

WESTMINSTER UNITED CHURCH 4094 TOMKEN ROAD

MISSISSAUGA, ONTARIO

NOISE AND VIBRATION IMPACT STUDY

RWDI #2201947

July 7, 2022

SUBMITTED TO

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VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	July 7, 2022	Draft	KD	GER
2		Final		



EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed mixed-use development located in Mississauga, Ontario. The proposed development will consist of two 12-storey residential buildings adjacent to the existing church and residential building. This assessment was completed to support the Zoning By-Law Amendment as required by the City of Mississauga.

The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade and in the outdoor amenity areas
3. Minimum sound isolation performance:
 - a. Suite bedroom window glazing with sound isolation performance up to STC-33.
 - b.
4. Construction of perimeter noise barriers along the outdoor amenity areas if feasible, with the applicable warning clause.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior during detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is feasible to meet the applicable sound and vibration criteria.



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1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed Westminster Church development located at 4094 Tomken Road in Mississauga, Ontario. The proposed development site is located at the southeast corner of Tomken Road and Rathburn Road East. The proposed development will consist of two 12-storey residential buildings adjacent to the existing church and residential building. The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic on Tomken Road to the northeast, Rathburn Road East to the northwest, Westminster Place to the southwest, and Burnhamthorpe Road East to the southeast.

There are no rail corridors located within 1 km of the proposed development, therefore no noise or vibration impacts from above-grade rail are expected.

A review of nearby stationary sources was conducted, and it was determined that there are no sources of concern for this development.

This assessment was completed to support the Zoning By-Law Amendment submission as required by the City of Mississauga. This assessment was based on design drawings dated September 2021 included in **Appendix D**.

2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources (road and rail), stationary noise sources and rail vibration are adopted from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline (MOE, 2013), with a summary of the applicable criteria included with **Appendix A**.

The proposed development site would be characterized as a "Class 1 Area", which is defined according to NPC-300 as an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum."

3 IMPACT OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

3.1.1 Road Traffic Volume Data

The Ultimate Annual Daily Traffic (UADT) volumes, traffic makeup, and daytime/nighttime split for Tomken Road, Rathburn Road East, Westminster Place and Burnhamthorpe Road East volumes were obtained from the City of Mississauga.



A summary of the traffic data used is included in **Table 1** below with more detailed information included in **Appendix E**.

Table 1: Road Traffic Volumes

Roadway	2042 Future Traffic (UADT)	% Day/Night	Speed Limit (km/hr)	% Trucks
Tomken Road	17,500	90%/10%	50	3%
Rathburn Road East	25,200	90%/10%	50	2%
Westminster Place	2,800	90%/10%	40	4%
Burnhamthorpe Road East	56,500	90%/10%	60	3%

3.1.2 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. Using the “building evaluation” feature of Cadna/A, each façade of the residential buildings was assessed.

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. Daytime sound levels were assessed at the following identified OLAs:

- OLA_01: Outdoor Living Area 1 Building A, Level 7
- OLA_02: Outdoor Living Area 2 Building B, Level 7
- OLA_03: Outdoor Living Area 3 Building B, Level 7

The OLAs are indicated in **Figure 2**.

3.1.3 Analysis and Results

Sound levels due to the adjacent transportation (road) sources were predicted using the RLS-90 standard (RLS,1990) as implemented in the Cadna/A software package.

To assess the impact of transportation noise on suites, the worst-case façade of each building was determined with the results summarized in **Table 2**.



Table 2: Predicted Ground Transportation Source Sound Levels – Plane of Window

Building	Road		Notes
	Day L _{EQ} , 16hr	Night L _{EQ} , 8hr	
Building A	72	65	1
Building B	70	63	1

Note(s):

1. The acoustical performance of building components must be specified to meet the indoor sound level criteria. Installation of air conditioning to allow for windows and doors to remain closed, warning clause “Type D”. Refer to **Appendix C** for guidance regarding air-conditioning as a noise mitigation measure.

To assess the impact of transportation noise on the qualifying OLAs for the development, predicted sound level results are summarized in **Table 3**.

Table 3: Transportation Sound Levels in Outdoor Living Areas (OLAs)

Receptor	Description	Daytime L _{EQ} , 16hr	Notes
OLA_01	Outdoor Living Area 1 Building A, Level 7	67 dBA	2
OLA_02	Outdoor Living Area 2 Building B, Level 7	63 dBA	2
OLA_03	Outdoor Living Area 3 Building B, Level 7	59 dBA	1

Note(s):

1. For OLA sound levels >55 dBA and ≤60 dBA, noise controls may be applied to meet the 55 dBA criterion. If noise control measures are not provided, a warning clause “Type A” is recommended.
2. Noise mitigation is recommended to meet the ≤55 dBA OLA sound level criterion. If noise controls are not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case, a warning clause “Type B” is recommended.

3.2 Stationary Source Assessment

A review of nearby stationary sources was conducted, and it was determined that there are no sources of concern for this development. There are no permitted facilities within 1 km of the proposed development. The area surrounding the proposed development is zoned as residential area. Due to the elevated traffic volume surrounding the development, it is expected that any stationary sources associated with commercial uses within the area will not be audible.

3.3 Recommendations

Based on the noise impact assessment results, the following recommendations were determined for the project. Recommendations are provided for transportation sources.

3.3.1 Transportation Sources

The following recommendations are provided to address transportation sources.



3.3.1.1 *Building Façade Components*

Due to the elevated transportation sound levels in the area, acoustical design of the façade components including spandrel, window glazing, and exterior doors, are recommended to be specified for the proposed development.

To assess the development’s feasibility, preliminary window glazing, and exterior balcony door sound isolation requirements were determined. These were based on following assumptions:

- Typical residential living room:
 - Glazing 60% of façade, Door: 20% of façade
 - 55% Façade to floor area Ratio
- Typical residential bedroom:
 - Glazing 80% of façade, Door: N/A
 - 81% Façade to floor area Ratio
- Acoustical character of rooms: High absorption finishes/furniture for bedrooms and intermediate absorption finishes/furniture for living rooms.

Based on the predicted plane of window sound levels and the assumptions listed above, recommendations for the minimum sound insulation ratings for the building components were determined using the National Research Council of Canada “BPN-56 method” (NRCC, 1985). The reported results are in terms of Sound Transmission Class (STC) ratings as summarized in **Table 4**.

Table 4: Recommended Façade Component Minimum Sound Insulation Rating

Portion of Development	Window Glazing	Exterior Door	Façade Wall
Building A	STC-33	OBC	OBC
Building B	OBC	OBC	OBC

Note(s):

1. “OBC” denotes that the noise insulation design is not required to be specified. Building envelope assemblies meeting the minimum Ontario Building Code (OBC) requirements will also exhibit sufficient noise reduction to meet the interior sound level criteria.

The maximum requirement for the window glazing was determined to be STC-30 which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units.

Taking into account the assumptions used as a basis to determine the glazing requirements, the applicable indoor transportation source sound level criteria are predicted to be achieved.

We recommend that the façade construction is reviewed during detailed design to ensure that the indoor sound level limits will be met, and that the window/door supplier is requested to provide STC laboratory test reports as part of shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.



3.3.1.2 Ventilation Recommendations

Due to the transportation sound levels at the plane of the façade, central air conditioning is recommended for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective purchasers or tenants should be informed by a warning clause “Type D”.

3.3.1.3 Outdoor Living Areas

Due to exposure to transportation sources along the nearby for Tomken Road, Rathburn Road East, Westminster Place and Burnhamthorpe Road East, sound levels in OLAs are predicted to be elevated. The road daytime average sound levels for the OLAs included in the assessment are in the range of 59-67 dBA. To reduce the transportation sound levels in OLAs to meet the applicable criteria, noise barriers are recommended.

The recommended geometry of the noise barriers are included with **Figure 3a** (to meet 55 dBA) and **Figure 3b** (to meet 60 dBA). The barrier heights are summarized in **Table 5**. General guidance with respect to noise barrier design is included with **Appendix C**.

Table 5: Barrier Height Recommendations for OLAs

Receptor	Description	Predicted OLA Sound Level	Barrier Height (m) to Meet Sound Level Criterion	
		Daytime L_{EQ} , 16hr	≤ 55 dBA ^[1]	≤ 60 dBA ^[2]
OLA_01	Outdoor Living Area 1 Building A, Level 7	67 dBA	3.1 m	1.3 m
OLA_02	Outdoor Living Area 2 Building B, Level 7	63 dBA	3.8 m	1.0 m
OLA_03	Outdoor Living Area 3 Building B, Level 7	59 dBA	2.3 m ^[3]	--

Note(s):

1. Refer to Figure 3a for barrier geometry to meet 55 dBA.
2. Refer to Figure 3b for barrier geometry to meet 60 dBA. A warning clause “Type B” is recommended in cases where the OLA sound level is >55 dBA (to a maximum of 60 dBA).
3. If noise control measures are not provided, a warning clause “Type A” is recommended.

3.3.2 Warning Clauses

The following warning clauses are recommended for the proposed development:

1. NPC-300 Type A or B to address transportation sound levels in Outdoor Living Areas (OLAs)
2. NPC-300 Type D to address transportation sound levels at the plane of window

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. The wording of the recommended warning clauses is included with **Appendix B**.



4 IMPACT OF THE PROPOSED DEVELOPMENT ON ITS SURROUNDINGS AND ON ITSELF

On-site stationary sources for the development are expected to consist of HVAC related equipment in the roof-top mechanical penthouse as well as various exhaust fans. Further, consideration should be given to control airborne and structure-borne noise generated within the proposed development.

Within the development itself the main sources of noise that are likely to affect the uses of the building are the mechanical systems. The potential noise impact of the commercial component of the development is recommended to be reviewed during detailed design, to ensure the applicable criteria will be met.

Provided that best practices for the acoustical design of the building are followed, noise from building services equipment associated with the development are expected to be feasible to meet the applicable sound level criteria due to the nature (residential/mixed-use) of the proposed development.

We recommend that the potential noise impact of the proposed development is reviewed during detailed design to ensure the applicable sound level criteria will be achieved.

5 CONCLUSIONS

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed mixed-use development located in Mississauga, Ontario.

The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade and in the outdoor amenity areas
3. Minimum sound isolation performance:
 - a. Suite bedroom window glazing with minimum sound isolation performance of STC-33.
4. Construction of perimeter noise barriers along the outdoor amenity areas if feasible, with the applicable warning clause.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria.

We recommend that the building design is evaluated prior to building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is feasible to meet the applicable sound and vibration criteria.



6 REFERENCES

1. Ontario Ministry of the Environment (MOE), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning (MOE, 2013).
2. Richtlinien für den Lärmschutz an Strassen (RLS). BM für Verkehr, Bonn, 1990 (RLS, 1990).
3. Federal Transit Administration, U.S. Department of Transportation, Transit Noise and Vibration Impact Assessment, 2018 (FTA, 2018).

7 STATEMENT OF LIMITATIONS

This report entitled Westminster United Church 4094 Tomken Road was prepared by Rowan William Davis & Irwin Inc. (“RWDI”) for KPMB Architects (“Client”). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein Westminster United Church 4094 Tomken Road (“Project”). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

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FIGURES



Site Context Plan

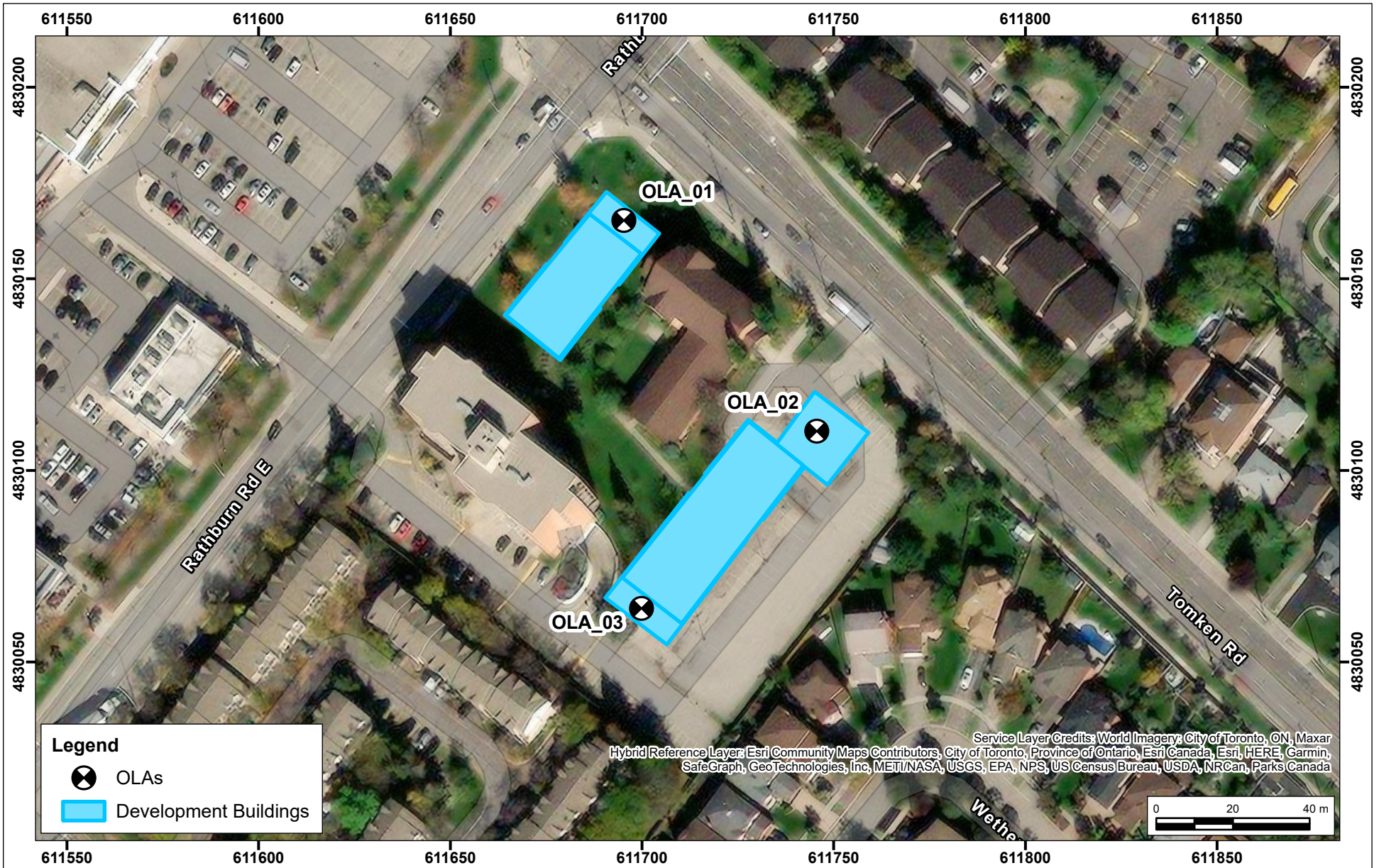
Map Projection: NAD 1983 UTM Zone 17N
 Westminister Church 4094 Tomken Road - Mississauga, Ontario



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Date Revised: Jul 4, 2022	



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Outdoor Living Areas (OLAs) Locations Location of Common Outdoor Amenity Areas

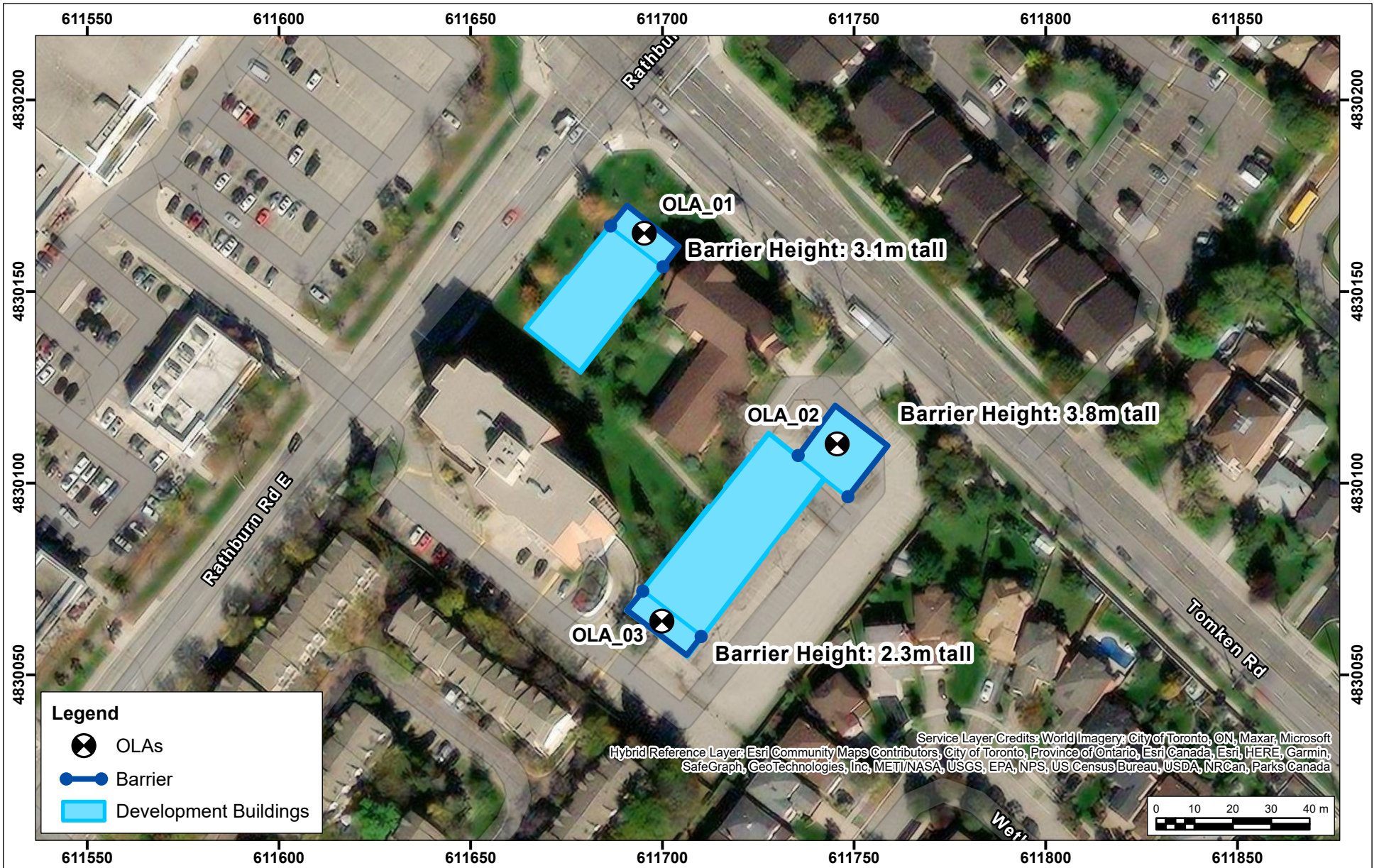
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Westminster Church 4049 Tomken Road - Mississauga, Ontario



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Date Revised: Jul 4, 2022	



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Outdoor Living Areas (OLAs) Mitigation to 55 dBA
Recommended Barrier Geometry and Height to meet 55 dBA

Map Projection: NAD 1983 UTM Zone 17N
 Westminster Church 4049 Tomken Road - Mississauga, Ontario

