

Rail Corridor Impact Study

Fitzwilliam and Argyle Streets, Parramatta

PREPARED FOR URBAN PROPERTY GROUP

May 2025



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Introduction

This part of the report provides background information to the project and the need for this report to be submitted with the Development Application.

Introduction

This Rail Impact Assessment Report is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf of the Applicant, UPG Fitzwilliam Pty Ltd (UPG) in support of the project comprising residential, hotel and retail uses at 2 Fitzwilliam Street, Parramatta (the site).

Following the approval of the Stage 1 Concept State Significant Development Application (SSDA) (SSD-49808717) and the completion of a design competition for the project, UPG are now pursuing the next stage of planning approvals, which include a State Significant Rezoning, a Detailed Stage 2 SSDA and an Amending SSDA to amend the approved Stage 1 Concept SSDA.

Project Background

Since acquiring the site from Transport for NSW (TfNSW) via an open tender in 2022, UPG have undertaken an extensive process to secure planning approvals for the site. A summary of the key planning milestones to date is provided below.

Stage 1 Concept Development

A Stage 1 SSDA (SSD-49808717) was approved on 26 April 2024. The Stage 1 SSDA approves a concept for two towers over a shared podium, with a building envelope and maximum gross floor area (GFA) for build-to-rent (BtR) housing, retail and commercial uses. A total floor space ratio (FSR) of 23.2:1 is approved under the Stage 1 SSDA, divided between different uses across two towers with maximum heights of RL182.02 (western tower) and RL160.29 (eastern tower).

Early Works DA

On 18 July 2024, an Early Works Development Application (DA) was formally lodged with the City of Parramatta Council for works to ensure the efficient staged delivery of the project. The DA seeks consent for the following works:

- necessary demolition and clearing of existing structures, such as fencing, hardstand areas, etc.
- bulk earthworks to enable the construction of the future basement;
- stabilisation works and construction of retaining structures, including necessary shoring, piling, and cap beams.

No permanent physical works are proposed as part of the Early Works DA, including any permanent basement structure.

Design Excellence

Design Competition

In accordance with the approved Design Excellence Strategy endorsed through the Stage 1 SSDA, UPG undertook a design competition in April 2024 to July 2024 for the mixed-use development. The design competition was undertaken to select an architect who presented the highest quality

architectural, landscape and urban design proposal for the development, and was informed by a Competition Brief endorsed by the Office of the NSW Government Architect (GANSW) on 29 April 2024. The participating architectural firms of the Design Competition included (in alphabetical order):

- Bates Smart, in collaboration with Arcadia
- SJB, in collaboration with Land and Form
- Plus Architecture and Furtado Sullivan, in collaboration with McGregor Coxall

A design scheme from each competitor was considered by a Jury of three members. The Jury was formed in consideration with Section 2.3 of the GANSW Design Competition Guidelines and the Design Excellence Strategy. The design schemes presented by the competitors were of extreme high-quality and addressed the complexities of the Site and provided solutions to address the planning, design and technical objectives of the competition brief.

The competition concluded in June 2024 and the Jury unanimously selected SJB as the winning architect.

Design Integrity Process

In accordance with the endorsed Design Excellence Strategy, a design review process has been undertaken, involving the convening of the Jury as a Design Integrity Panel (DIP) to ensure that areas of refinement arising from the design competition have been considered and addressed.

The DIP process will continue throughout post-lodgement and post-approval to ensure that the development scheme is of a high quality, maintains its design integrity and exhibits design excellence in accordance with Clause 7.13 of the Parramatta LEP 2023.

The Site

The site address is 2 Fitzwilliam Street, Parramatta and comprises four allotments legally described as Lots 10, 11, 12, 13 and 14, in DP 1285124. Located in the heart of the Parramatta Central Business District (CBD), the site is immediately adjacent to the Parramatta Bus Interchange, a portion of which forms part of the site, and is opposite Parramatta Railway Station (25m to the site's north).

