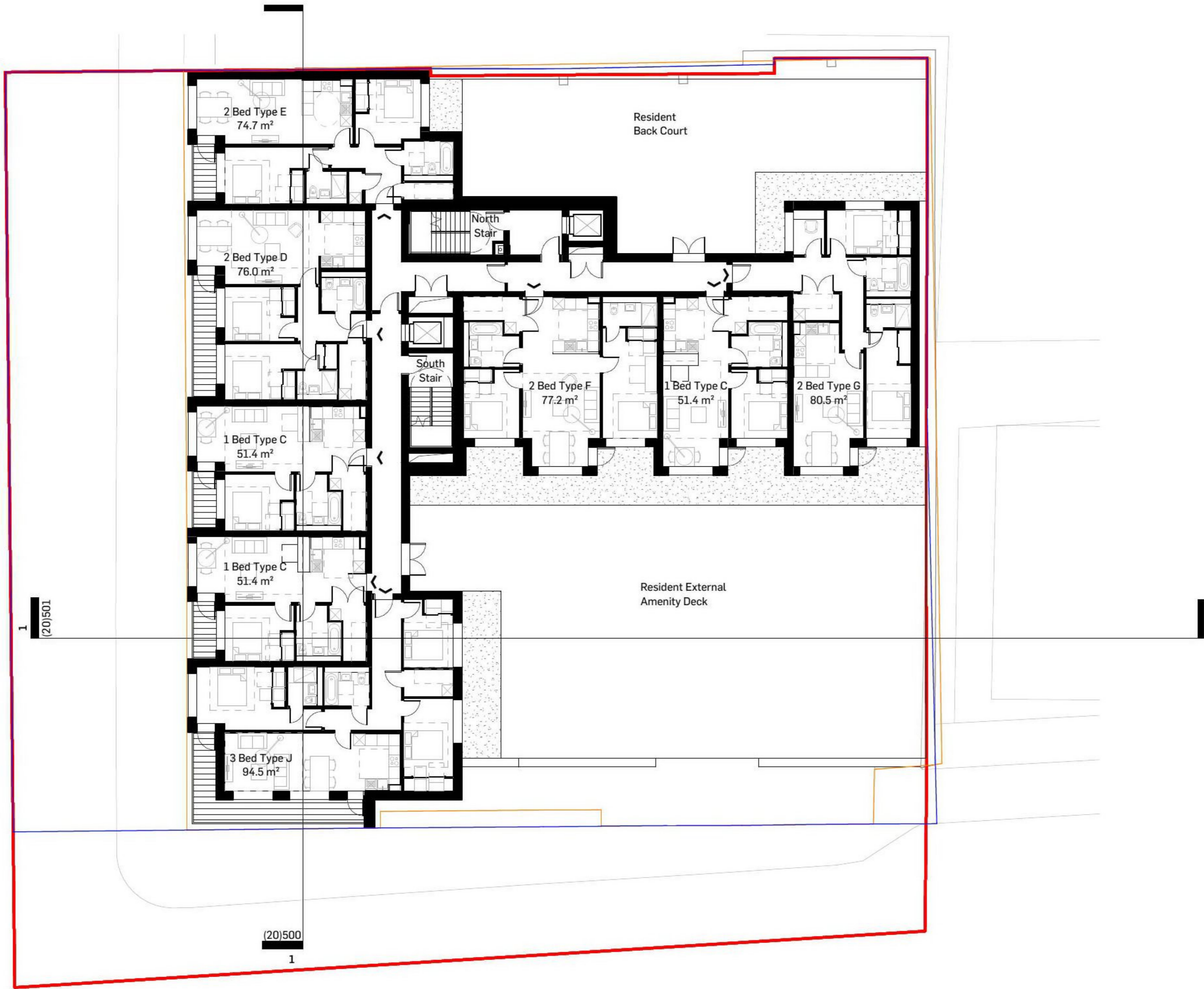
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P00	First Issue	11/08/21	HJ	CH

Rev	Description	Date	Drawn	Check
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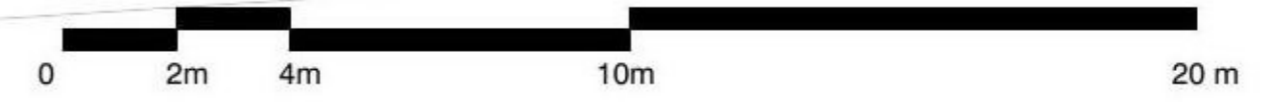
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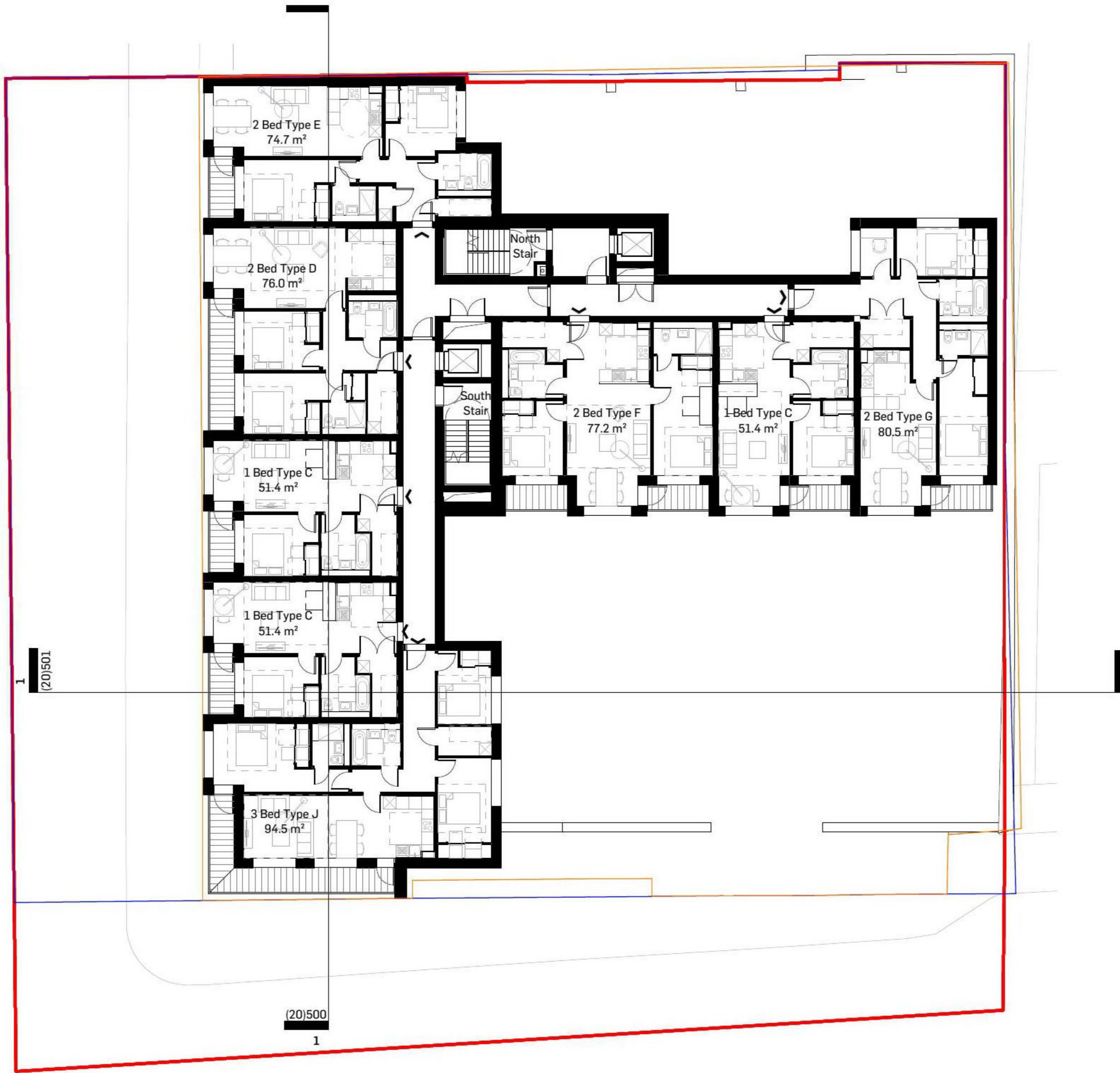