True North



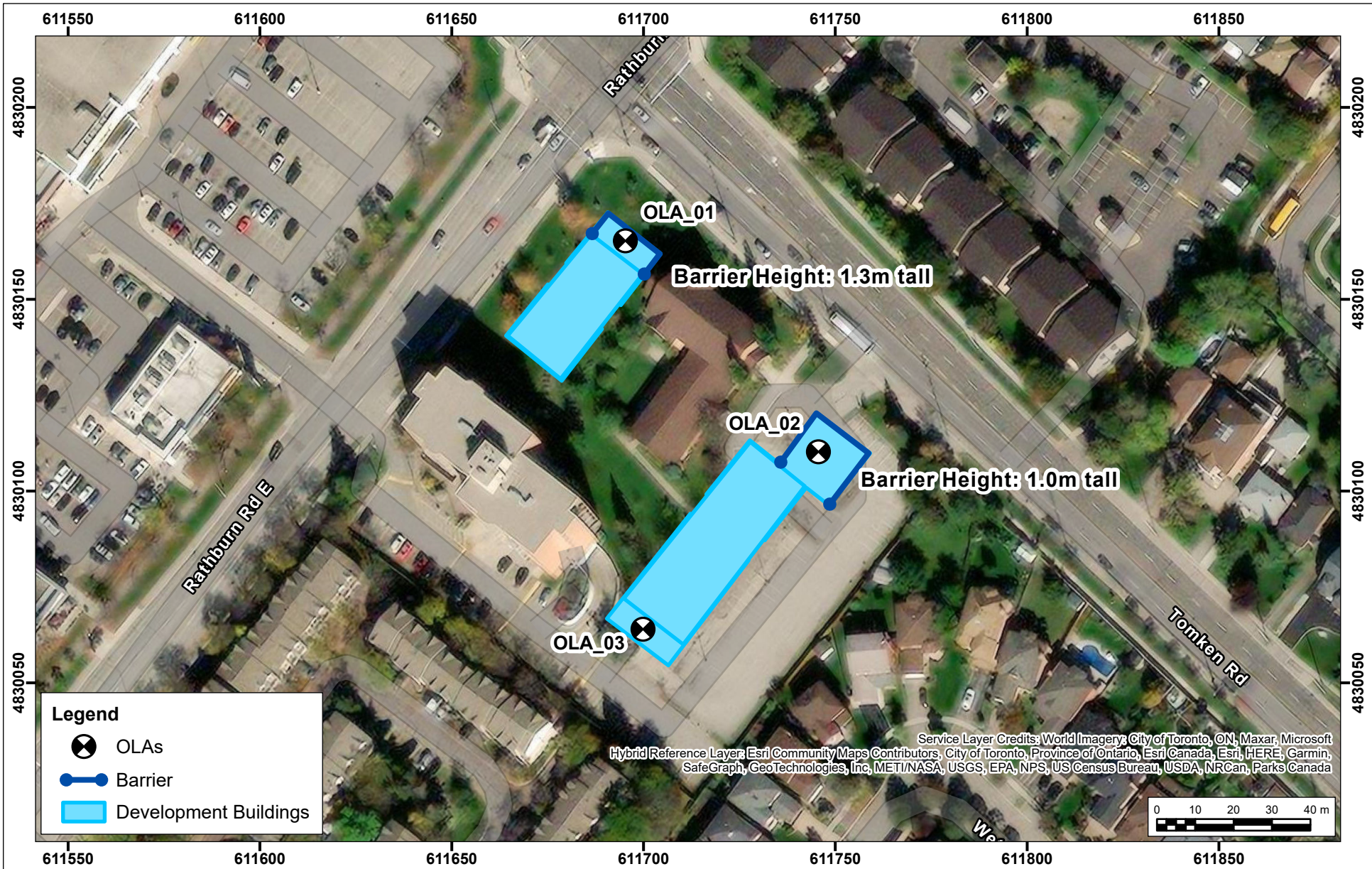
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Date Revised: Jul 4, 2022

Project #: 2201947





Outdoor Living Areas (OLAs) Mitigation to 60 dBA Recommended Barrier Geometry and Height to meet 60 dBA

Map Projection: NAD 1983 UTM Zone 17N
Westminster Church 4049 Tomken Road - Mississauga, Ontario

True North



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Date Revised: Jul 4, 2022

Project #: 2201947



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APPENDIX A

APPENDIX A: CRITERIA

A.1 Transportation Sources

Guidance from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline was used to assess environmental noise generated by transportation-related sources. There are three aspects to consider, which include the following:

- i. Transportation source sound levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) sound insulation design recommendations.
- ii. Transportation source sound levels at the plane of the window, which determines air-conditioning and ventilation system recommendations and associated warning clauses which inform the future occupants that windows and doors must be closed in order to meet the indoor sound level criteria.
- iii. Transportation source sound levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

A.1.1 Road and Rail

A.1.1.1 Indoor Sound Level Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in Table 1 for indoor areas of sensitive uses. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed.

Table 1: Indoor Sound Level Criteria for Road and Rail Sources

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
Living Quarters Examples: Living, dining and den areas of residences, hospitals, nursing homes, schools and daycare centres	Road	45 dBA	
	Rail	40 dBA	
Sleeping Quarters	Road	45 dBA	40 dBA
	Rail	40 dBA	35 dBA

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in Table 2 are provided to inform good-practice design objectives.

Table 2: Supplementary Indoor Sound Level Criteria for Road and Rail Sources

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
General offices, reception areas, retail stores, etc.	Road	50 dBA	-
	Rail	45 dBA	-
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Road	45 dBA	-
	Rail	40 dBA	-
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	Road	-	40 dBA
	Rail	-	35 dBA
Sleeping quarters of hotels/motels	Road	-	45 dBA
	Rail	-	40 dBA

A.1.1.2 Outdoor Living Areas (OLAs)

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building.

OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. The sound level criteria for outdoor living areas is summarized in Table 3.

Table 3: Sound Level Criteria – Outdoor Living Area

Assessment Location	Sound Level Criteria (Outdoors)	
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
Outdoor Living Area (OLA) (Combined Road and Rail)	55 dBA	-

A.1.1.3 Outdoor and Plane of Window Sound Levels

In addition to the sound level criteria, noise control measures and requirements for ventilation and warning clauses requirements are recommended for residential land-uses based on predicted transportation source sound levels incident in the plane of window at bedrooms and living/dining rooms, and/or at outdoor living areas. These recommendations are summarized in Table 4 below.

Table 4: Ventilation, Building Component, and Warning Clauses Recommendations for Road/Rail Sources

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h	
Plane of Window (Road)	> 65 dBA	> 60 dBA	<p>Installation of air conditioning to allow windows to remained closed.</p> <p>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.</p> <p>Warning clause “Type D” is recommended.</p>
	> 55 dBA	> 50 dBA	<p>Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause “Type C” is recommended.</p> <p>Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause “Type D” is recommended.</p>

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h	
Plane of Window (Rail ^{1,2})	> 60 dBA	> 55 dBA	<p>The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved.</p> <p>Warning clause “Type D” is recommended.</p>
	> 60 dBA ($L_{eq,24hr}$) and < 100m from tracks		<p>Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings.</p> <p>Warning clause “Type D” is recommended.</p>
Outdoor Living Area (Combined Road and Rail ³)	≤ 60 dBA > 55 dBA	-	<p>If sound levels are predicted to exceed 55 dBA, but are less than 60 dBA, noise controls may be applied to reduce the sound level to 55 dBA.</p> <p>If noise control measures are not provided, a warning clause “Type A” is recommended.</p>
	> 60 dBA	-	<p>Noise controls (barriers) should be implemented to meet the 55 dBA criterion.</p> <p>If mitigation is not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case a warning clause “Type B” would be recommended.</p>

Notes:

- Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.
- Some railway companies (e.g. CN, CP) may require that the exterior walls include a brick veneer or masonry equivalent for the façade facing the railway line, regardless of the sound level.
- Whistle noise is not included in the determination of the sound level at the OLA.

A.1.1.4 Rail Layover Sites

NPC-300 provides a sound level limit for rail layover sites to be the higher of the background sound level or 55 dBA $L_{eq,1-hr}$, for any one-hour period.

A.1.1.5 Rail Vibration Criteria

An assessment of rail vibration is generally recommended for developments within 75m of a rail corridor or rail yard, and adjacent to or within a setback of 15m of a transit (subway or light-rail) rail line.

The generally accepted vibration criterion for sensitive land-uses is the threshold of perception for human exposure to vibration, being a vibration velocity level of 0.14 mm/s RMS in any one-third octave band centre frequency in the range of 4 Hz to 200 Hz.

This vibration criterion is based on a one-second exponential time-averaged maximum hold root-mean-square (RMS) vibration velocity level and is consistent with the Railway Associations of Canada (RAC, 2013) guideline, the U.S. Federal Transit Authority (FTA, 2018) criterion for residential land-uses, the Toronto Transit Commission (TTC) guidelines for the assessment of potential vibration impact of future expansion (MOEE/TTC, 1993).

A.1.2 Aircraft

Land-use compatibility in the vicinity of airports is addressed in Ministry of the Environment, Conservation, and Parks (MECP) Guideline NPC-300 (MOE, 2013). The guideline provides recommendations for ventilation, and noise control for different Noise Exposure Forecast (NEF) values, which would be based on NEF contour maps available from the airport authority. The NEF values can be expressed as $L_{A,eq,24hr}$ sound levels by using the expression $NEF = L_{A,eq,24hr} - 32$ dBA.

Table 5: Indoor Sound Level Criteria for Aircraft Sources

Assessment Location	Indoor Sound Level Criteria NEF ($L_{eq, 24hr}$) ¹
Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, etc.	NEF- 5 (37 dBA)
Sleeping quarters	NEF-0 (32 dBA)

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in Table 6 are provided to inform good-practice design objectives.

Table 6: Supplementary Indoor Sound Level Criteria for Aircraft Sources

Assessment Location	Indoor Sound Level Criteria ¹
General offices, reception areas, retail stores, etc.	NEF-15 (47 dBA)
Individual or semi-private offices, conference rooms, etc.	NEF-10 (42 dBA)
Sleeping quarters of hotels/motels, theatres, libraries, places of worship, etc.	NEF-5 (37 dBA)

Table 7: NPC-300 Sound Level Criteria for Aircraft (Outdoors)

Assessment Location	Outdoor Sound Level Criteria ¹
Outdoor areas, including OLA	NEF-30 (62 dBA)

Table 8: Ventilation, Building Component, and Warning Clauses Recommendations for Aircraft Sources

Assessment Location	Aircraft Sound Level	NPC-300 Requirements
	NEF (L _{EQ,24-hr})	
Outdoors	≥NEF 30	<p>Air conditioning to allow windows to remained closed.</p> <p>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.</p> <p>Warning clauses “Type D” and “Type B” are recommended.</p>
	<p>< NEF 30</p> <p>≥ NEF 25</p>	<p>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.</p> <p>Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause “Type C” is recommended.</p> <p>Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause “Type D” is recommended.</p>
	< NEF 25	Further assessment not required

A.2 Stationary Sources

A.2.1 NPC-300 Sound Level Criteria – Stationary Sources

Guidance from the MECP NPC-300 Environmental Noise Guideline is used to assess environmental noise generated by stationary sources, for example industrial and commercial facilities.

Noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case one-hour average sound level (L_{eq}) for each period of the day. For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and plane of window.

The assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or “Class” of the area. The NPC-300 exclusion limits for continuously operating stationary sources are summarized in Table 9.

Table 9: NPC-300 Exclusion Limits – Continuous and Quasi-Steady Impulsive Stationary Sources ($L_{Aeq-1hr}$)

Time Period	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime 0700-1900h	50 dBA	50 dBA	50 dBA	50 dBA	45 dBA	45 dBA	55 dBA	60 dBA
Evening 1900-2300h	50 dBA	50 dBA	45 dBA	50 dBA	40 dBA	40 dBA	55 dBA	60 dBA
Nighttime 2300-0700h	--	45 dBA	--	45 dBA	--	40 dBA	--	55 dBA

Notes:

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.
2. Class 1, 2 and 3 sound level criteria apply to a window that is assumed to be open.
3. Class 4 area criteria apply to a window that is assumed closed. Class 4 area requires formal designation by the land-use planning authority.
4. Sound level criteria for emergency backup equipment (e.g. generators) operating in non-emergency situations such as testing or maintenance are 5 dB greater than the applicable sound level criteria for stationary sources.

For impulsive sound, other than quasi-steady impulsive sound, from a stationary source, the sound level criteria at a POR is expressed in terms of the Logarithmic Mean Impulse Sound Level (L_{LM}), and is summarized in Table 10.

Table 10: NPC-300 Exclusion Limits – Impulsive Stationary Sources (L_{IM})

Time Period	Number of Impulses in Period of One-Hour	Class 1 and 2 Areas		Class 3 Areas		Class 4 Areas	
		Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime (0700-2300h)	9 or more	50 dBAI	50 dBAI	45 dBAI	45 dBAI	55 dBAI	60 dBAI
Nighttime (2300-0700h)		-	45 dBAI	-	40 dBAI	-	55 dBAI
Daytime (0700-2300h)	7 to 8	55 dBAI	55 dBAI	50 dBAI	50 dBAI	60dBAI	65 dBAI
Nighttime (2300-0700h)		-	50 dBAI	-	45 dBAI	-	60 dBAI
Daytime (0700-2300h)	5 to 6	60 dBAI	60 dBAI	55 dBAI	55 dBAI	65 dBAI	70 dBAI
Nighttime (2300-0700h)		-	55 dBAI	-	50 dBAI	-	65 dBAI
Daytime (0700-2300h)	4	65 dBAI	65 dBAI	60 dBAI	60 dBAI	70 dBAI	75 dBAI
Nighttime (2300-0700h)		-	60 dBAI	-	55 dBAI	-	70 dBAI
Daytime (0700-2300h)	3	70 dBAI	70 dBAI	65 dBAI	65 dBAI	75 dBAI	80 dBAI
Nighttime (2300-0700h)		-	65 dBAI	-	60 dBAI	-	75 dBAI
Daytime (0700-2300h)	2	75 dBAI	75 dBAI	70 dBAI	70 dBAI	80 dBAI	85 dBAI
Nighttime (2300-0700h)		-	70 dBAI	-	65 dBAI	-	80 dBAI
Daytime (0700-2300h)	1	80 dBAI	80 dBAI	75 dBAI	75 dBAI	85 dBAI	90 dBAI
Nighttime (2300-0700h)		-	75 dBAI	-	70 dBAI	-	85 dBAI

Notes:

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.

A.2.2 D-Series Guidelines

The MECP D-series guidelines (MOE, 1995) provide direction for land use planning to maximize compatibility of industrial uses with adjacent land uses. The goal of Guideline D-6 is to minimize encroachment of sensitive land uses on industrial facilities and vice versa, in order to address potential incompatibility due to adverse effects such as noise, odour and dust.

For each class of industry, the guideline provides an estimate of potential influence area and states that this influence area shall be used in the absence of the recommended technical studies. Guideline D-6 also recommends a minimum separation distance between each class of industry and sensitive land uses (see Table 11). Section 4.10 of D-6 identifies exceptional circumstances with respect to redevelopment, infill and mixed-use areas. In these cases, the guideline suggests that separation distances at, or less than, the recommended minimum separation distance may be acceptable if a justifying impact assessment is provided.

Table 11: Summary of Guideline D-6

Industry Class	Definition	Potential Influence Area	Recommended Minimum Separation Distance (property line to property line)
Class I	Small scale, self-contained, daytime only, infrequent heavy vehicle movements, no outside storage.	70 m	20 m
Class II	Medium scale, outdoor storage of wastes or materials, shift operations and frequent heavy equipment movement during the daytime.	300 m	70 m
Class III	Large scale, outdoor storage of raw and finished products, large production volume, continuous movement of products and employees during daily shift operations.	1000 m	300 m

Guideline D-6 provides criteria for classifying industrial land uses, based on their outputs, scale of operations, processes, schedule and intensity of operations. Table 12 provides the classification criteria and examples.

Table 12: Guideline D-6 Industrial Categorization Criteria

Criteria	Class I	Class II	Class III
Outputs	<ul style="list-style-type: none"> • Sound not audible off property • Infrequent dust and/ or odour emissions and not intense • No ground-borne vibration 	<ul style="list-style-type: none"> • Sound occasionally audible off property • Frequent dust and/ or odour emissions and occasionally intense • Possible ground-borne vibration 	<ul style="list-style-type: none"> • Sound frequently audible off property • Persistent and intense dust and/ or odour emissions • Frequent ground-borne vibration
Scale	<ul style="list-style-type: none"> • No outside storage • Small scale plant or scale is irrelevant in relation to all other criteria 	<ul style="list-style-type: none"> • Outside storage permitted • Medium level of production 	<ul style="list-style-type: none"> • Outside storage of raw and finished products • Large production levels
Process	<ul style="list-style-type: none"> • Self-contained plant or building which produces / stores a packaged product • Low probability of fugitive emissions 	<ul style="list-style-type: none"> • Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions 	<ul style="list-style-type: none"> • Open process • Frequent outputs of major annoyances • High probability of fugitive emissions
Operation / Intensity	<ul style="list-style-type: none"> • Daytime operations only • Infrequent movement of products and/or heavy trucks 	<ul style="list-style-type: none"> • Shift operations permitted • Frequent movements of products and/or heavy trucks with majority of movements during daytime hours 	<ul style="list-style-type: none"> • Continuous movement of products and employees • Daily shift operations permitted
Examples	<ul style="list-style-type: none"> • Electronics Manufacturing • Furniture refinishing • Beverage bottling • Auto parts • Packaging services • Dairy distribution • Laundry and linen supply 	<ul style="list-style-type: none"> • Magazine printing • Paint spray booths • Metal command • Electrical production • Dairy product manufacturing • Feed packing plant 	<ul style="list-style-type: none"> • Paint and varnish manufacturing • Organic chemicals manufacturing • Breweries • Solvent recovery plant • Soap manufacturing • Metal manufacturing

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APPENDIX B

APPENDIX B: WARNING CLAUSES

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Warning clauses may be used individually or in combination.

The following warning clauses are recommended based on the applicable guidelines; however, wording may be modified/customized during consultation with the planning authority to best suit the proposed development:

B.1 Transportation Sources

NPC-300 Type A: Recommended to address surface transportation sound levels in OLAs if sound level is in the range of >55 dBA but \leq 60 dBA, and noise controls have not been provided.

"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

NPC-300 Type B: Recommended to address surface transportation sound levels in OLAs if the sound level is in the range of >55 dBA but \leq 60 dBA, and noise controls have been provided. Recommended to address outdoor aircraft sound levels \geq NEF 30.

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

NPC-300 Type C: Applicable for low and medium density developments only, recommended to address transportation sound levels at the plane of window.

"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

NPC-300 Type D: Recommended to address transportation sound levels at the plane of window.

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

Proximity to Railway Line: Metrolinx/CN/CP/VIA Warning Clause for developments that are within 300 metres of the right-of-way

"Warning: [Canadian National Railway Company] [Metrolinx / GO] [Canadian Pacific Railway Company] [VIA Rail Canada Inc.] or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR/Metrolinx/GO/CPR/VIA will not responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."