With an area of approximately 2,811.8m², the site has two street frontages, including a circa 110m frontage to Fitzwilliam Street and a circa 115m street frontage to Argyle Street. The eastern boundary of the site also adjoins an approved 30-storey project (not yet constructed) on the southern half of the site at 10 Valentine Street. Figure 1 shows the site and its context.

Currently, the site is vacant, and it contains limited vegetation, site fencing and remnant concrete slabs. An existing car park and driveway for service vehicles is located in the eastern portion of the site and a through-site pedestrian path is located within the site's western boundary. A portion of the Argyle Street footpath is also located on the site and includes a bus shelter.



Figure 1 Aerial view of the site (outlined in red)

Source: SJB

Proposed Planning Applications

To facilitate the proposed development, three separate planning applications are being pursued as set out below.

State Significant Rezoning

On 30 September 2024, the NSW Government announced that the Fitzwilliam Street project was selected as one of eleven projects accepted into the new State Significant Rezoning Program. This program is a government initiative to fast track the delivery of housing to achieve the National Housing Accord.

As such, a rezoning will be concurrently completed with the detailed Stage 2 SSDA and Amending SSDA to the Stage 1 Concept Proposal, seeking site-specific amendments to the Parramatta Local Environmental Plan 2023 (Parramatta LEP 2023) to facilitate the change of use of the podium and east tower from office premises to residential accommodation and a mixture of non-office uses (e.g. hotel).

Detailed Stage 2 SSDA

A detailed Stage 2 SSDA will be prepared and lodged concurrently with the rezoning for the construction of the proposed mixed-use development on the site, which specifically seeks approval for the following:

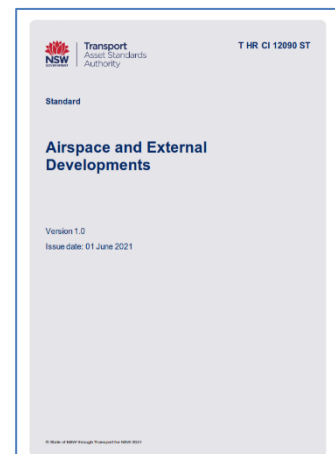
- Construction of a new mixed-use development consistent with the Stage 1 Concept Approval (as amended), comprising:
 - A shared podium containing ground level retail and hotel uses.
 - Two towers comprising residential accommodation.
- Basement carparking accessed via Fitzwilliam Street.
- Localised excavation for lift pits
- Through site link connecting Fitzwilliam and Argyle Street.
- Associated landscaping and public domain works.
- Extension and augmentation of physical infrastructure and utilities.

Amending SSSA to the Stage 1 Concept Approval

In addition to the rezoning, the Stage 1 Concept Approval will be amended via an Amending SSSA to reflect the proposed land use mix and distribution. The Amending SSSA relates to the land use and introduction of hotel uses and expansion of residential accommodation, responding to strategic planning objectives to deliver more housing supply.

Guidelines and Standards

This Rail Impact Assessment Report addresses Condition C13(b) of the Stage 1 SSSA (SSD-49808717) which was approved on 26 April 2024. Condition C13(b) requires that The RIAR must comply with the requirements of the TfNSW Transport Standard Airspace and External Developments (T HR CI 12090 ST) 2021.



Chapter 1: Safety Requirements

This Chapter of the report addresses the safety requirements, as applicable to this proposed development, outlined in **Section 5** of the Standard.

1.1 Safety in Design

Section 5.1 of the Standard applies to airspace developments, and those external developments nominated by TfNSW during the review process. Safety considerations, and compliance with applicable standards have been considered during the design of the concept development, however, should TfNSW deem that further safety considerations are required, it is considered that these are more appropriately covered as conditions of consent on the SSDA which can then be addressed as part of the Construction Certificate stage.

1.2 Fire and life safety objectives

Section 5.2 of the Standard requires consideration of any fire and life safety risks created by this development. Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required. However, should TfNSW deem compliance with this requirement as being necessary and justified, it is considered that this can be dealt with as condition of consent to be complied with at the Construction Certificate stage.