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-  Title Boundary
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P00	First Issue	11/08/21	HJ	CH

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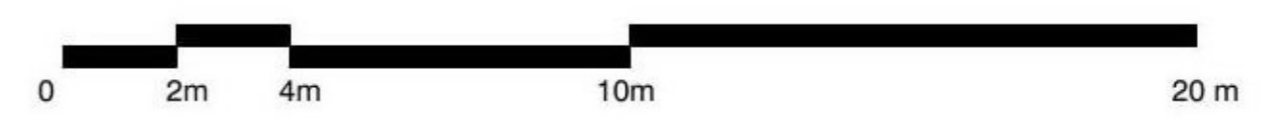
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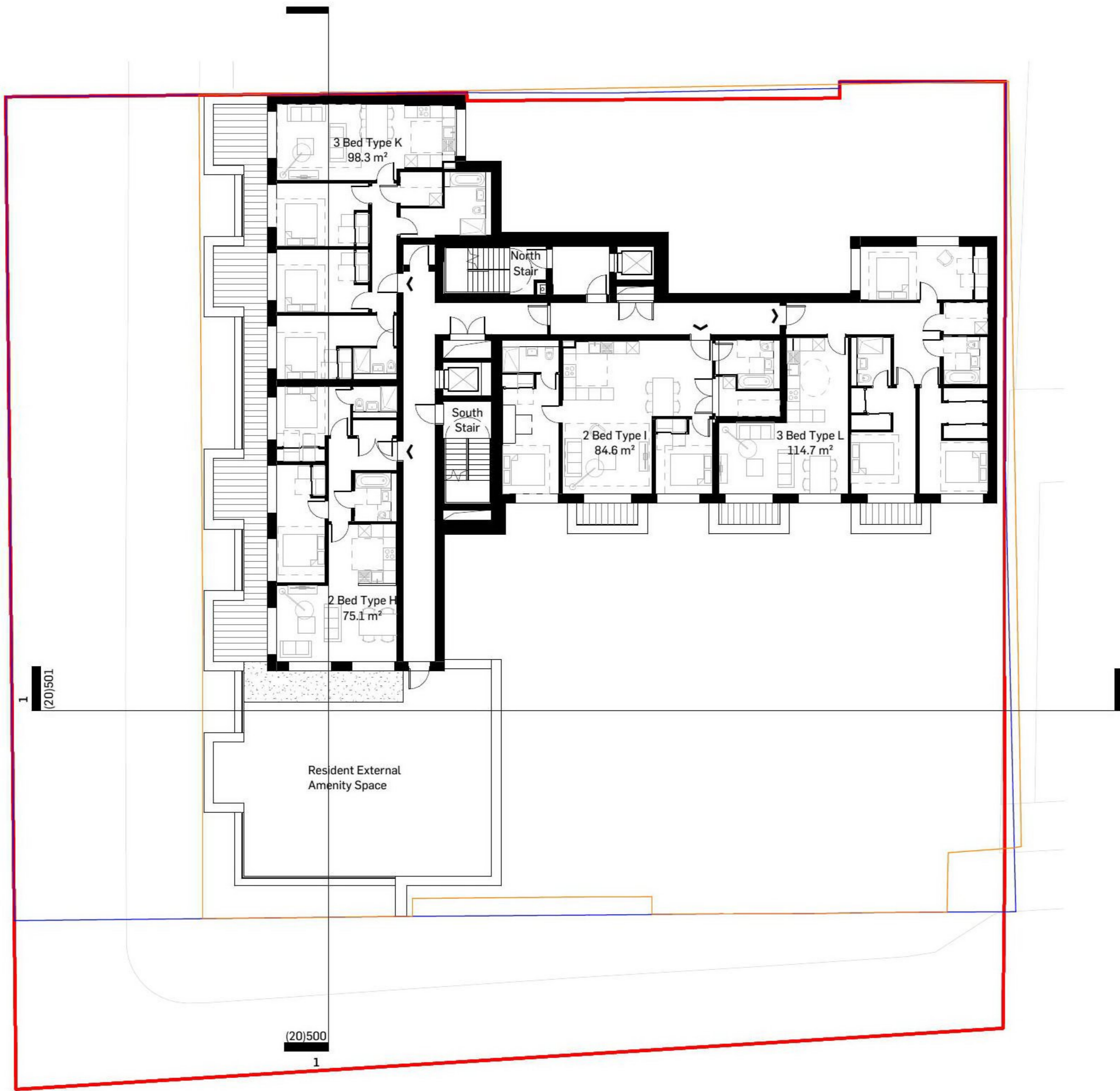
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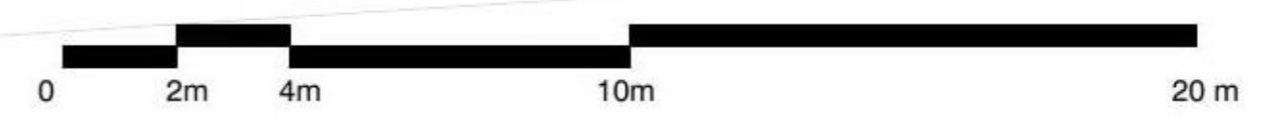
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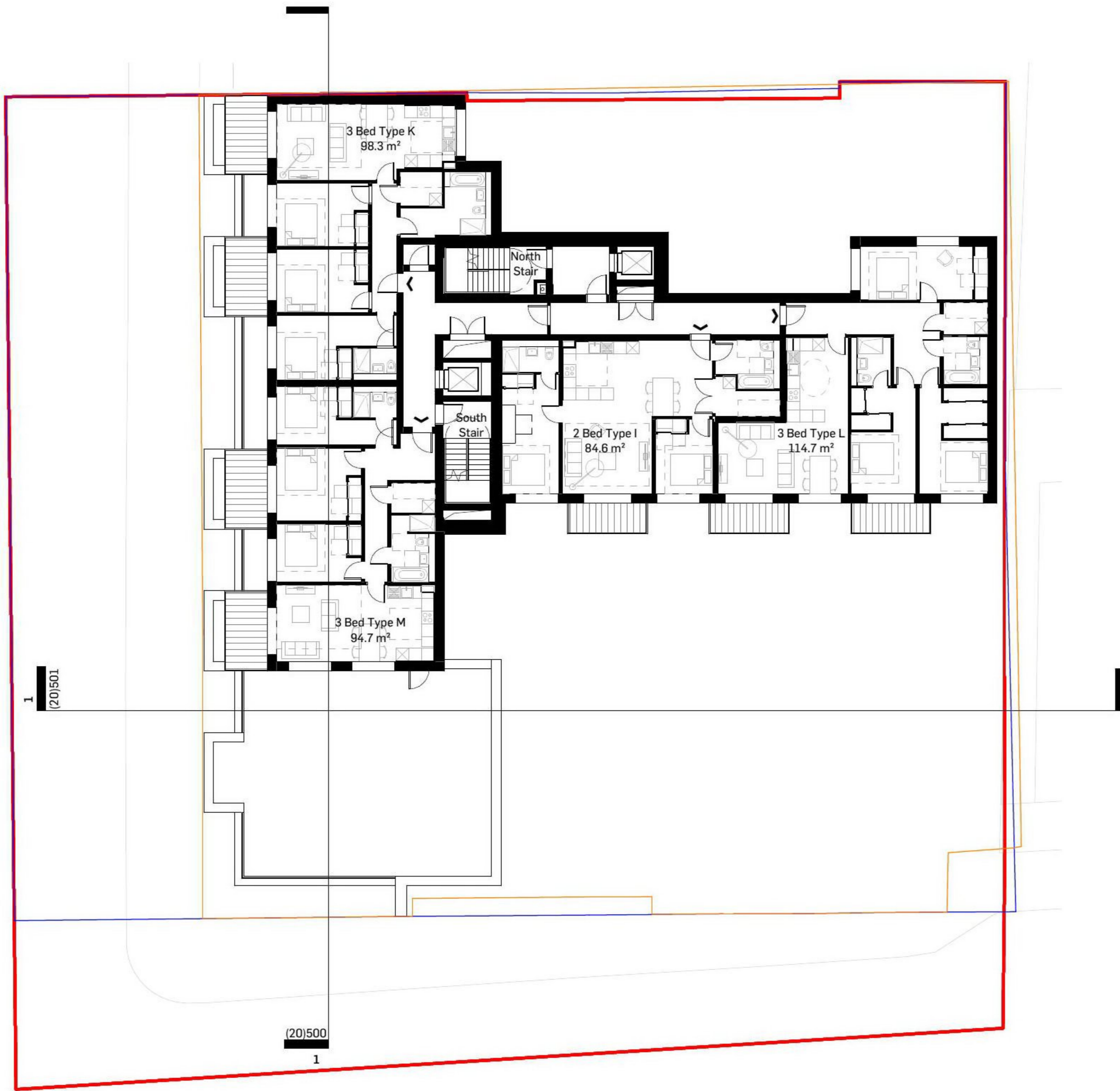