B.2 Stationary Sources

NPC-300 Type E: Recommended to address proximity to commercial/industrial land-use

"Purchasers/tenants are advised that due to the proximity of the adjacent industrial/commercial land-uses, noise from the industrial/commercial land-uses may at times be audible."

NPC-300 Type F: Recommended to for Class 4 Area Notification

"Purchasers/tenants are advised that sound levels due to the adjacent industry (facility) (utility) are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."

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APPENDIX C

APPENDIX C: NOISE MITIGATION GUIDANCE

C.1 Acoustic/Noise Barrier

Generally, noise controls to attenuate transportation sound levels at Outdoor Living Areas (OLAs) would consist of the implementation of acoustic/noise barriers with materials that would meet the guidance included in NPC-300, for example:

- A wall, berm, wall/berm combination or similar structure, used as a noise control measure, and high enough to break the line-of-sight between the source and the receptor.
- The minimum surface density (face weight) is 20 kg/m²
 - Many materials could satisfy the surface density requirement, e.g. wood, glass, concrete, Plexiglas, Acrylite.
 - The required thickness can be determined by dividing the 20 kg/m² face weight by the material density (kg/m³). Typically, this would imply:
 - 50 mm (2") thickness of wood
 - 13 mm (0.5") thickness of lighter plastic (like Plexiglas or PVC)
 - 6 mm (0.25") thickness of heavier material (like aluminum, glass, concrete)
- The barrier should be structurally sound, appropriately designed to withstand wind and snow load, and constructed without cracks or surface gaps. Joints between panels may need to be overlapped to ensure surfaces are free of gaps, particularly for wood construction.
- Any gaps under the barrier that are necessary for drainage purposes should be minimized and localized, so that the acoustical performance of the barrier is maintained.
- If a sound absorptive face is to be included in the barrier design, the minimum noise reduction coefficient is recommended to be NRC 0.7.

C.2 Building Ventilation and Air Conditioning

The use of air conditioning itself is not a noise control measure; however, it allows for windows and doors to remain closed, thereby reducing the indoor sound levels.

NPC-300 provides the following guidance with respect to implementation of building ventilation and air conditioning:

- a. the noise produced by the proposed ventilation system in the space served does not exceed 40 dBA. In practice, this condition usually implies that window air conditioning units are not acceptable;
- b. the ventilation system complies with all national, provincial and municipal standards and codes;
- c. the ventilation system is designed by a heating and ventilation professional; and
- d. the ventilation system enables the windows and exterior doors to remain closed.

Air conditioning systems also need to comply with Publication NPC-216, and/or any local municipal noise by-law that has provisions relating to air conditioning equipment.

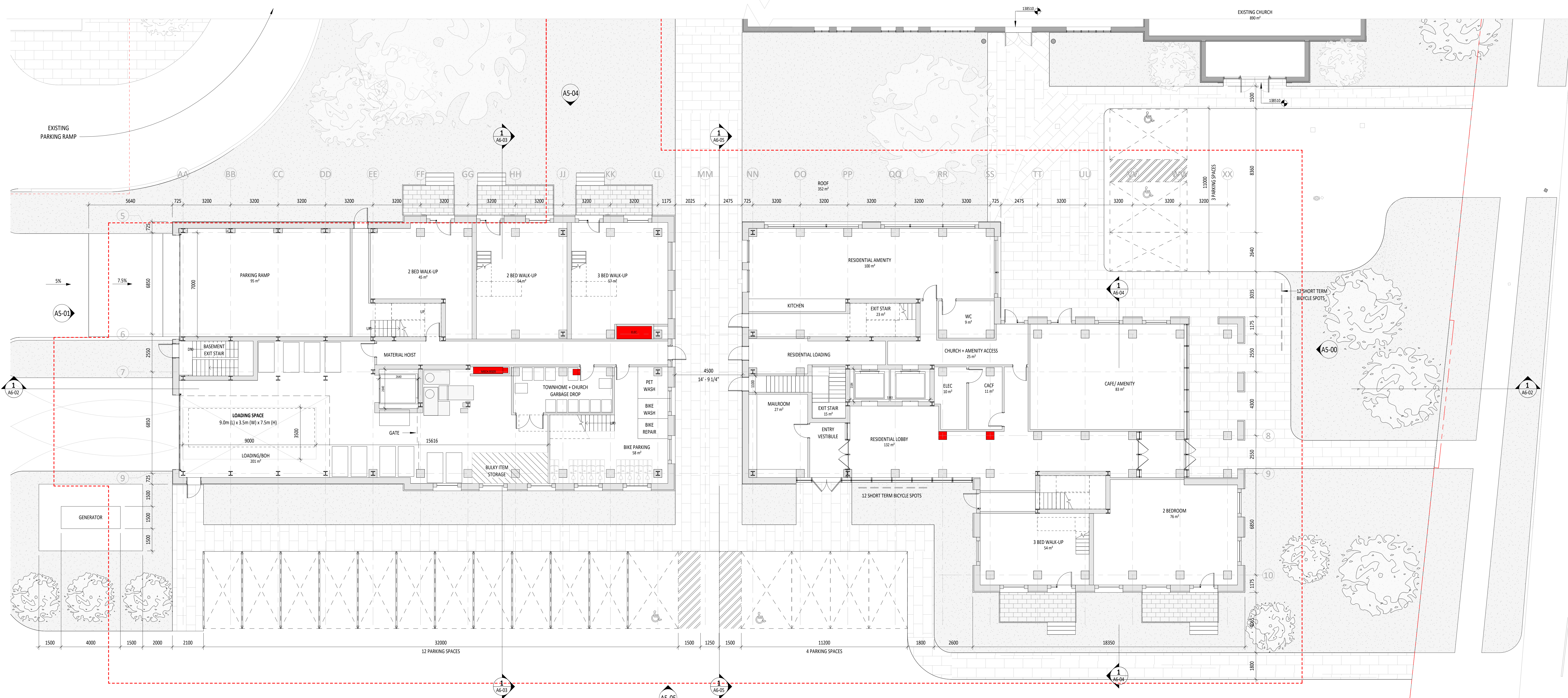
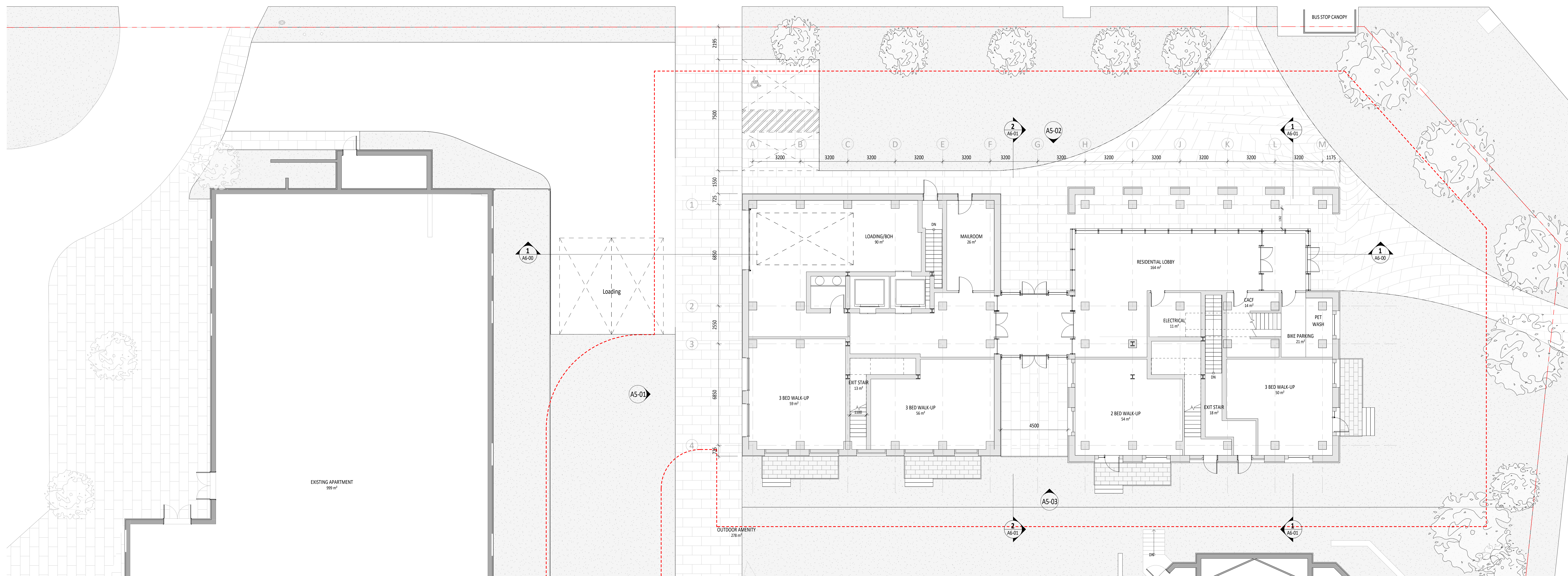
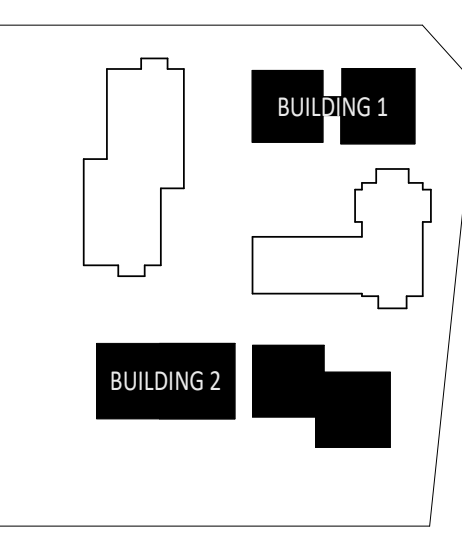
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APPENDIX D

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GENERAL NOTES:

1. Existing structure to be retained. Contractor will verify all existing conditions and dimensions against the plans and will report any discrepancies to the Architect immediately.
2. The Architect's Design is to be used in conjunction with all other documents including the Project Manual and the Architectural Specifications. In case of discrepancy between the Contract Documents, the more specific shall prevail.
3. Installation of proposed Mechanical and Electrical Services, Ramps and other items indicated in the Architectural Drawings. Locations shown are for informational purposes only. Final locations and details to be determined by the trades. All work shall be in accordance with the applicable codes and standards as required by the Authority.
4. Dimensions indicated on the drawings are based on finished surfaces unless otherwise noted.
5. The Architect is not responsible for the accuracy of construction and quantity information. For more details, methods and techniques of construction, refer to the specifications.
6. Field dimensions are to be used for construction unless specifically noted for each purpose.

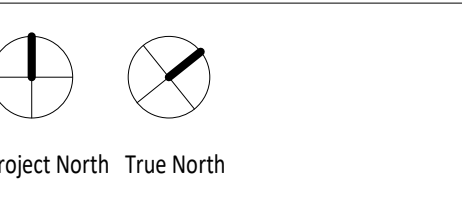


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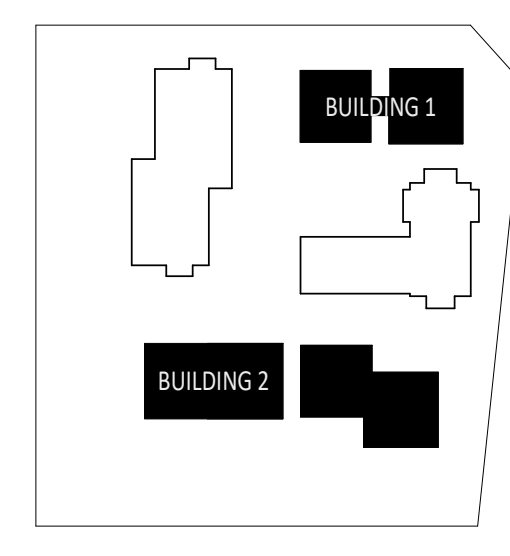


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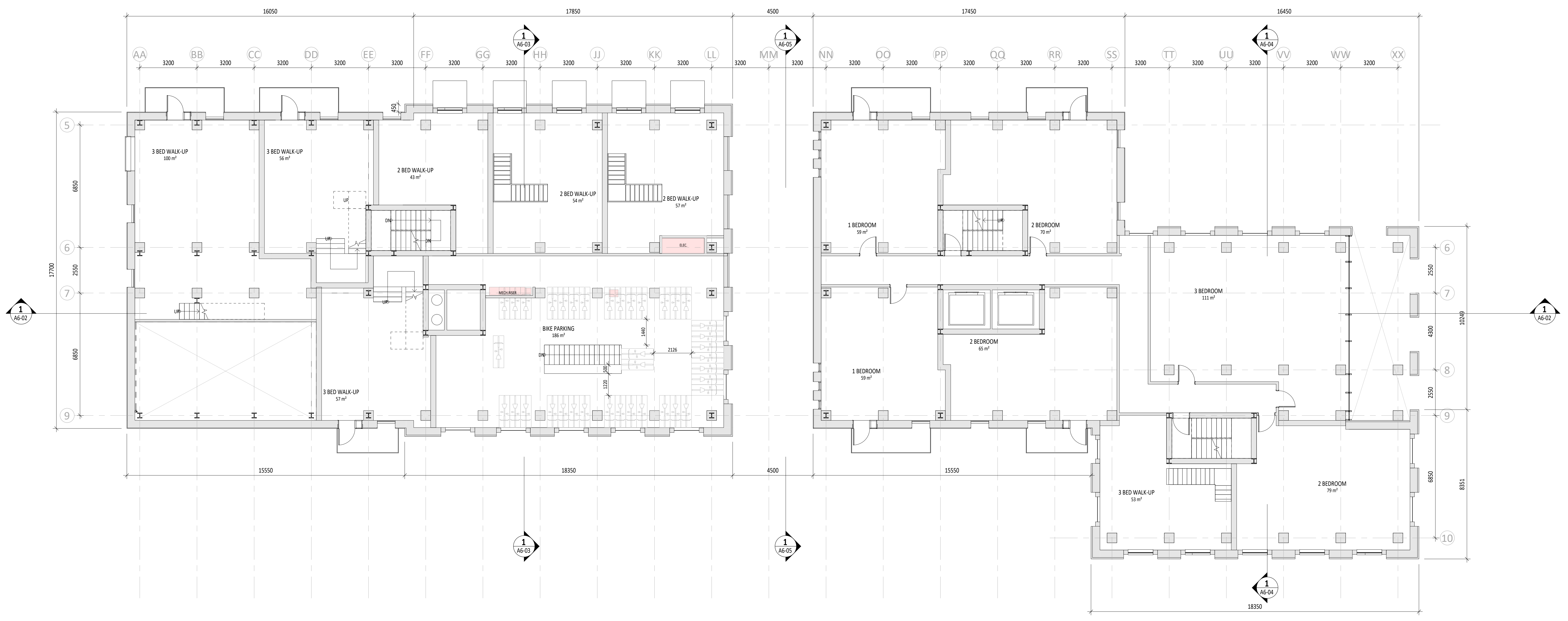
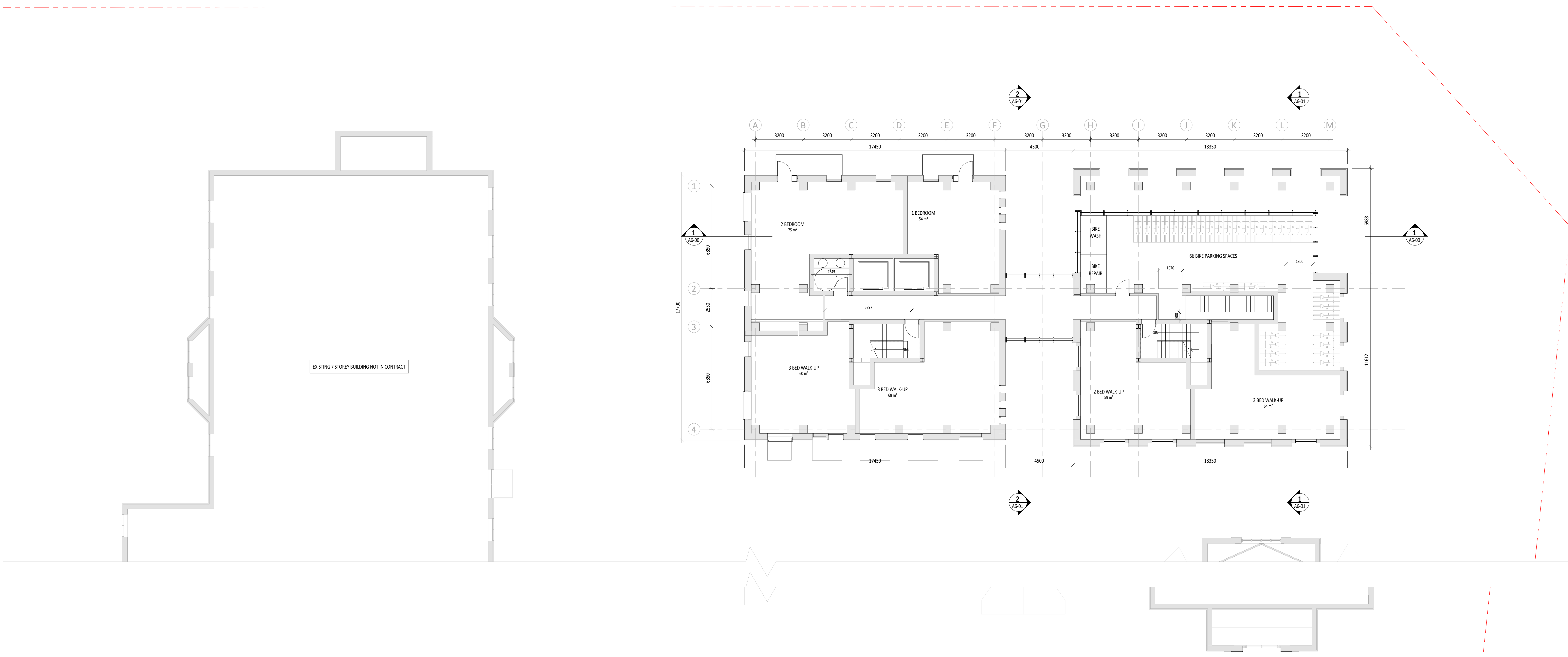
FLOOR PLAN - GROUND LEVEL

A2-05

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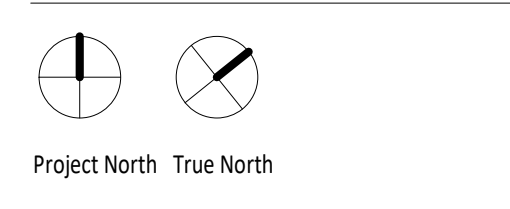