1.3 Risk Assessment

Section 5.3 of the Standard requires the undertaking of risk assessment where required in the standard or by TfNSW. As the development is located beyond 20m of the centreline of the nearest rail track it is considered that this requirement does not apply.

1.4 Protection of the rail corridor

Section 5.4 of the Standard requires the installation of measures to prevent the throwing or falling of objects onto the rail corridor or rail facilities from balconies, windows and roof top terraces. Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required.

1.5 Security

The site is separated from the rail corridor by a bus interchange and therefore does not directly adjoin the rail corridor. As such, no fencing or other security measures are required.

1.6 Dangerous Goods

The proposed development is a mixed use development made up of residential, hotel and ground plane retail uses. As such no dangerous goods are envisaged to be stored on this site and hence it is considered that Section 5.6 of the Standard does not apply.

Chapter 2: Environmental Requirements

This Chapter of the report addresses the environment requirements, as applicable to this proposed development, outlined in **Section 6** of the Standard.

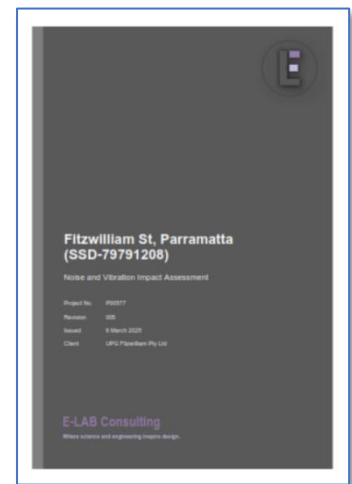
2.1 Green Infrastructure

The proposed development will incorporate green infrastructure as part of the final detailed design. Landscape Architectural plans have been prepared by Land and Form and these have been submitted as Appendix L to the EIS. However, given the site's location in the Parramatta CBD and adjoining the bus interchange, there will be no green infrastructure impacting on the rail corridor.