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P01	Updated to M&E requirements. Drawing series amended	24/08/21	HJ	CH
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Rev	Description	Date	Drawn	Check
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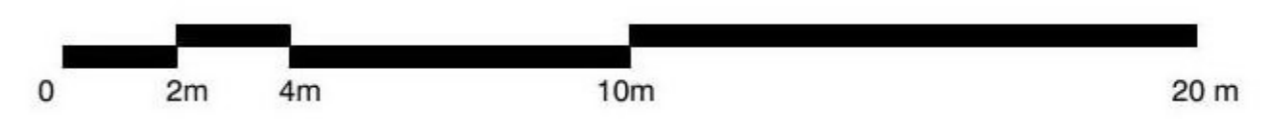
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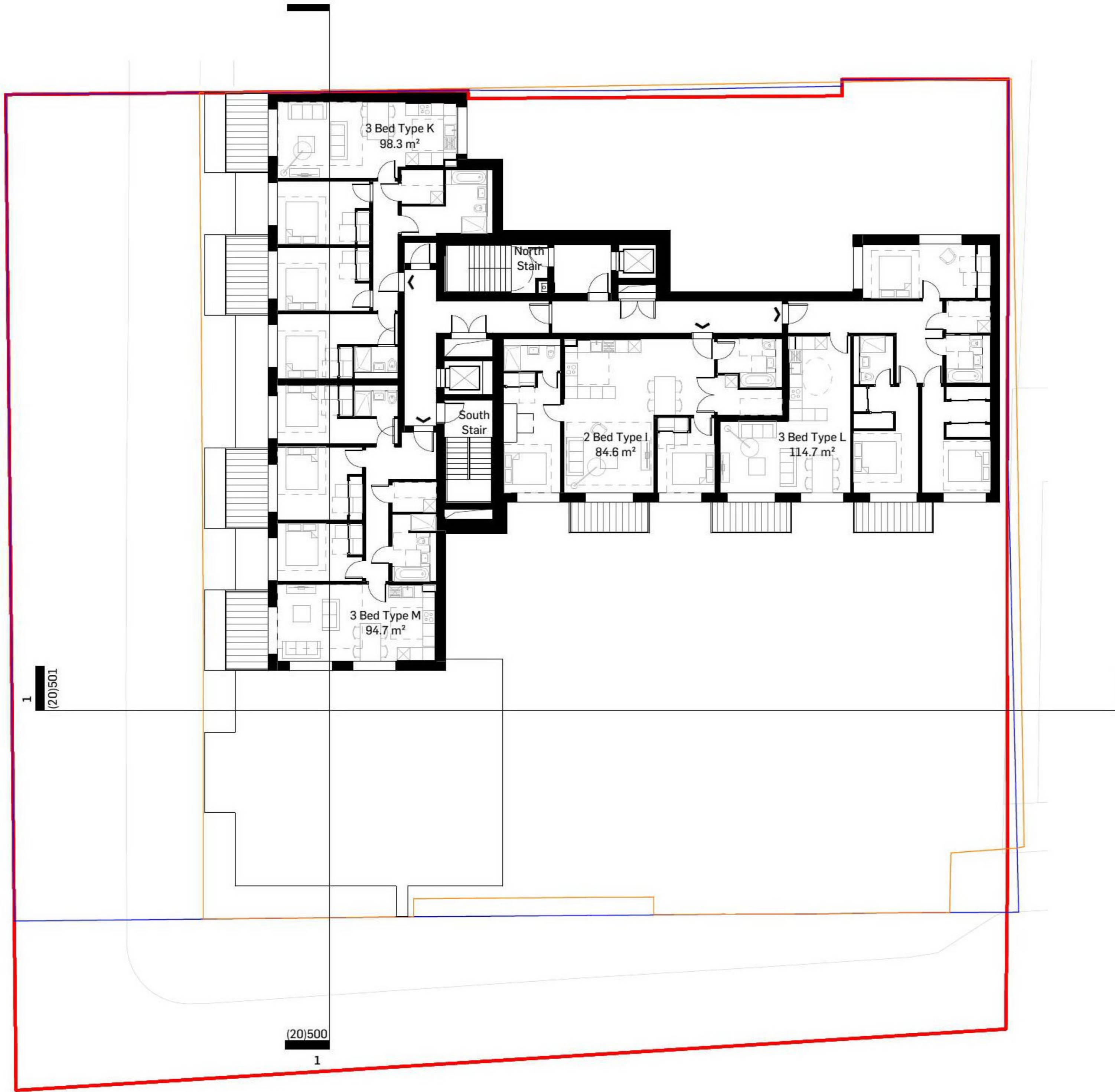
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P03	Windows Added, Apartment Types Amended	24/09/21	HG	CH
P02	Updated to reflect Elevation Concept	10/09/21	HG	CH
P01	Updated to M&E requirements. Drawing series amended	24/08/21	HJ	CH