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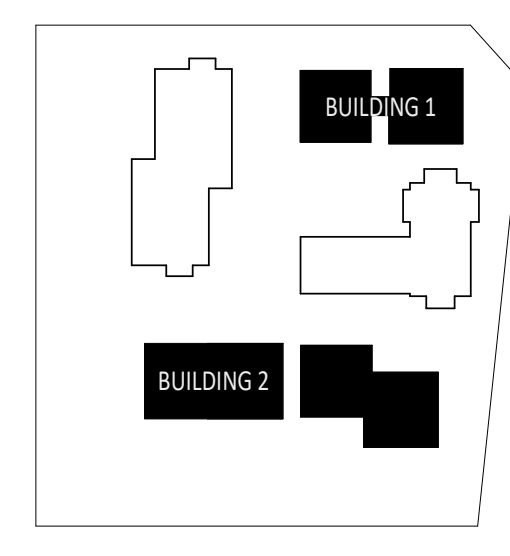
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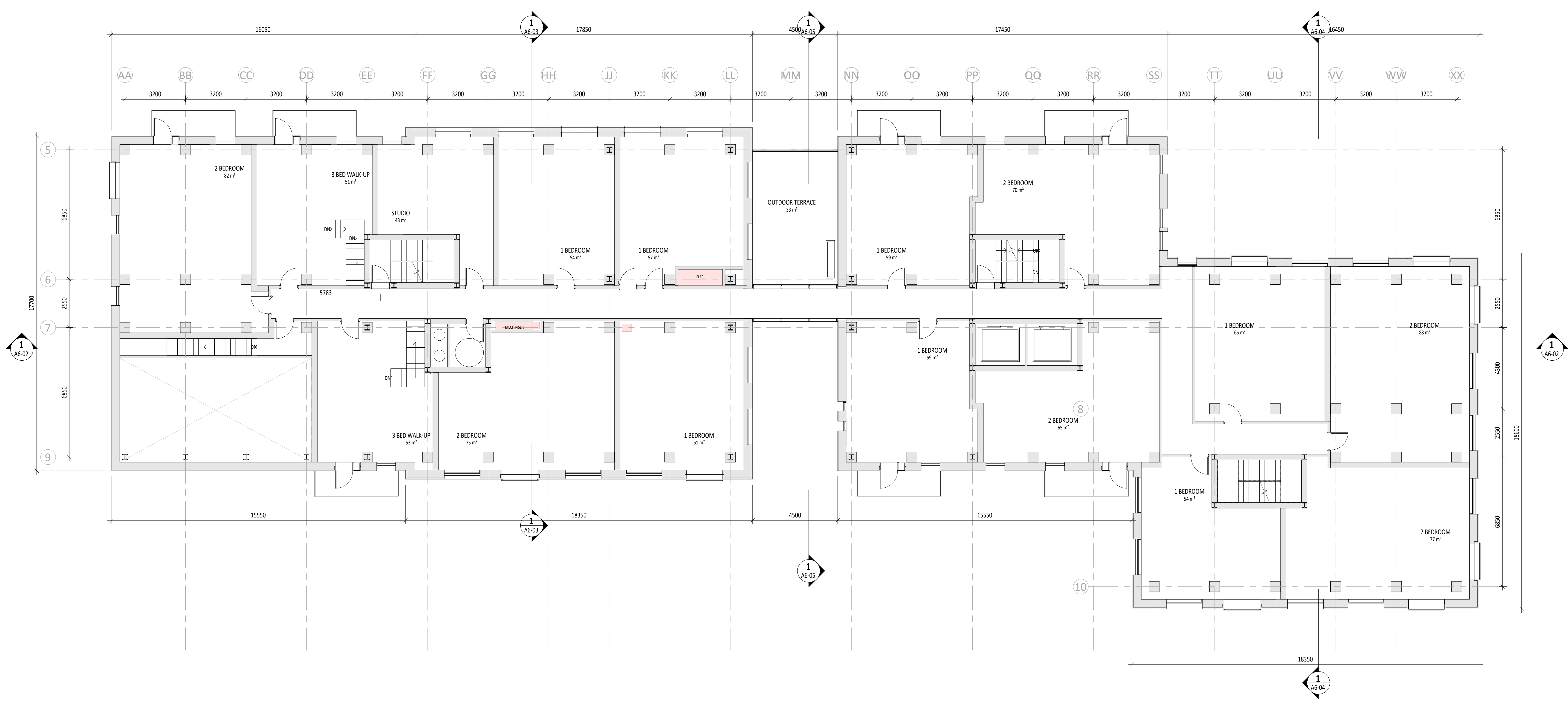
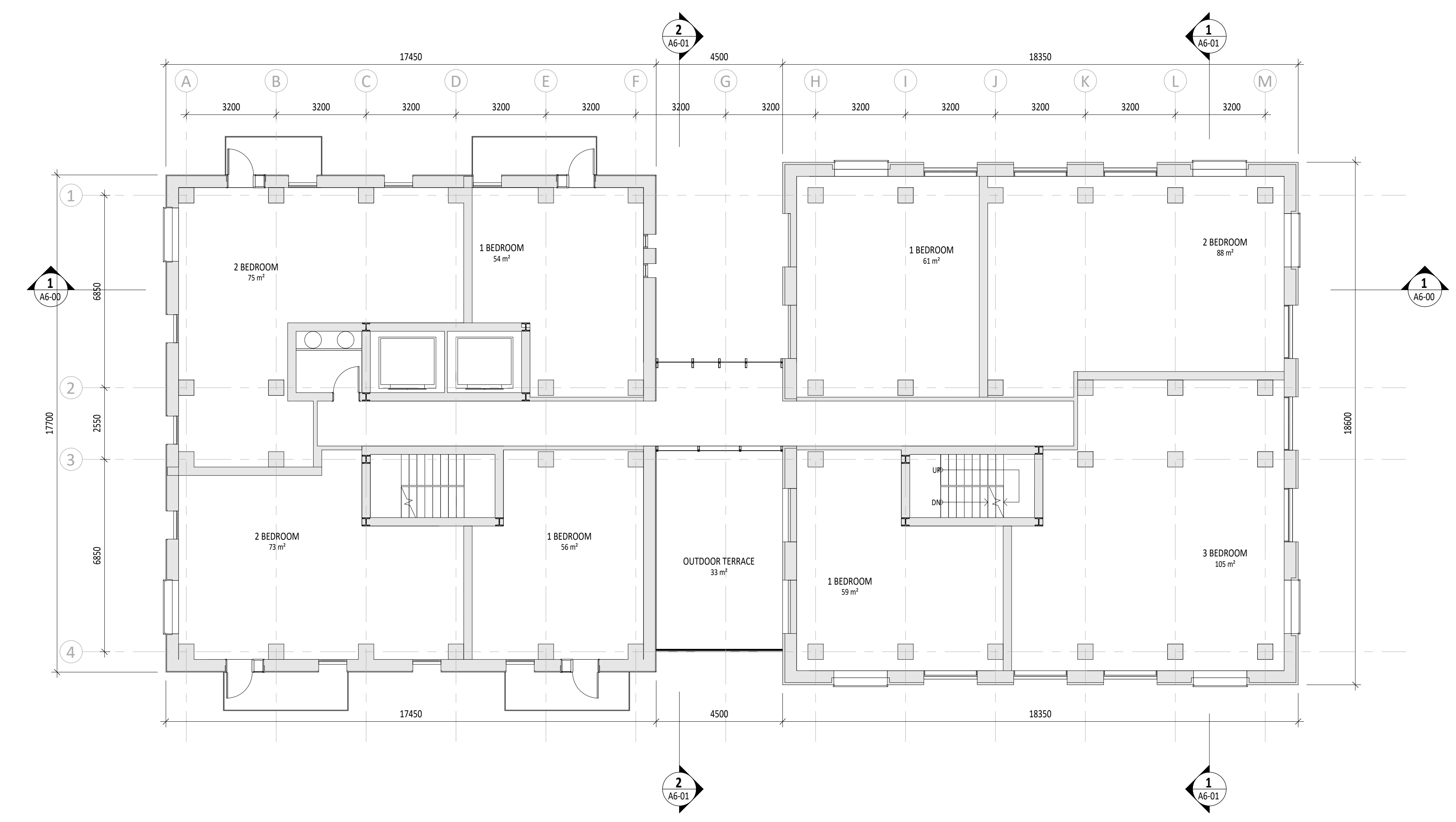
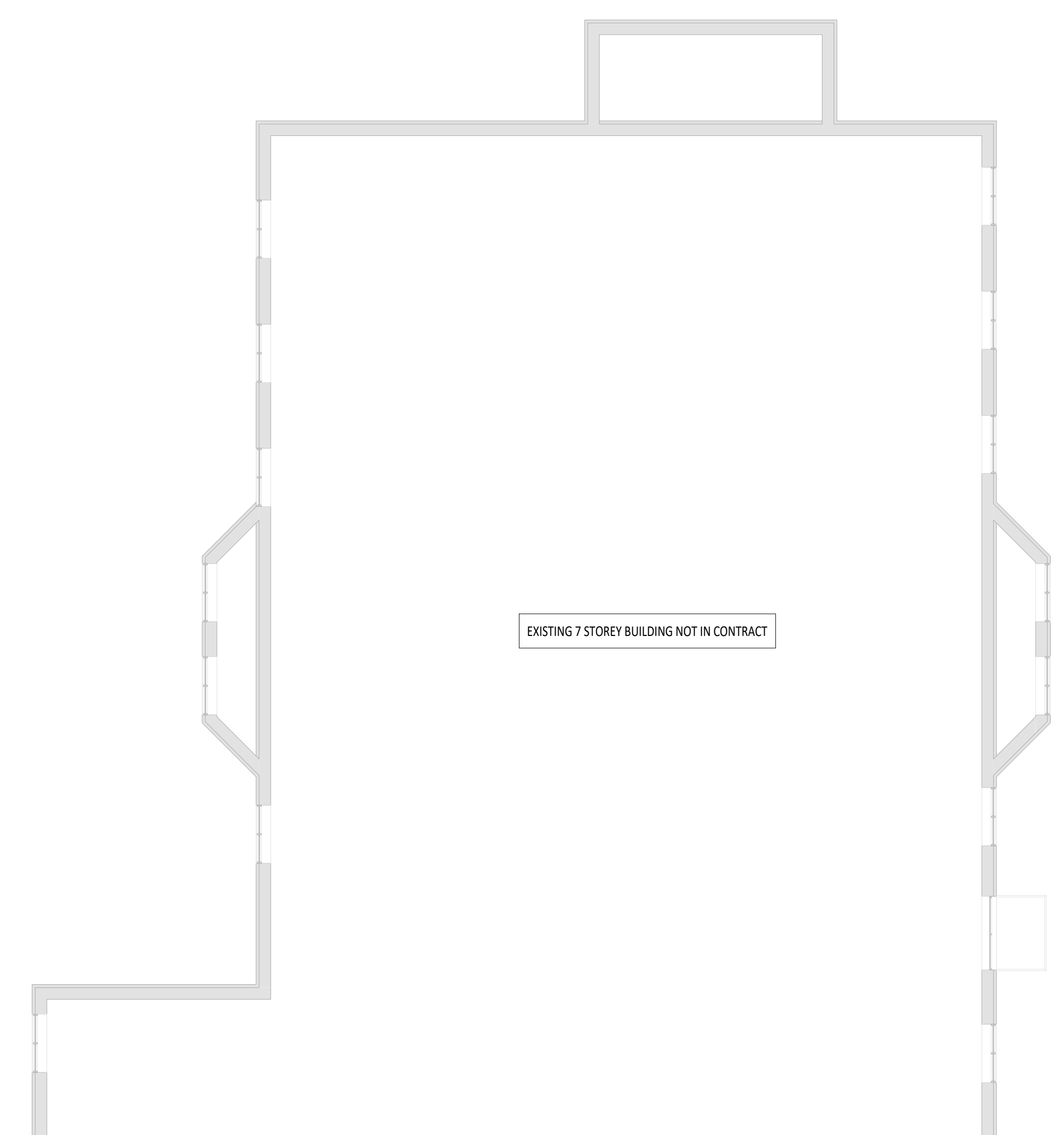
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FLOOR PLAN - LEVEL 2

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 2. The Architect and Designer are to be held in conjunction with all other Consultants (including the Structural Engineer and the Electrical, Mechanical and Civil Engineering) in case of any discrepancy between the Consultant's drawings and those of the Architect, the Architect shall prevail.
 3. Installation of specified Mechanical and Electrical Devices, Wiring and/or other items indicated on the Architectural Drawings. Location shown is for information only and does not constitute a guarantee of performance. Installation and operation of such devices shall be the responsibility of the contractor.
 4. Dimensions indicated on the drawings are based on finished surface unless otherwise noted.
 5. The architect is not responsible for the accuracy of construction and materials. It is the contractor's responsibility to verify the methods and techniques of construction.
 6. Field quantities are to be used for construction unless specifically noted for each purpose.



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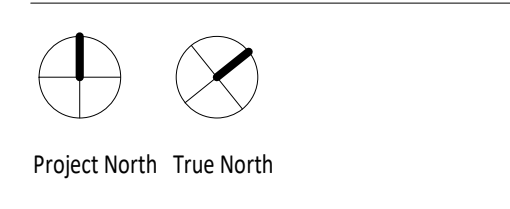


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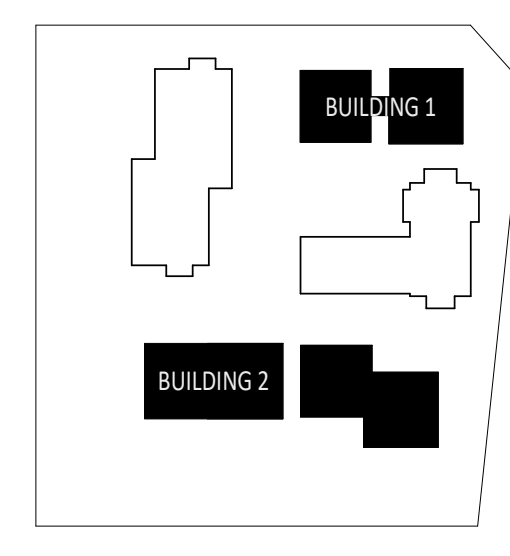
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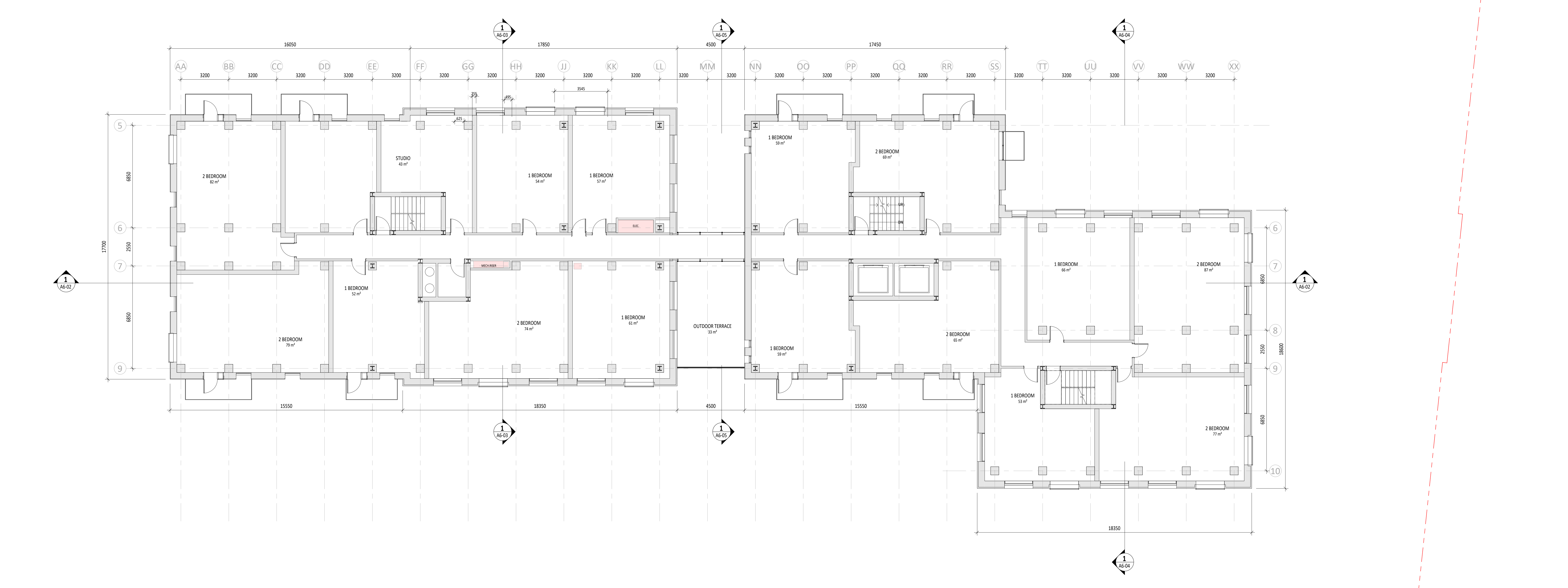
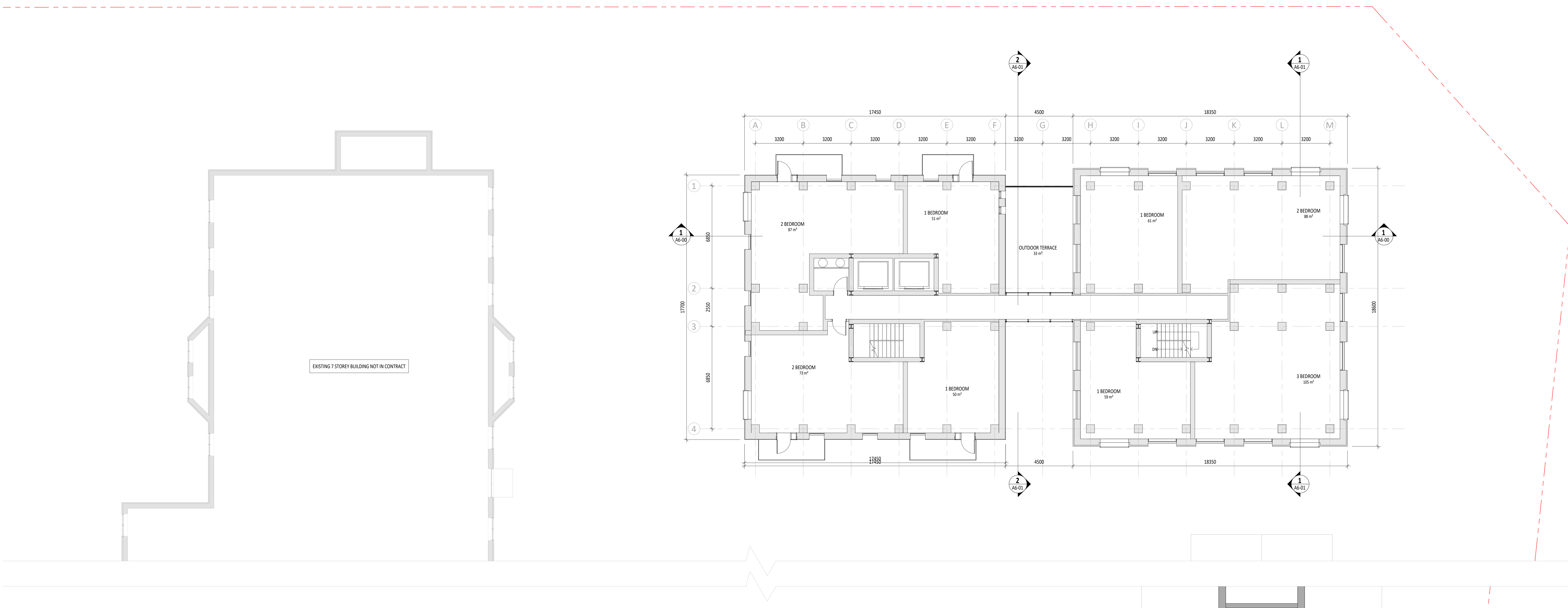
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FLOOR PLAN - LEVEL 3