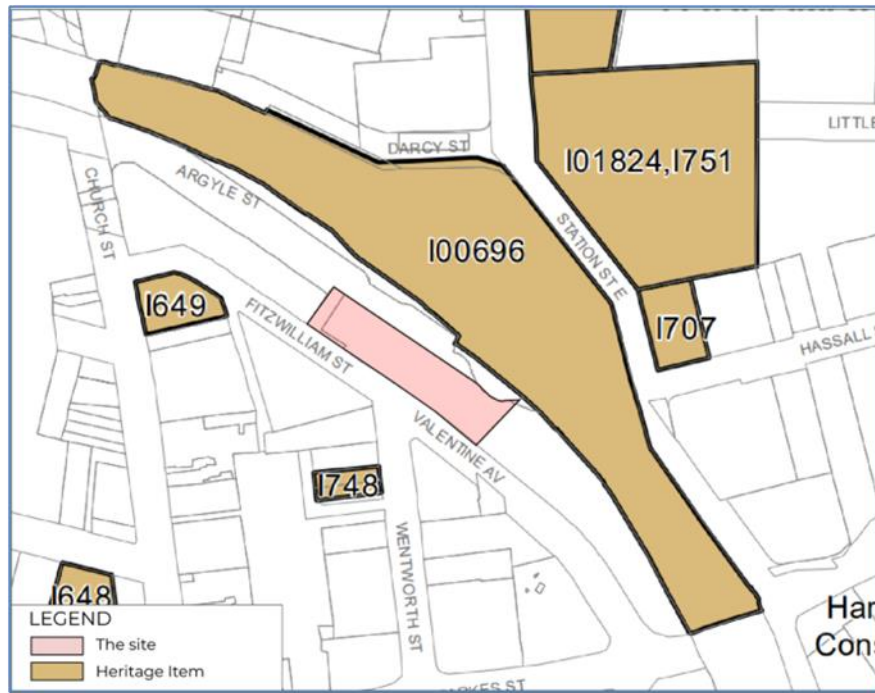
2.2 Noise and Vibration

The SSDA is accompanied with a Noise and Vibration Impact Assessment report prepared by E-LAB Consulting and is provided as Appendix V to the EIS. Clause 2.100 of the Transport and Infrastructure SEPP 2021 (TISEPP) and Section 6.2 of the Standard requires compliance with acoustic requirements. The E-LAB report has been prepared in accordance with the Department of Planning's *Development Near Rail Corridors and Busy Roads - Interim Guidelines* and assesses both rail noise from passing trains and also noise emissions from operation of the station (ie, announcements). The proposed development will incorporate measures which will ensure that the required dBA levels stipulated in Clause 2.100(3) of the TISEPP are not exceeded.



2.3 Heritage

Parramatta Railway Station group is listed on the NSW State Heritage Register (Listing. 00696) – see listing outline below. Section 6.3 of the Standard requires the consideration of a development's impact on adjoining heritage items. However, given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required. However, should TfNSW deem compliance with this requirement as being necessary and justified, it is considered that this can be dealt with as condition of consent to be complied with at the Construction Certificate stage.



Source: Ethos Urban Environmental Impact Statement 2023

Chapter 3: Configuration

This Chapter of the report addresses the configuration requirements, as applicable to this proposed development, outlined in **Section 7** of the Standard

3.1 Airspace developments

Section 7.1 of the Standard applies to airspace developments, and such is not applicable to this proposed development.

3.2 External developments

Section 7.2 of the Standard applies to external developments that trigger either a referral to or concurrence from the prescribed rail authority. As the planning pathway is via the SSDA approval pathway then this requirement of the Standard does not apply. However, consideration will be given to the safety or structural integrity, and the safe and effective operation of existing rail infrastructure facilities in the rail corridor are protected during undertaking of the development works, and on completion of the development. This Report and relevant expert reports accompanying the SSDA are provided to address the relevant TfNSW requirements contained in the Standard that apply to the concept design.

3.3 Prohibited configurations

Section 7.3 of the Standard provides requirements for ground anchors and frangible supports. The Applicant has indicated that temporary anchors are being explored and is in the process of seeking a concession from TfNSW and the Transport Asset Manager (TAM) (formerly Transport Asset Holding Entity (TAHE)).

Chapter 4: Services

This Chapter of the report addresses the requirements for services, as applicable to this proposed development, outlined in **Section 8** of the Standard.

Based on survey information it seems that there are no rail specific easement dealing with rail services. As such it is considered that this requirement does not apply. However, should TfNSW deem compliance with this requirement as being necessary and justified, it is considered that this can be dealt with as a condition of consent to be complied with at the Construction Certificate stage.

Chapter 5: Clearances

This Chapter of the report addresses the requirements for track clearances, as applicable to this proposed development, outlined in **Section 9** of the Standard.

5.1 Track clearances

Given the separation of the development site from the Station (ie some 26m) and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required. However, should TfNSW deem compliance with this requirement as being necessary and justified, it is considered that this can be dealt with as condition of consent to be complied with at the Construction Certificate stage.

5.2 Viaduct clearance

The development site is not located near any viaduct.

5.3 Electrical clearances

At ground level and below ground level the proposed development does not encroach on any rail related registered electrical easement that encumbers the development site.

Chapter 6: Temporary components and works

This Chapter of the report addresses the requirements for temporary components, such as shoring systems, as applicable to this proposed development, outlined in **Section 10** of the Standard.

The proposed development contains a five-level basement and as such, will require the installation of a shoring system during excavation. Also proposed is localised excavation for the lift pits. The proposed shoring system is described further in Chapter 9 of this Report.

Chapter 7: Supports and collision protection

This Chapter of the report addresses the collision protection requirements, as applicable to this proposed development, outlined in **Section 11** of the Standard.