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Rev	Description	Date	Drawn	Check
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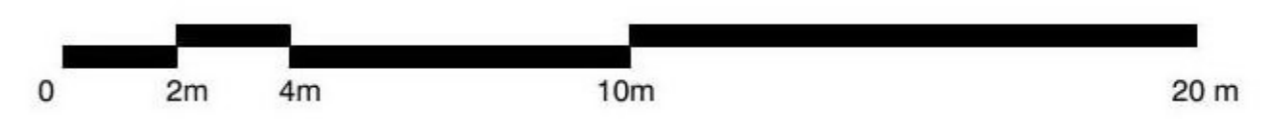
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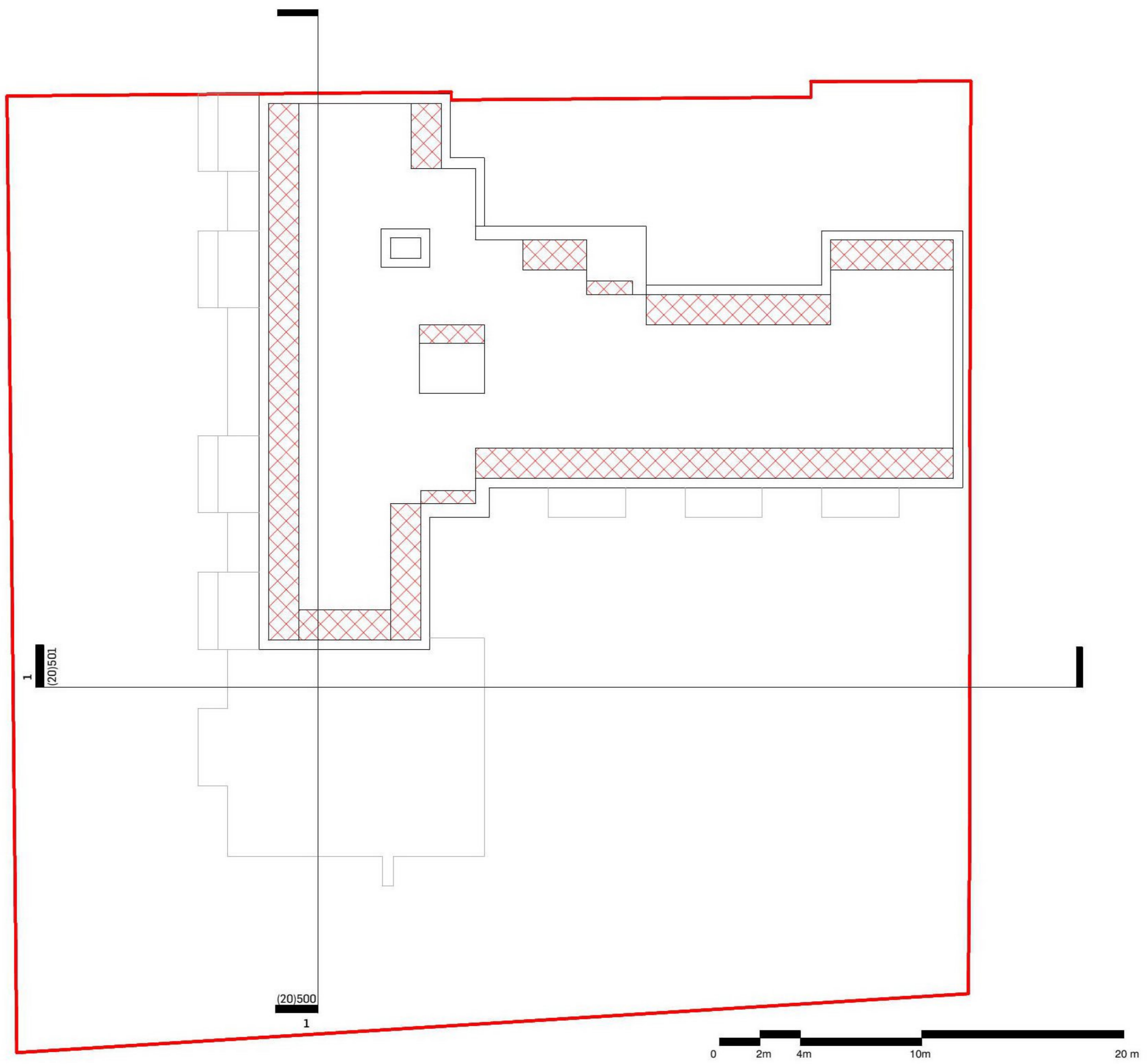
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