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 2. The Architect and Designer are to be held responsible for the accuracy of the information contained herein.
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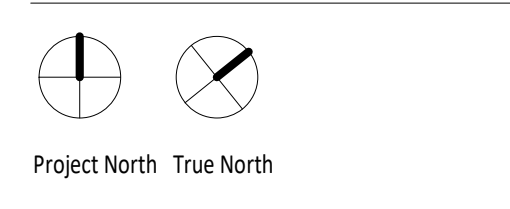


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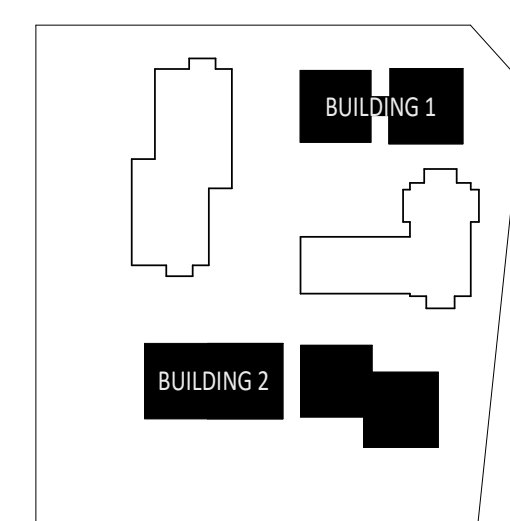
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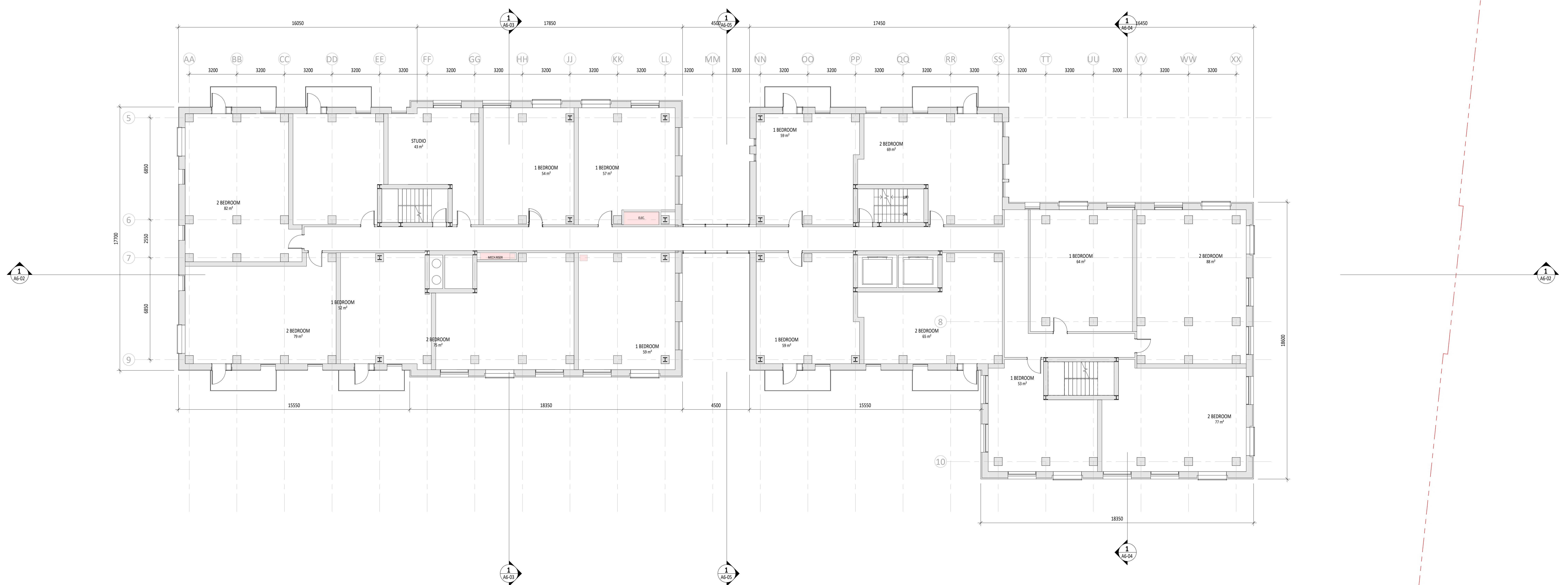
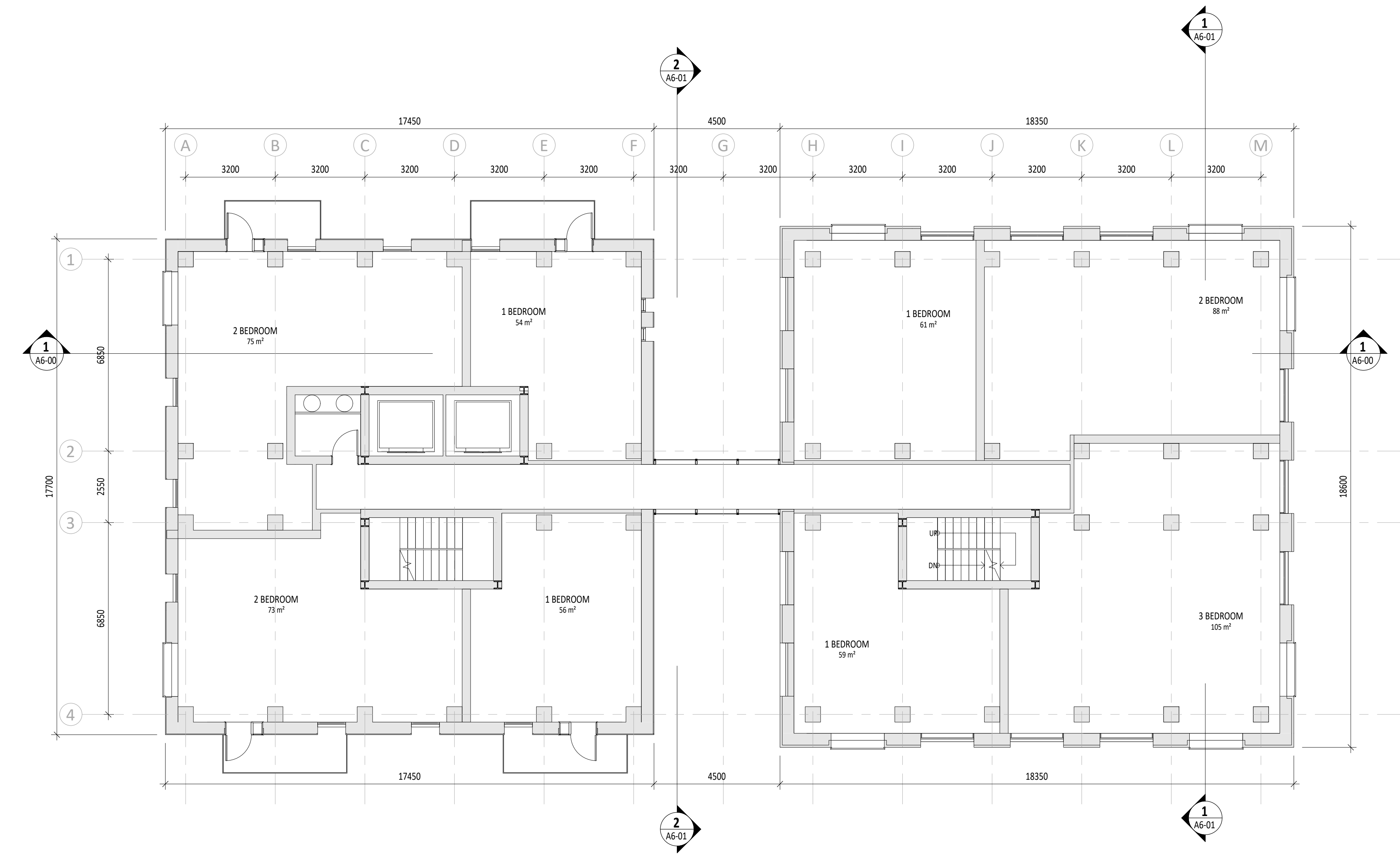
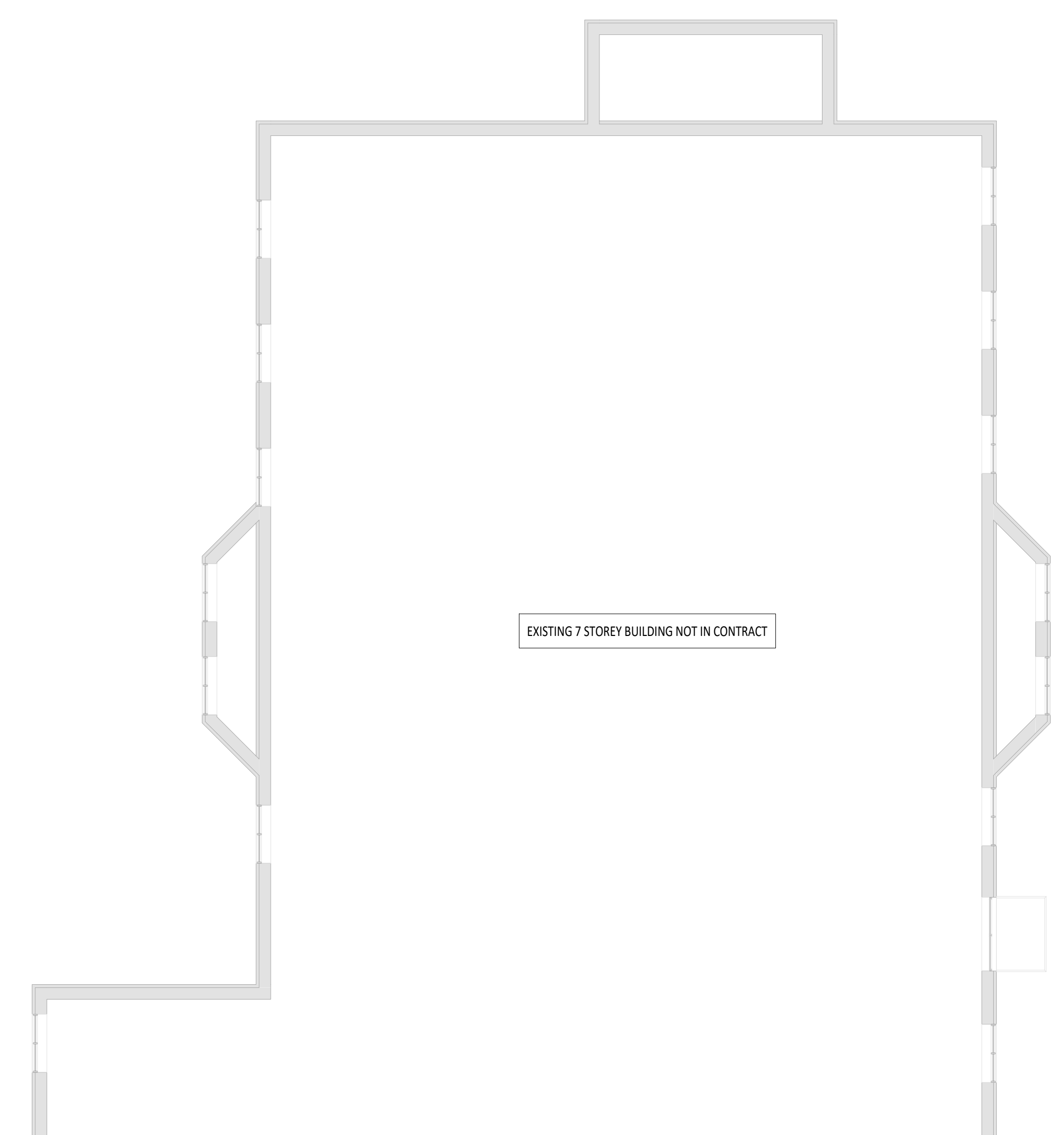
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FLOOR PLAN - LEVEL 4

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 2. The Architect and Designer are to be held in conjunction with all other Contractors including the Trade Contractors and the Client/Contractor and their Design. In case of difference between the Contractor's interpretation and the Architect's interpretation, the Contractor's interpretation shall prevail.
 3. Installation of specified Mechanical and Electrical Services, Wiring and Fire are indicated in the Architectural Drawings. Location shown is for the installation of the specified services. Details and installation shall be as indicated in the Architect's drawings.
 4. Dimensions indicated are in millimeters unless otherwise stated.
 5. The Architect is not responsible for the accuracy of the construction and materials to be used for the construction of the building.
 6. These drawings are to be used for construction unless specifically noted for other purposes.



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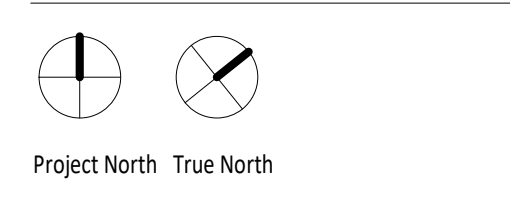


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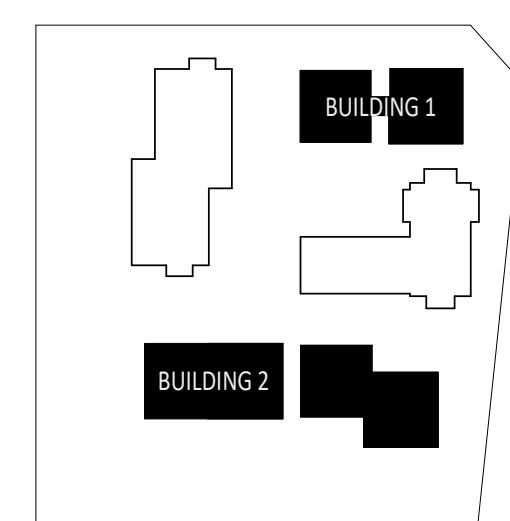
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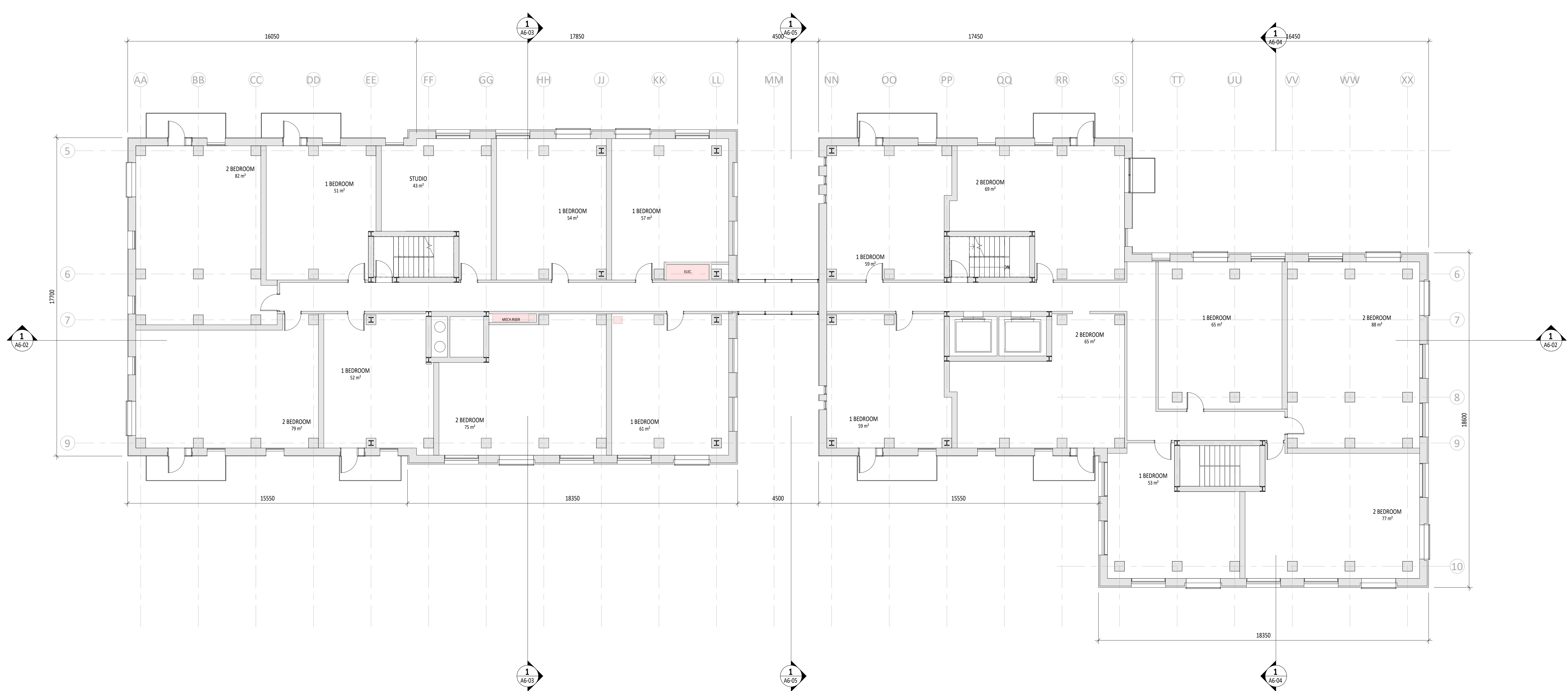
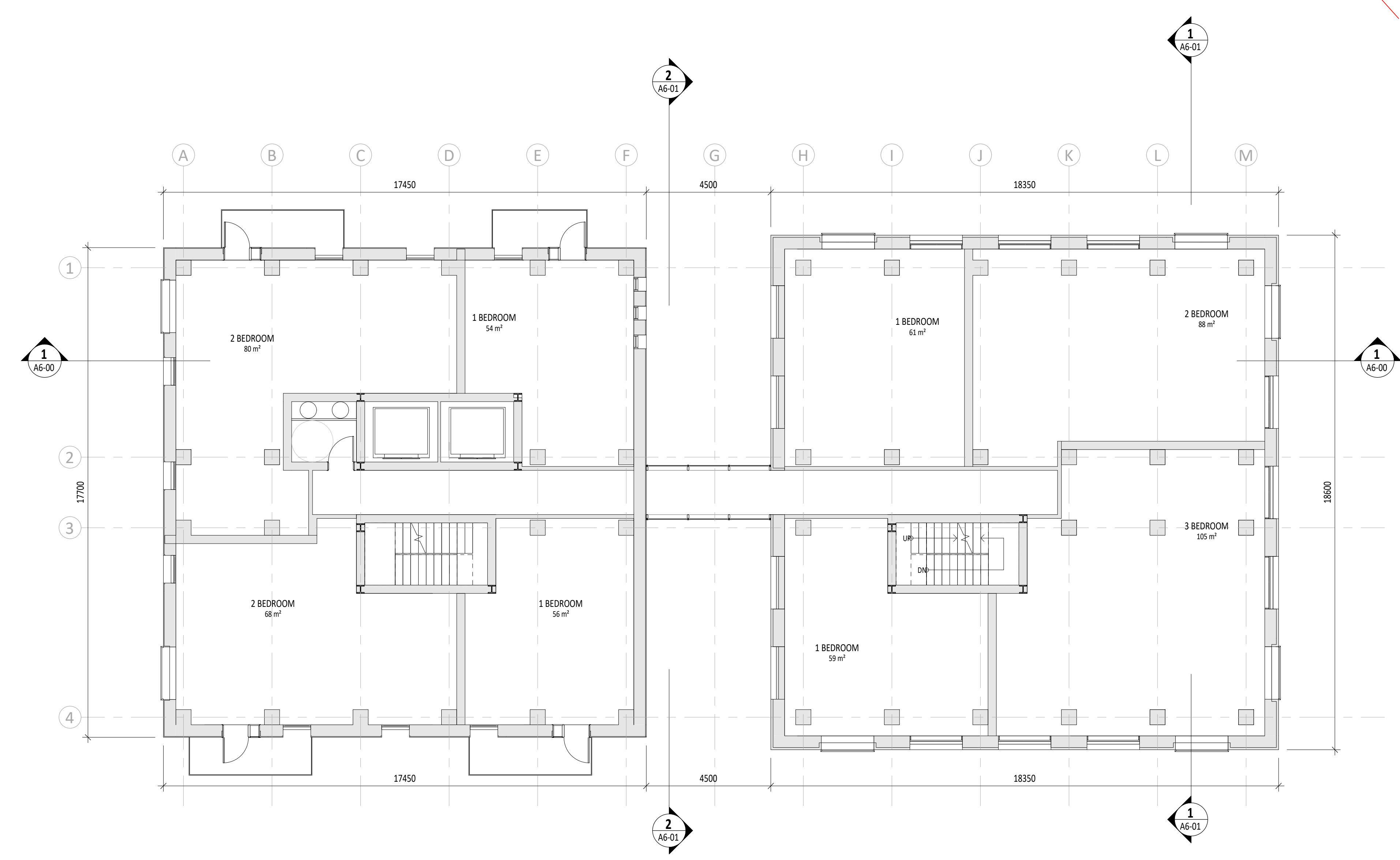
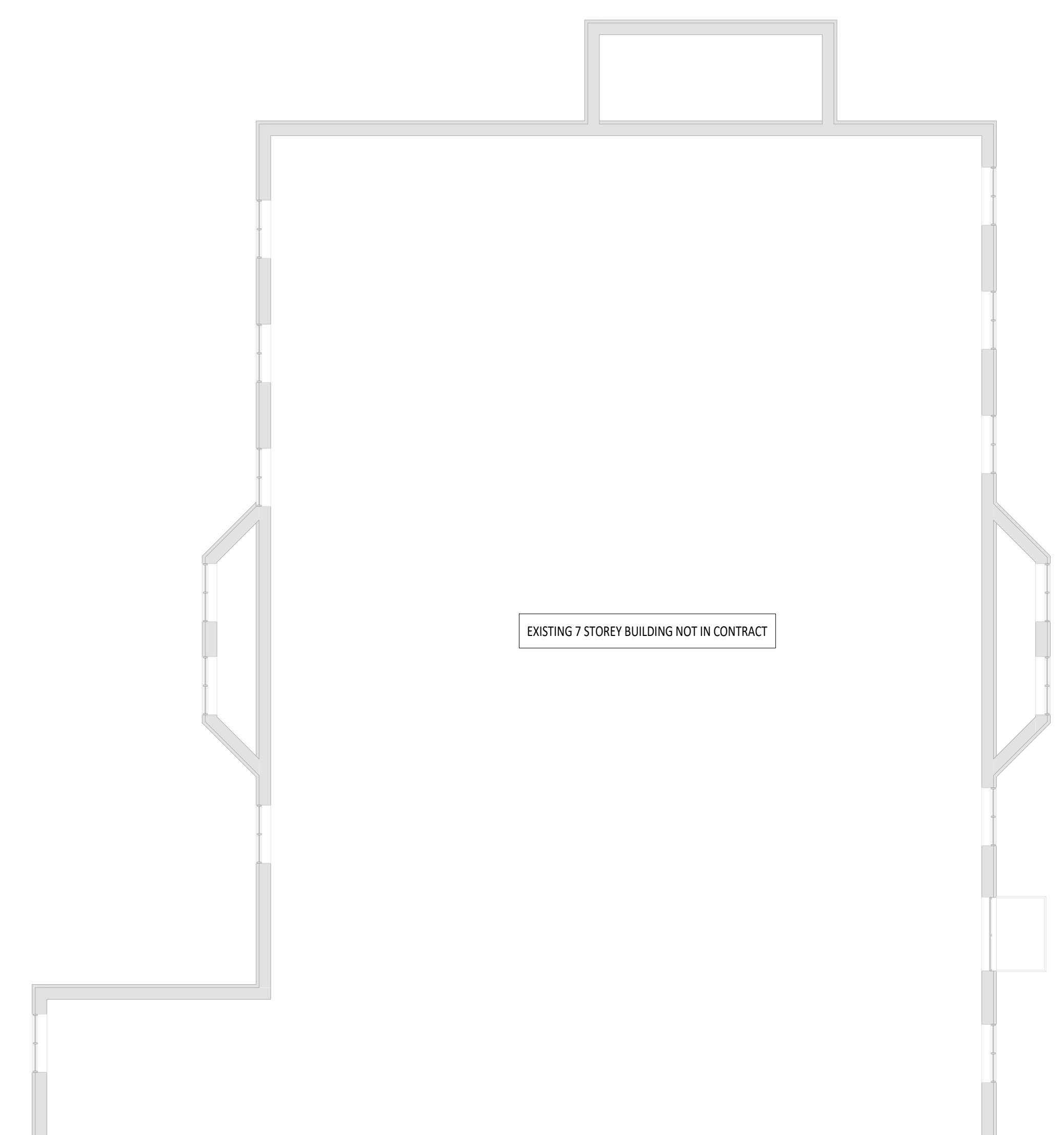
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FLOOR PLAN - LEVEL 5