Section 11 of the Standard requires supports for developments to comply with the Australian Standard AS 5100 - *Bridge design*. Given the separation of the development site from the Station (ie some 26m) and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required.

Chapter 8: Electrical Requirements

This Chapter of the report addresses the electrical requirements, as applicable to this proposed development, outlined in **Section 12** of the Standard.

8.1 General electrical requirements

Section 4 of this Report provides details with respect to the location of the rail electrical cable, easement and clearance from the proposed development.

8.2 Electrolysis

Typically, the assessment of the effects of stray currents is imposed as a condition of consent to be undertaken at Construction Certificate stage. However, as the Concept SSSA SEARs specifically requires the preparation of such an assessment, an electrolysis assessment was undertaken during this process. A copy of the electrolysis assessment is provided as Appendix A to this Report.

The electrolysis testing results show that three of the four test locations recorded stray current effects that exceed the acceptable limits. These levels are deemed to present a corrosion hazard to on-ground and in-ground metallic structures. The assessment provides high-level recommendations of measures to be included in the structural design of the building at the Construction Certificate stage. Further analysis at the construction certificate stage when construction drawing is a more appropriate timing for the next testing and analysis.

8.3 Lighting and reflective materials

Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required. However, should TfNSW deem compliance with this requirement as being necessary and justified, it is considered that this can be dealt with as a condition of consent to be complied with at the detailed construction certificate stage.

Chapter 9: Geotechnical

This Chapter of the report addresses the geotechnical requirements, as applicable to this proposed development, outlined in **Section 14** of the Standard.

9.1 Geotechnical investigation

As the proposed development involves basement excavation, localised excavation for lift pits and shoring, Section 14.1 of the Standard requires the undertaking of a detail geotechnical investigation. A geotechnical assessment has been undertaken by EI Australia and their report is provided as Appendix Y to the EIS. Details of the report are discussion in Section 9.3.1 of this Report.

9.2 Engineering analysis and impact assessment

Section 14.2 of the Standard requires the undertaking of an engineering analysis and impact assessment for development involving ground penetration deeper than 2m and within 25m of the rail corridor. The proposed development involves the excavation of the construction of five basement levels directing abutting a below ground rail stratum, and some localised excavation for lift pits. As such, this requirement applies and is discussed further in Section 9.3 of this Report.

9.3 Engineering assessment report

Section 9.3 of the Standard requires the preparation of an engineering assessment report comprising the following:

- geotechnical investigation report
- impact assessment report
- risk assessment report

These are discussed below:

9.3.1 Geotechnical Investigation report

As mentioned in Item 9.1 above, a geotechnical assessment was undertaken by EI Australia and their report is provided as Appendix Y to the EIS. The geotechnical report contains, where applicable, the level of detail as described in Section 14.3.1 of the Standard which would be applicable for this SSDA.

The geotechnical report provides details of the rock formation encountered in the bore holes, excavation methodology, a recommended excavation retention system and pile footings and recommendation for monitoring. If required track monitoring is typically imposed as a condition of consent to be complied with at the Construction Certificate stage. It is considered that this is the most appropriate form to detail with track monitoring.

9.3.2 Impact assessment report

The Applicant intends to seek a TfNSW concession for the installation of temporary ground anchors as part of the shoring system for the development. As such, the final structural design for the development cannot be finalised until the outcome of that concession application is determined. As such, it is considered that the preparation of the Impact Assessment Report is best deferred under the Construction Certificate stage to allow UPG and TfNSW/TAM to agree on the concession application.

9.3.3 Risk assessment report

Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required for the proposed development.



9.3.4 *Independent verification*

As the proposed development is not located on TfNSW property the proposed development does not require independent verification under Section 14.3.4 of the Standard.

9.4 Ground penetrations

The proposed development involves excavation for the construction of five basement levels and localised excavation for lift pits. The proposed excavation and its impact have been addressed in Section 9.3 of this Report.

9.5 Approved ground anchors

The Applicant intends to seek a TfNSW concession for the installation of temporary ground anchors as part of the shoring system for the development. It is envisaged that the items contained in Section 14.5 of the Standard would be imposed as conditions on the concession approval.

Chapter 10: Footings and basement

This Chapter of the report addresses the requirements for footings and basements, as applicable to this proposed development, outlined in **Section 15** of the Standard.

10.1 Footings

The final structural design has not been finalised as yet and will be completed following further consultation with TfNSW/TAM following submission of the SSDA and Ground anchor concession application and prior to construction commencement. As such, it is considered that the final footing design be provided to TAM/TfNSW as part of the Construction Certificate stage.

10.2 Basements

The final structural design has not been finalised as yet and will be completed once the outcome of the temporary ground anchor concession approval from TfNSW is known and consultation with TAHE regarding footings in and abutting TAM land. As such, it is considered that the final basement and localised excavation for lift pit design be provided to TfNSW as part of the Construction Certificate stage.

Chapter 11: Water and drainage

This Chapter of the report addresses the requirements for water and drainage, as applicable to this proposed development, outlined in **Section 16** of the Standard.

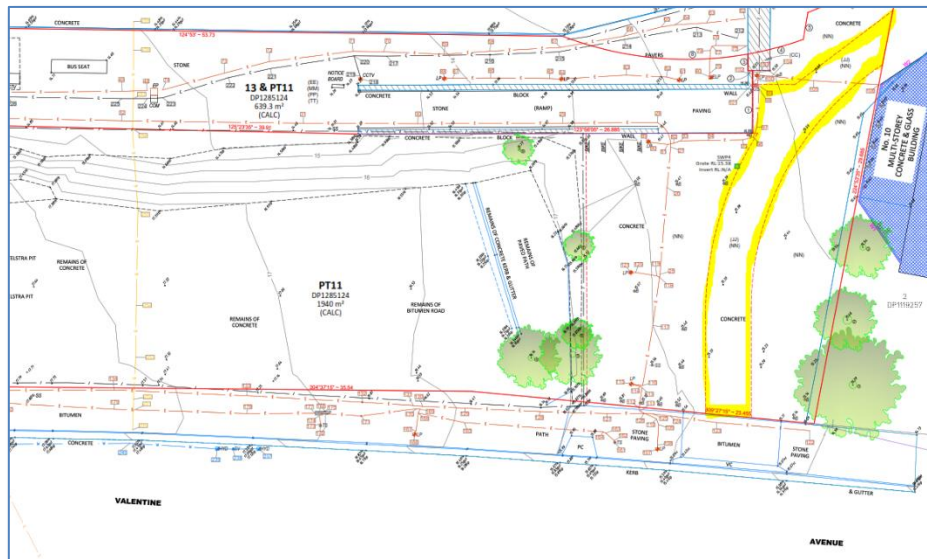
Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required for the proposed development.

Chapter 12: Survey

This Chapter of the report addresses the survey requirements, as applicable to this proposed development, outlined in **Section 17** of the Standard.

A detailed survey plan of the site has been prepared by a Registered Surveyor from SDG Group and is provided as Appendix E to the EIS. The Survey Plan **Ref: 8840** provides details of the subject site. Survey and as-built details have been included in the relevant architectural, landscape and engineering drawings.

The eastern part of the subject is encumbered by a right of way in favour of Sydney Trains, as shown in the image below (highlighted in yellow). As discussed in Chapter 13 below, a Construction Licence and Easement Agreement is being negotiated between TAM and UPG outlining how Sydney Trains access will be maintained on the site to provide access to the Parramatta rail yard during construction and will be finalised well before commencement of works..



Source: SDG Group

12.1 Boundary definition

Given the separation of the subject site from the rail corridor due to the large bus interchange a boundary definition was deemed to be superfluous. However, should TfNSW deem compliance with this requirement as being necessary and justified, it is considered that this can be dealt with as condition of consent to be complied with at the Construction Certificate stage.