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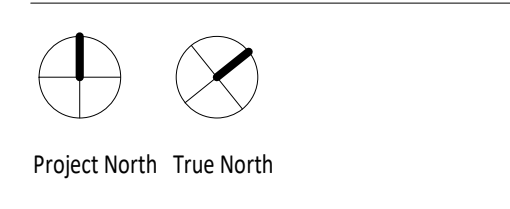


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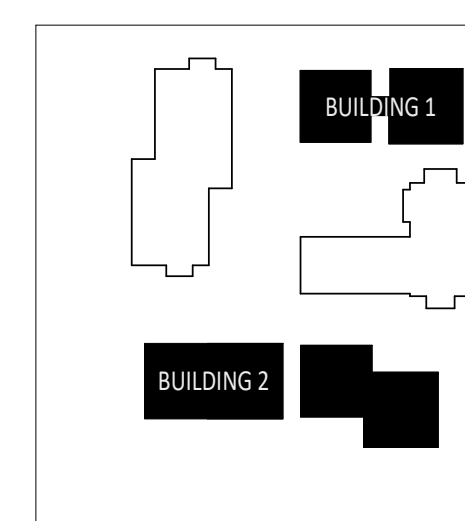
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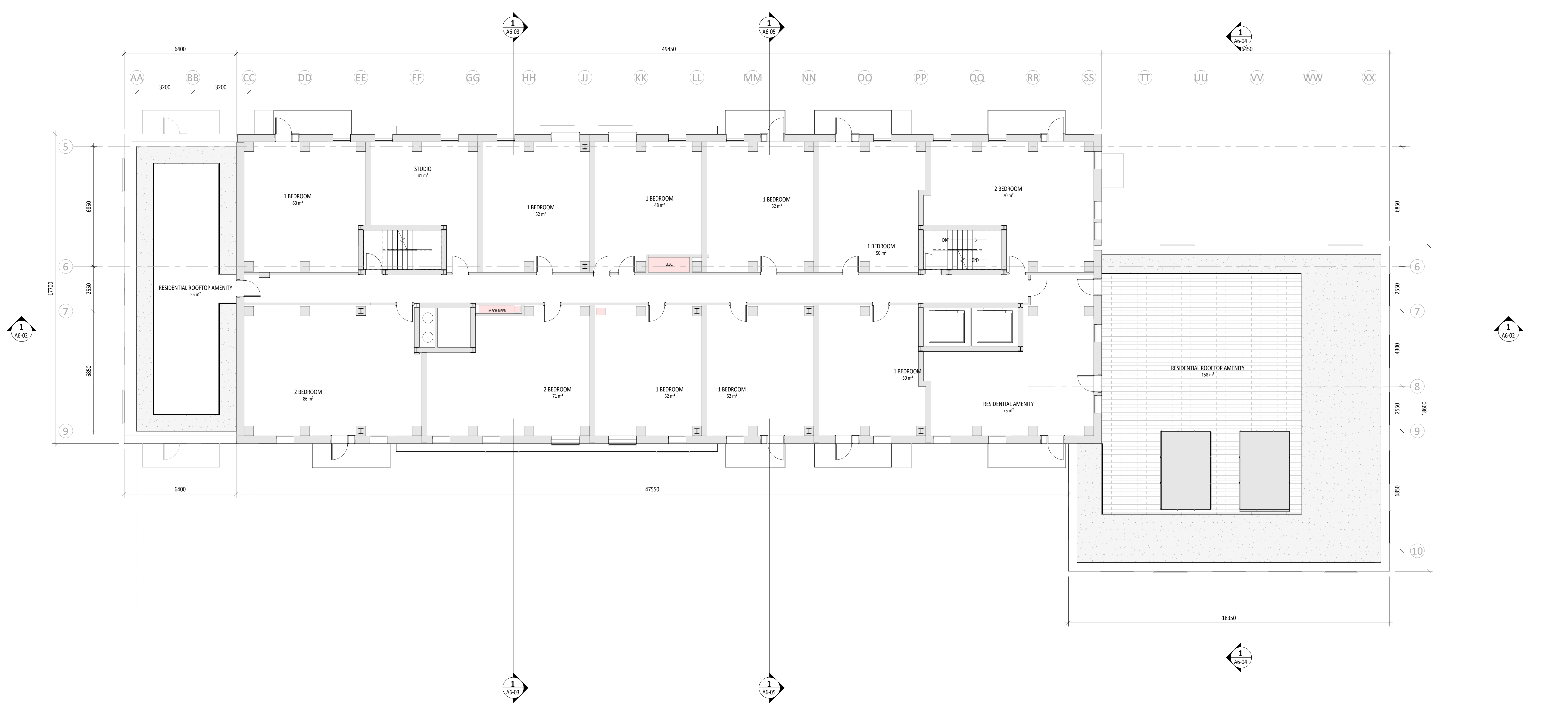
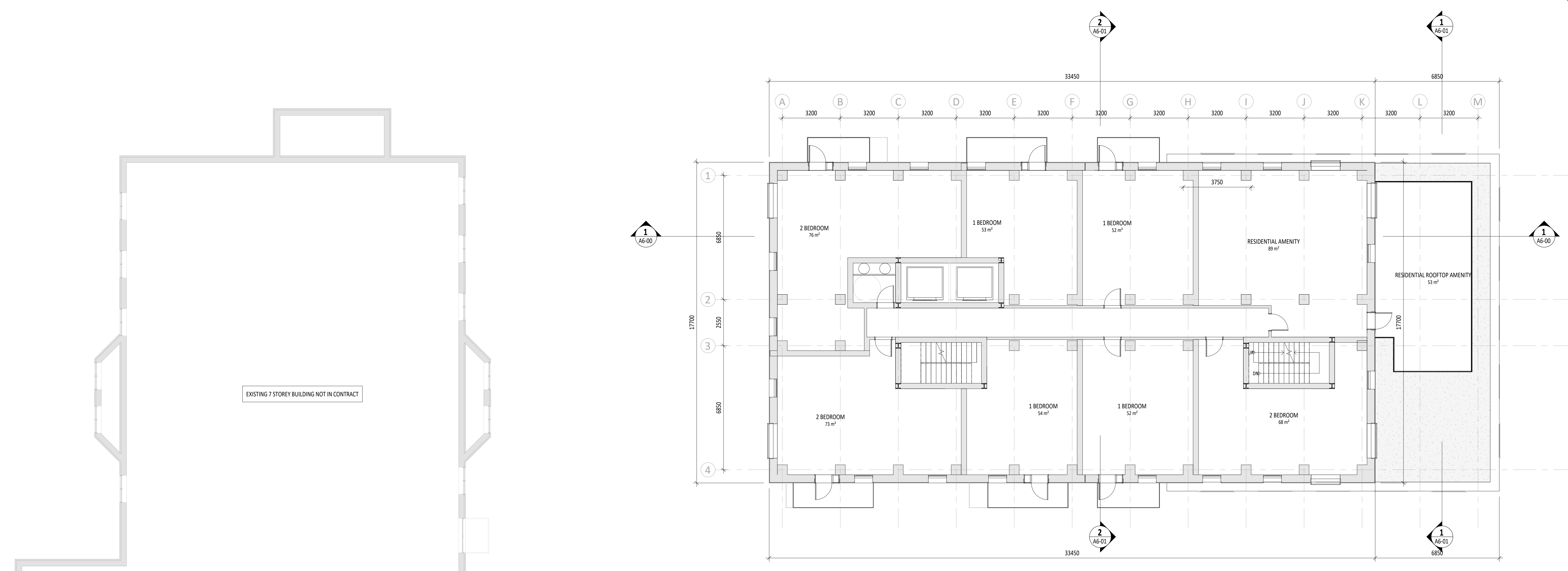
Project No. 2112
 Scale 1:100
 Plot Date 22-09-21

FLOOR PLAN - LEVEL 6

- GENERAL NOTES:**
1. Drawing is to be used by the Client/Contractor and all other parties involved in the project. It is not to be used for any other purpose without the written approval of the architect.
 2. The architect is not responsible for any errors or omissions in the drawing. It is the responsibility of the Client/Contractor to verify the accuracy of the drawing.
 3. The architect is not responsible for any errors or omissions in the drawing. It is the responsibility of the Client/Contractor to verify the accuracy of the drawing.
 4. The architect is not responsible for any errors or omissions in the drawing. It is the responsibility of the Client/Contractor to verify the accuracy of the drawing.
 5. The architect is not responsible for any errors or omissions in the drawing. It is the responsibility of the Client/Contractor to verify the accuracy of the drawing.
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KEY PLAN

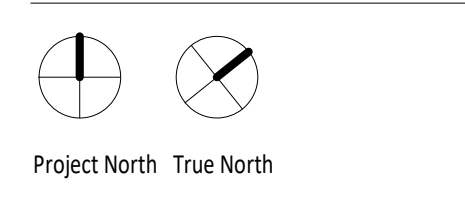


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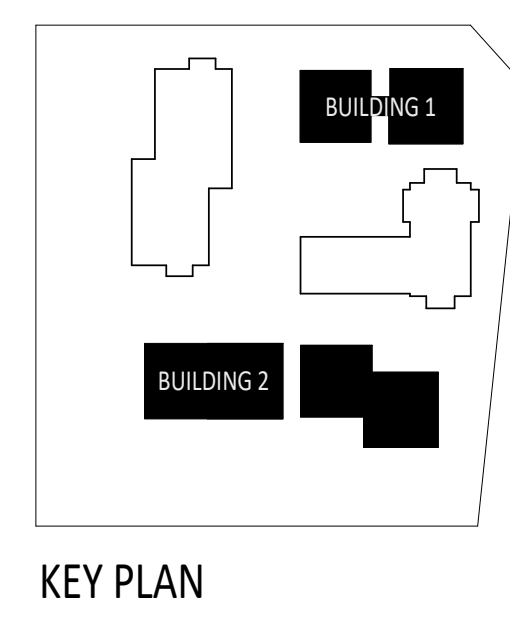
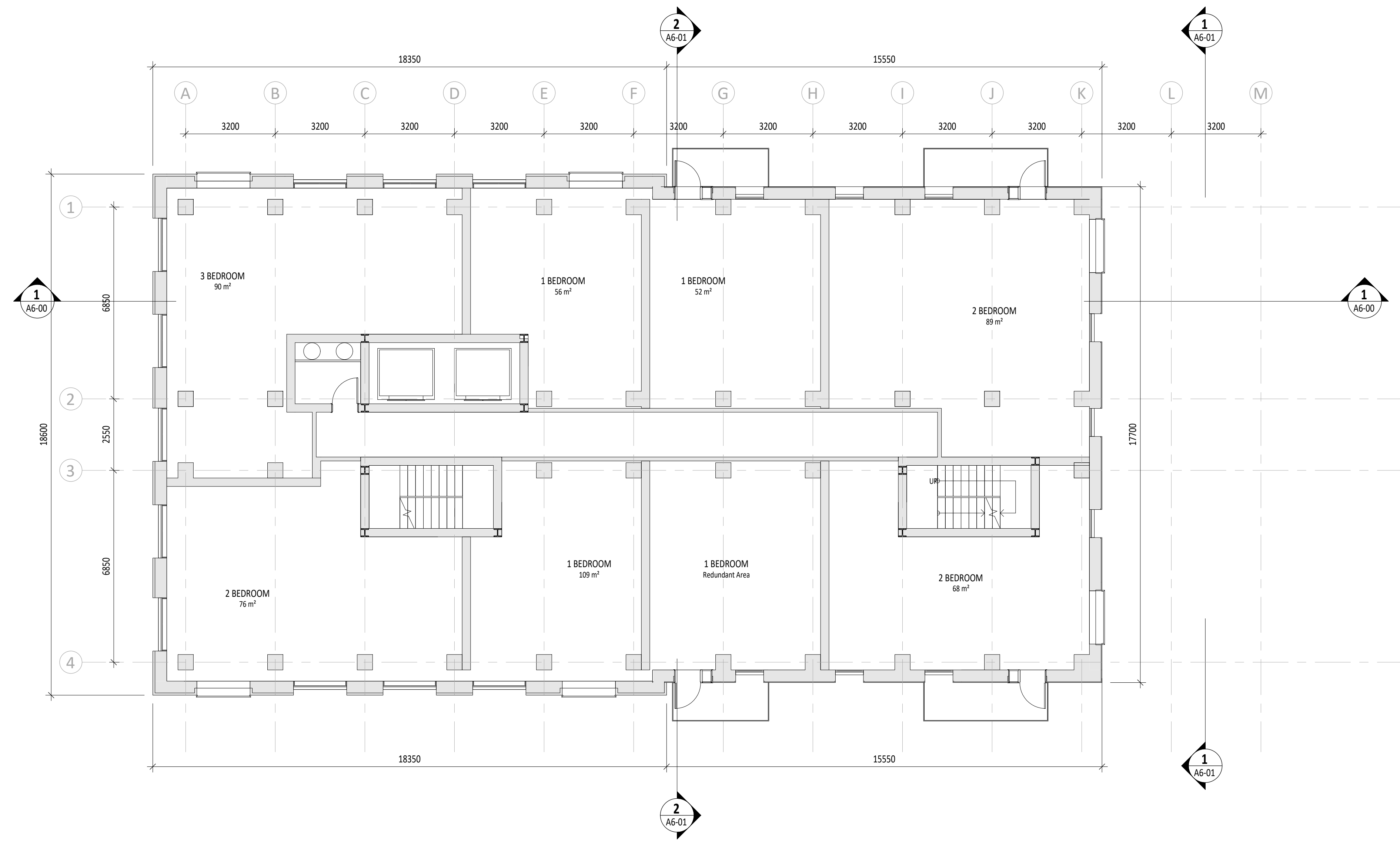
Project No. 2112
 Scale 1:100
 Plot Date 11/09/21