12.2 Boundary fencing

The subject site is physically separated from the rail corridor due to the presence of the presence of a bus interchange. As such this requirement does not apply.

Chapter 13: Access

This Chapter of the report addresses the access requirements, as applicable to this proposed development, outlined in **Section 18** of the Standard.

The proposed development the subject of this SSDA does not require any access to the rail corridor. However, as mentioned in Chapter 12 above, the site is encumbered by a right of way in favour of Sydney Trains. This right of way provides access to the rail corridor from Fitzwilliam Street. However, the right of way is limited in height, enabling the development to straddle over the right of way. Access to the rail corridor will not be restricted by the final design of the proposed development.

Chapter 14: Construction

This Chapter of the report addresses the construction requirements, as applicable to this proposed development, outlined in **Section 22** of the Standard.

14.1 General construction requirements

It is envisaged that TfNSW will require the imposition of specific construction related conditions of consent which will be required to be complied with at specific intervals/stages of development.

14.2 Airspace developments

Section 22.2 of the Standard does not apply as the proposed development is not an airspace development.

14.3 Dilapidation surveys

Should TfNSW deem it necessary that dilapidation surveys are required, it is considered that this requirement be imposed a condition of consent to be undertaken prior to the commencement of works and if required, on completion.

14.4 Crane and other aerial operations

The construction of the development will require the use of crane(s). It is considered that this requirement is a construction related item and best dealt with as a condition of consent to be complied with at the Construction Certificate stage.

14.5 Track possessions and power outages

Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that track possessions or power outages will not be required.

14.6 Demolition and earthworks

Demolition and earthworks are being undertaken under a separate Development Application for Early Works (DA-392/2024) with Parramatta City Council. It is understood that TfNSW has been given the opportunity to review and comment on this application and required conditions of consent would likely be imposed on this approval and as such should not form part of this SSDA.

14.7 Drainage and pollution control

Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that track possessions or power outages will not be required.

14.8 Electrical restrictions

Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that track possessions or power outages will not be required.

Chapter 15: Maintenance and operation

This Chapter of the report addresses the requirements for maintenance and operations, as applicable to this proposed development, outlined in **Section 23** of the Standard.

15.1 General maintenance and operation

Given the separation of the development site from the Station and existence of a substantial bus interchange between the two, it is considered that compliance with this requirement would not be required.

15.2 Maintenance of Airspace developments

Section 23.2 of the Standard does not apply as the proposed development is not an airspace development.

Chapter 16: Decommissioning and disposal

This Chapter of the report addresses the requirements for decommissioning and disposal, as applicable to this proposed development, outlined in **Section 24** of the Standard.

It is envisaged, that at the end of the economic life of the proposed development that it will be able to be demolished without impact on the rail corridor or rail operations and would comply with any rail requirements applicable at that time.

Appendix A: Electrolysis Risk Report



Document Number: W23408/NSW-P100142

23 May 2023

Macroplan Holdings
Level 10
580 George Street
Sydney NSW 2000

Attention: Mr Jim Tsirimiagos

Email: Jim.Tsirimiagos@macroplan.com.au

Dear Jim,

**ELECTROLYSIS RISK REPORT AT
FITZWILLIAM AND ARGYLE STREET, PARRAMATTA, NSW 2150**

Please find attached our electrolysis report for the above site. We trust you find our report satisfactory. Should you have any queries, please do not hesitate to contact our office.

Yours sincerely,

Corrosion Control Engineering (Holdings) Pty Ltd

David Sunjaya
NSW Engineering Manager
NACE Certified Cathodic Protection Specialist (#71491)



ELECTROLYSIS RISK REPORT FITZWILLIAM AND ARGYLE STREET, PARRAMATTA NSW 2150 MACROPLAN

DOCUMENT NUMBER: W23408/NSW-P100142

REVISION: 0

DATE: 18 May 2023



TECHNICAL REVIEW					
CONSULTED PERSON		POSITION/CERTIFICATION		SIGNATURE	
David Sunjaya		NSW Engineering Manager NACE Cathodic Protection Specialist #71491			
Adam Dunn		Corrosion Engineer NACE Cathodic Protection Technician #200553			
REVISION	DATE	REASON FOR ISSUE	PREPARED	CHECKED	APPROVED
0	18/05/2023	First Issue	Henry Watts	Adam Dunn	David Sunjaya