FLOOR PLAN - LEVEL 7

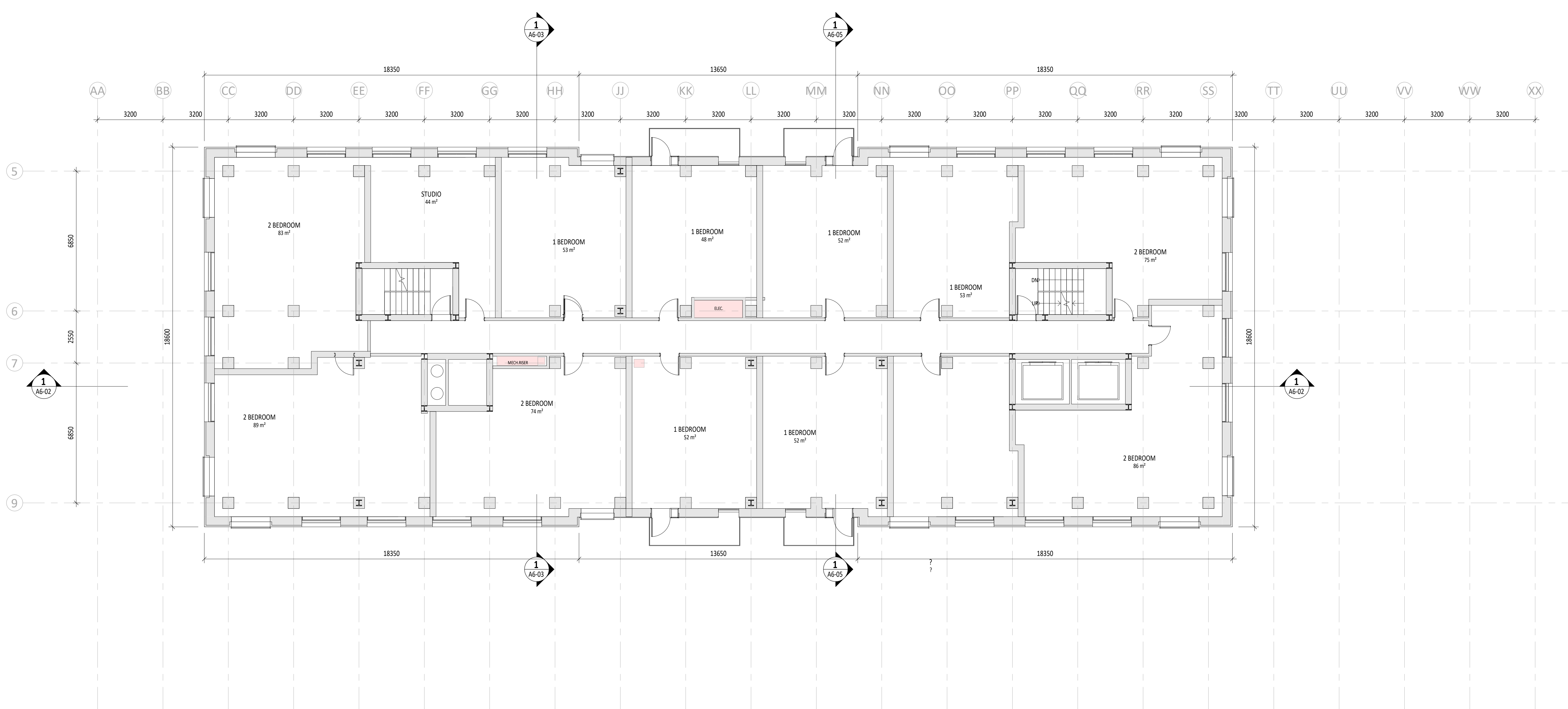
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GENERAL NOTES:

1. Drawing is to be used by the Client/Contractor and all other parties involved in the construction of the project. It is not to be used for any other purpose.
2. The Architect and Designer are to be held responsible for all other work not shown on this drawing. In case of any discrepancy between the Contract Documents and this drawing, the Contract Documents shall prevail.
3. The Architect and Designer are not responsible for the design of any mechanical, electrical, plumbing, or other systems. The design of such systems shall be the responsibility of the respective consultants.
4. The Architect and Designer are not responsible for the design of any structural elements. The design of such elements shall be the responsibility of the structural engineer.
5. The Architect and Designer are not responsible for the design of any landscape elements. The design of such elements shall be the responsibility of the landscape architect.
6. The Architect and Designer are not responsible for the design of any interior finishes. The design of such finishes shall be the responsibility of the interior designer.



KEY PLAN

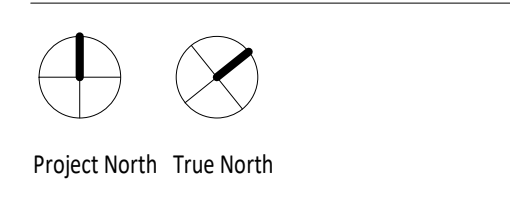


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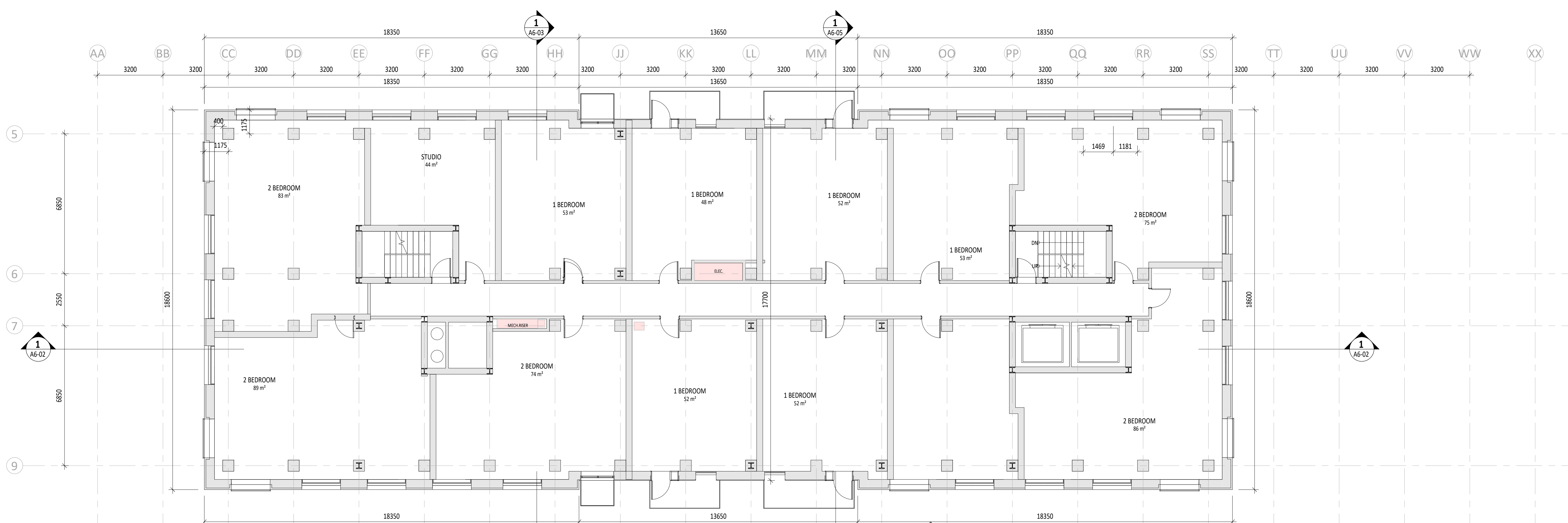
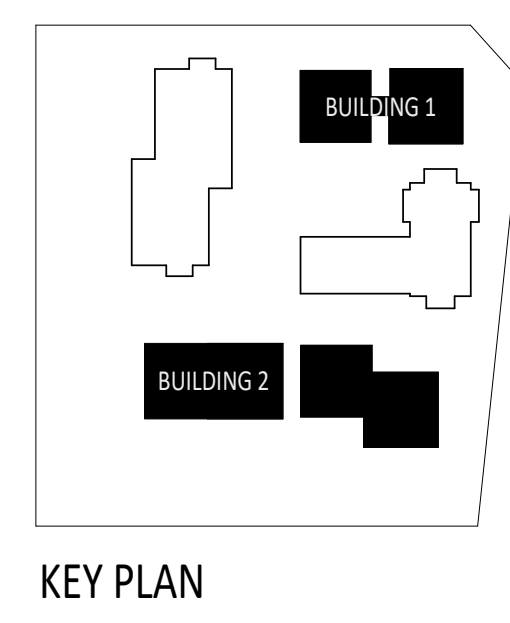
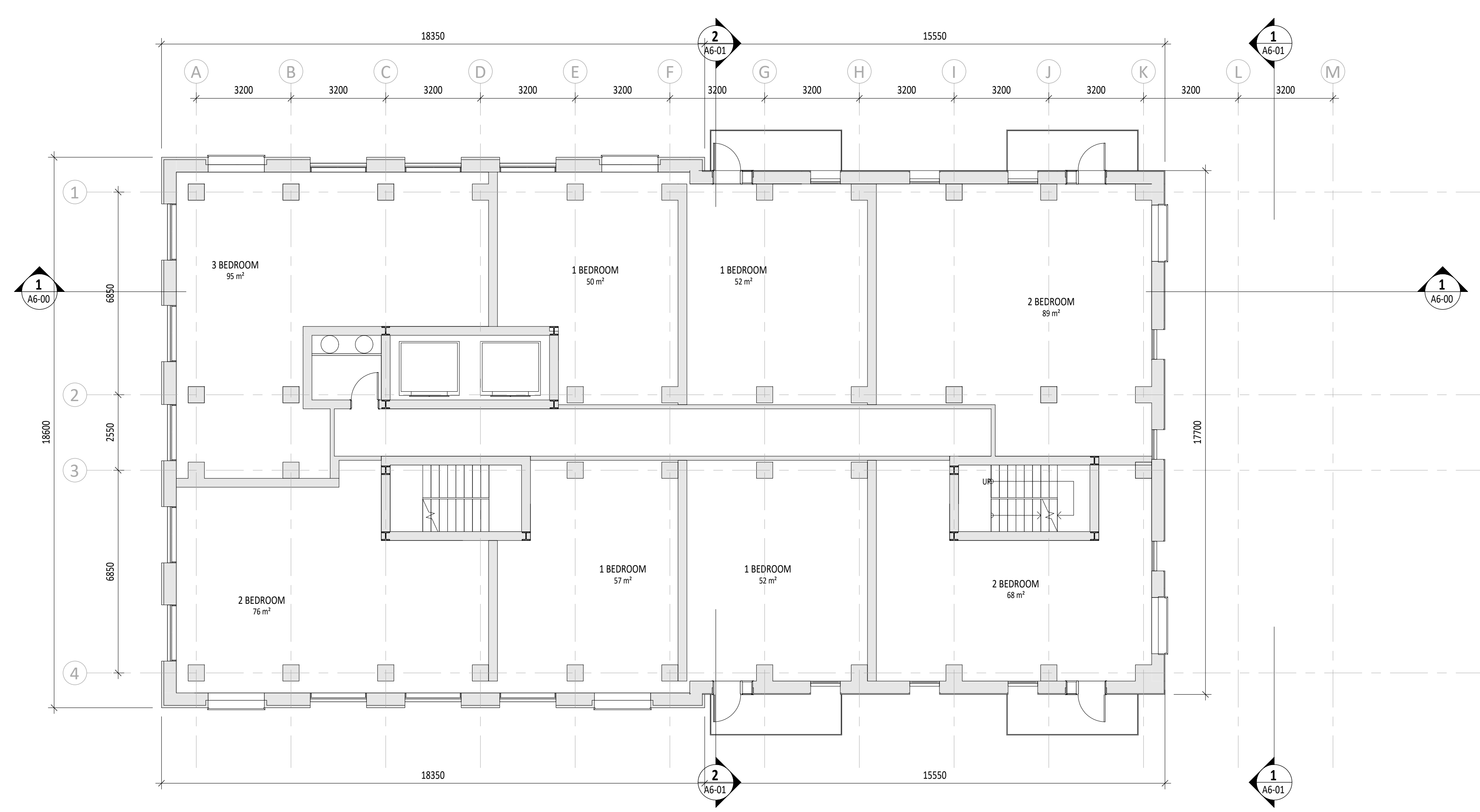
Project No. 2112
 Scale 1:100
 Plot Date 11/09/21

FLOOR PLAN - LEVEL 9

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1. Drawing is to be used by the Contractor and all other parties involved in the construction of the building and shall not be used for any other purpose.
2. The Architect and Designer are to be held responsible for the accuracy of the information contained herein.
3. The Architect and Designer are to be held responsible for the accuracy of the information contained herein.
4. The Architect and Designer are to be held responsible for the accuracy of the information contained herein.
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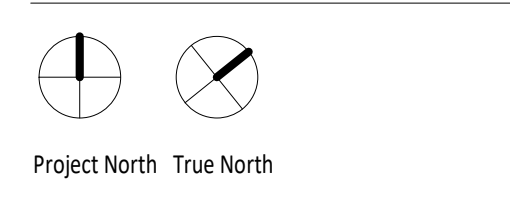


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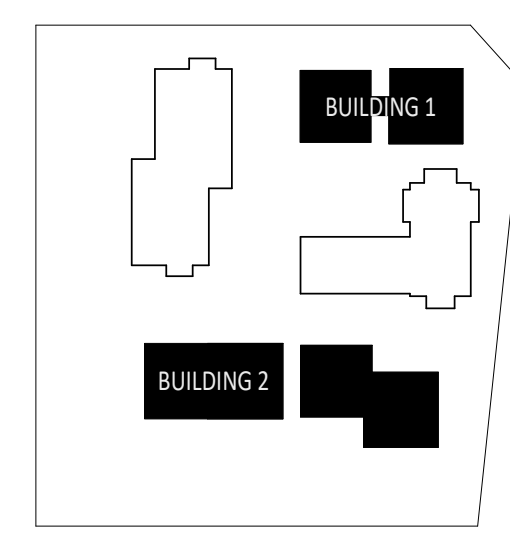
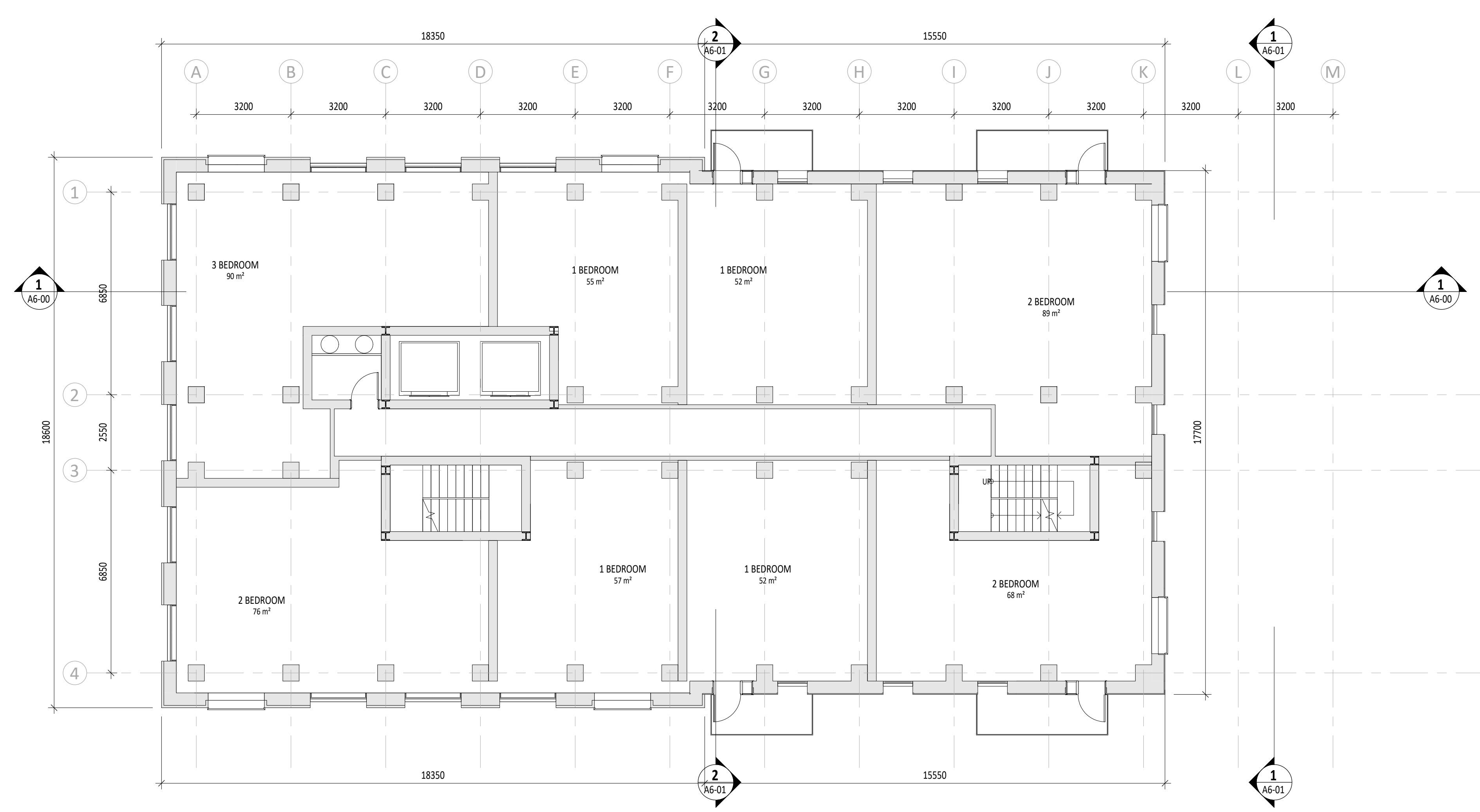
Project No. 2112
 Scale 1:100
 Plot Date 11/09/21

FLOOR PLAN - LEVEL 10

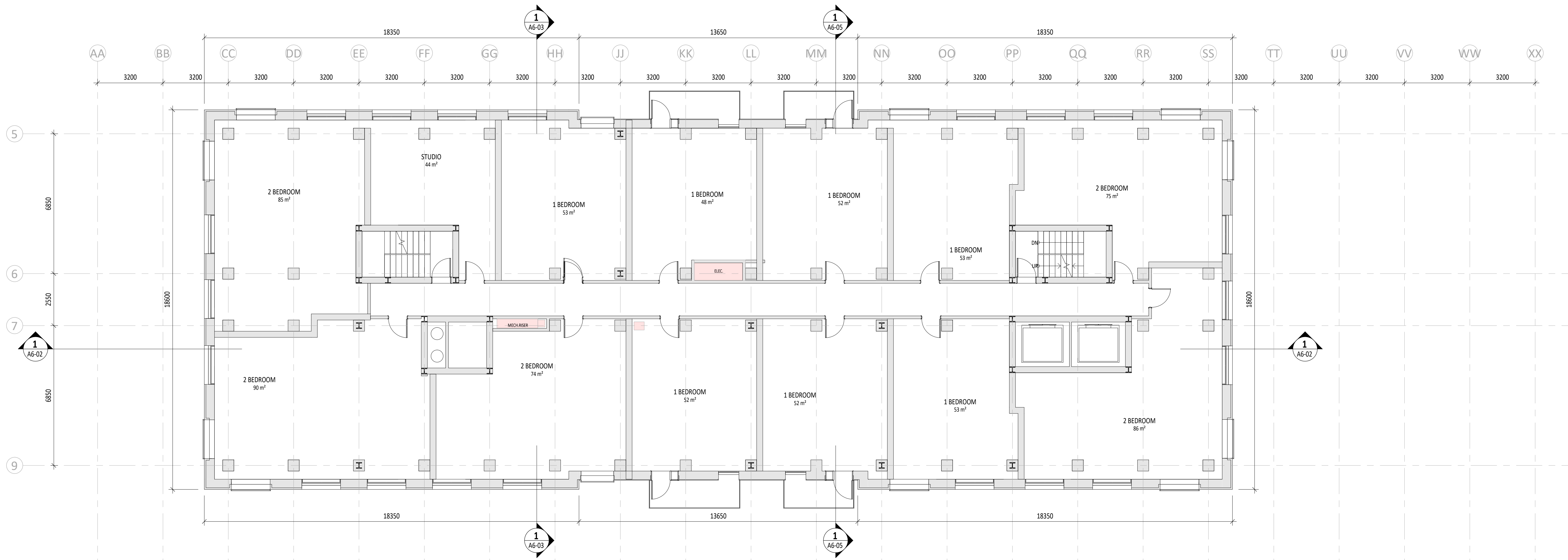
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GENERAL NOTES:

1. The Client is responsible for providing all necessary information and data for the design of the building.
2. The Architect and Designer are to be held responsible for the design of the building and for the construction of the building in accordance with the approved drawings and specifications.
3. The Architect and Designer are not responsible for the design of the building and for the construction of the building in accordance with the approved drawings and specifications.
4. The Architect and Designer are not responsible for the design of the building and for the construction of the building in accordance with the approved drawings and specifications.
5. The Architect and Designer are not responsible for the design of the building and for the construction of the building in accordance with the approved drawings and specifications.
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KEY PLAN

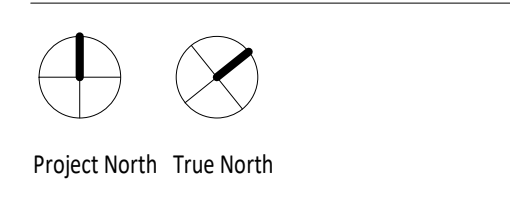


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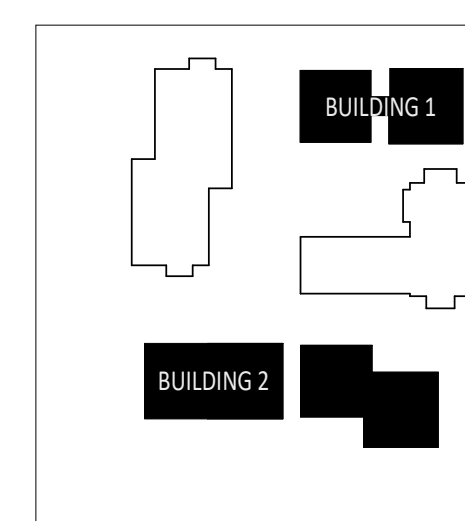
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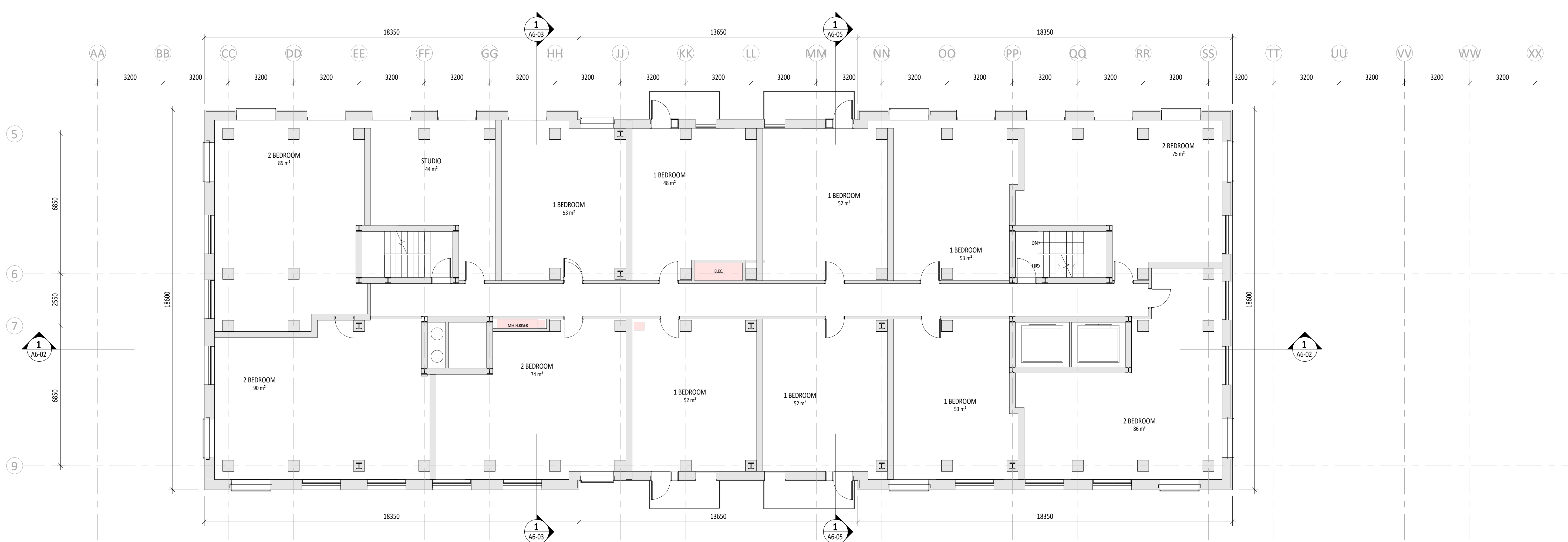
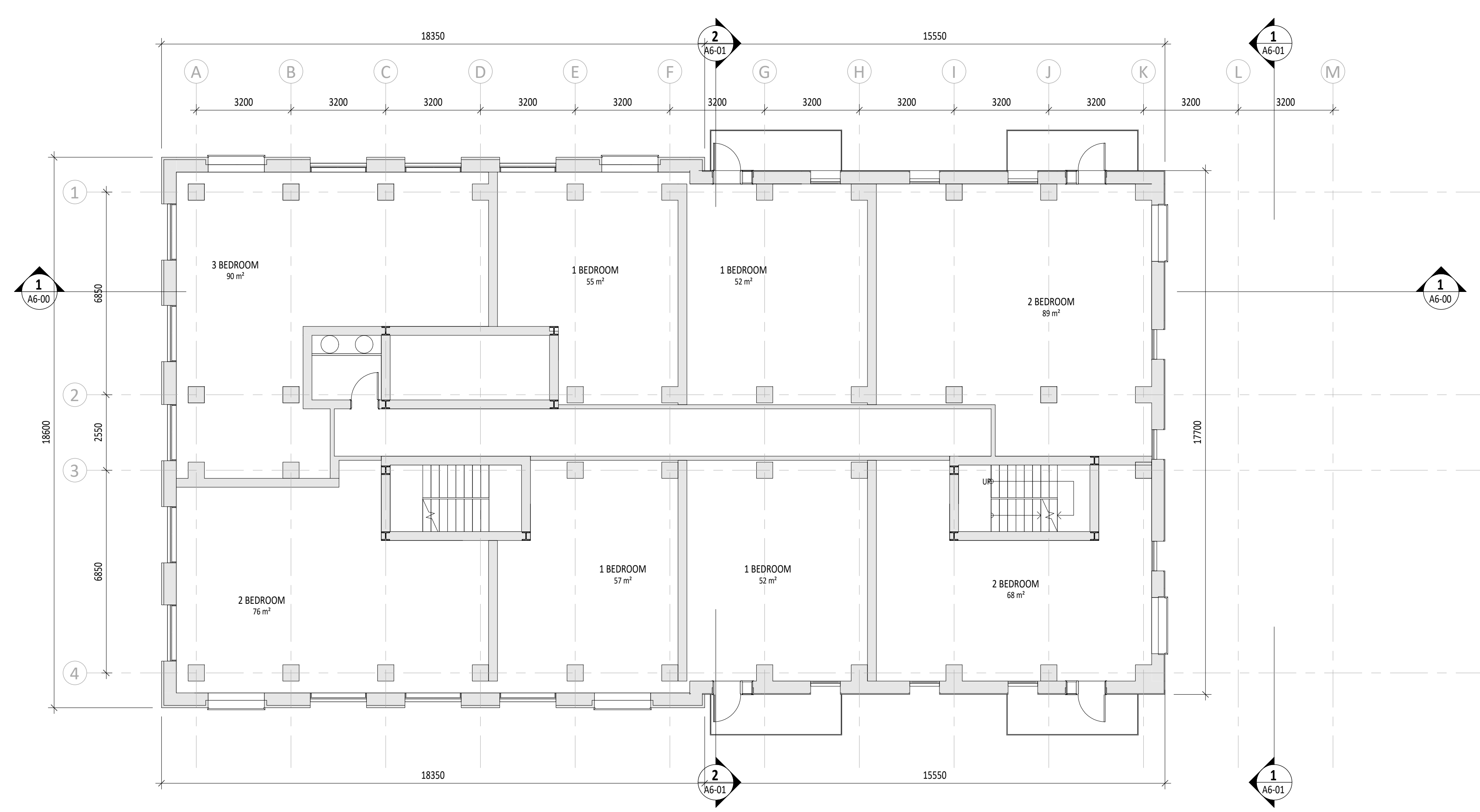
Project No. 2112
 Scale 1:100
 Plot Date 11/09/21

FLOOR PLAN - LEVEL 11

- GENERAL NOTES:**
1. The Client is responsible for providing all necessary information and data for the Architect to prepare the drawings.
 2. The Architect is responsible for providing the drawings in accordance with the requirements of the Client and the applicable building codes.
 3. The Architect is not responsible for the construction of the building or for the safety of the building during or after construction.
 4. The Architect is not responsible for the design of the building's mechanical, electrical, plumbing, or fire protection systems.
 5. The Architect is not responsible for the design of the building's structural system.
 6. The Architect is not responsible for the design of the building's interior finishes.



KEY PLAN

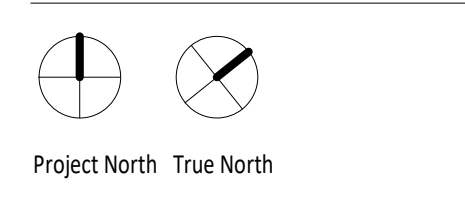


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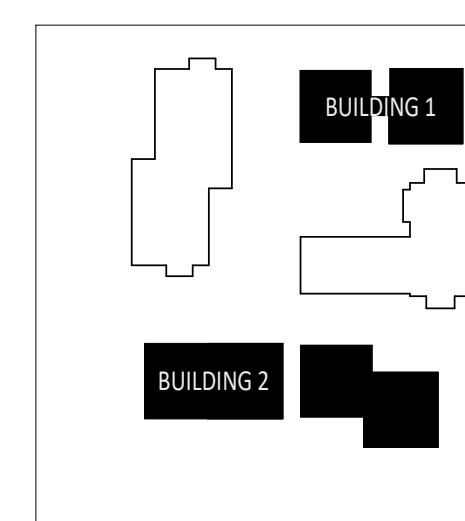
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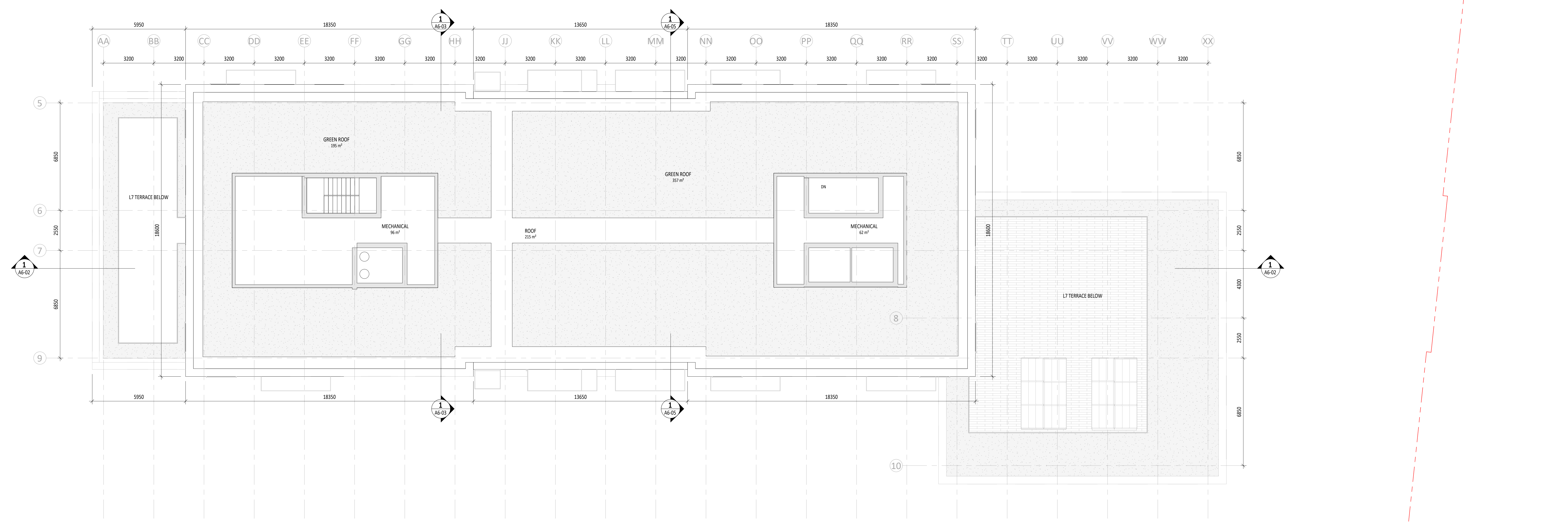
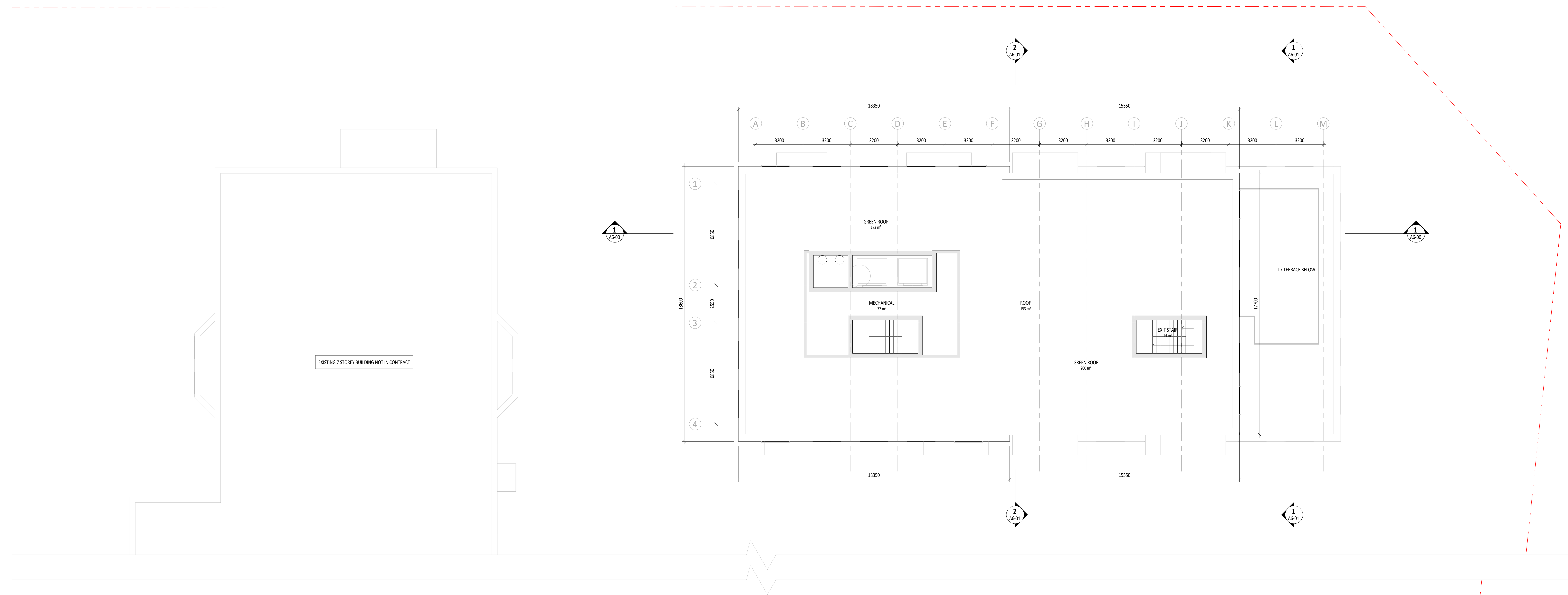
Project No. 2112
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 Plot Date 11/09/21

FLOOR PLAN - LEVEL 12

- GENERAL NOTES:**
1. The Contractor shall verify all existing conditions and dimensions before the start of work and report any discrepancies to the Architect immediately.
 2. The Architect and Contractor shall be responsible for all other conditions including the Project Manual and the Architectural, Mechanical and Electrical Drawings. In case of discrepancy between the Contract Documents, the Project Manual shall prevail.
 3. Installation of proposed Mechanical and Electrical Devices, Ropes and other items shall be in accordance with the Project Manual and the Architectural Drawings. Location shall be as indicated on the drawings and approved by the Architect.
 4. Dimensions indicated on the drawings are the base of finished surface unless otherwise noted.
 5. The Architect is not responsible for the methods and techniques of construction and assumes no responsibility for any methods and techniques of construction.
 6. Field quantities are to be used for construction unless specifically noted for each purpose.



KEY PLAN

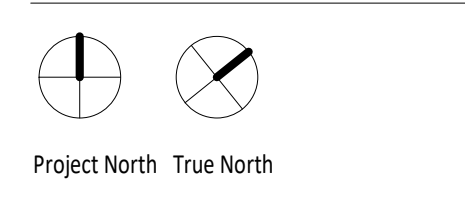


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FLOOR PLAN - ROOF LEVEL

The page features a decorative background with a blue curved shape in the top-left corner and a large grey curved shape that dominates the lower half of the page. The text 'APPENDIX E' is centered within the grey area.

APPENDIX E

Date: 15-Jun-22

NOISE REPORT FOR PROPOSED DEVELOPMENT

REQUESTED BY:

Name: Amy Patenaude

Company: RWDI

Location:
•Tomken Road
•Rathburn Road East
•Westminster Place
•Burhamthorpe Road E.

PREPARED BY:

Name: Loudel Uy

Tel#: (905) 615- 3200



ID# 552

ON SITE TRAFFIC DATA

Specific	Street Names			
	Tomken Road	Rathburn Road East	Westminster Place	Burhamthorpe Road E
AADT:	17500	25200	2800	56500
# of Lanes:	4	4	2	6
% Trucks:	3%	2%	4%	3%
Medium/Heavy Trucks Ratio:	55/45	55/45	55/45	55/45
Day/Night Split:	90/10	90/10	90/10	90/10
Posted Speed Limit:	50km/h	50km/h	40km/h	60km/h
Gradient Of Road:	<2%	<2%	<2%	<2%
Ultimate R.O.W:	23m	17m	12m	28m

Comments: Ultimate Traffic Data only (2041)