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Appendices

Appendix A: Data Logger Charts

1. Introduction

As requested, Corrosion Control Engineering (Holdings) Pty Ltd (CCE) conducted electrolysis risk testing at Fitzwilliam and Argyle Street, Parramatta NSW 2150 on Monday 15th May and Tuesday 16th May.

2. The Electrolysis Problem

Most of the DC current to power the electric trains (trains, metro, and light rail) returns to the railway substations via the rail lines. However, some leaks to ground (stray traction current) and in returning to the substation via this path can be picked up (and discharged) from buried metallic structures, leading to possible electrolysis type corrosion problems. This corrosion of the metal occurs at the discharge point.

The problems can be significant if:

- The metallic structures are sufficiently large or long enough and close to the electrified railway lines.
- The stray traction current leakages to soil are of sufficient frequency and magnitude.

3. Test Method

The in-ground stray traction, causing voltage fluctuations on the development site, was monitored by data logging voltage gradients and potentials as follows:

1. Data logging voltage gradients between steel earth stakes parallel to the rail. The earth stakes were installed approximately 60 metres apart.
2. Data logging voltage gradients between steel earth stakes perpendicular to the rail. The earth stakes were installed approximately 14 metres apart.
3. Data logging the potential of the electrical earth, approximately located at the centre of the development site.
4. Data logging the potential of the water service, approximately located at the centre of the development site.
5. Data Logging the potential of the metal boundary fencing parallel to the rail.

Note, TfNSW standards 'THRCI 12090 ST: Airspace and External Developments, Version 1.0' and 'THRCI 12051 ST: Development Near Rail Tunnels, Version 2.0' does not provide any acceptance criteria for stray current effects. The NSW Electrolysis Committee adopts acceptance criteria (low risk) of 20 mV anodic and 100 mV cathodic time weighted average shift over a period of up to 24 hours. Given there are no specified mitigation methods, the conclusions and recommendations in this report are based on CCE's experience in this field.

4. Test Results

A summary of the test results is presented in the following table. The corresponding data logger charts are presented in Appendix B.

Test Number	Data Logging Test Performed	Test Duration	Observed Fluctuations
1	Data logging voltage gradients between steel earth stakes parallel to the rail. The earth stakes were installed approximately 60 metres apart.	20-hours	Most fluctuations within 25 mV. Maximum fluctuation of 56 mV.
2	Data logging voltage gradients between steel earth stakes perpendicular to the rail. The earth stakes were installed approximately 14 metres apart.	20-hours	Most fluctuations within 5 mV.
3	Data logging the potential of the electrical earth, approximately located at the centre of the development site.	20-hours	Most fluctuations within 14 mV. Maximum fluctuation of 83 mV.
4	Data logging the potential of the water service, approximately located at the centre of the development site.	20-hours	Most fluctuations within 5 mV. Maximum fluctuation of 10 mV.
5	Data Logging the potential of the metal boundary fencing parallel to the rail.	20-hours	Most fluctuations within 5 mV.

5. Discussion

The test results show that three of the four test locations recorded stray current effects that exceed acceptable limits.

1. The logger chart for the steel earth stakes parallel to the rail shows stray current effects that are exceeding acceptable limits.
2. The logger chart for the steel earth stakes perpendicular to the rail shows stray current effects that are within acceptable limits.
3. The logger chart for the potential recording of the electrical earth shows stray current effects mostly within acceptable limits but at times exceed acceptable limits.
4. The logger chart for the potential recording of the water service pipe shows stray current effects that are within acceptable limits.

5. The logger chart for the potential recording of the site boundary fence shows stray current that are within acceptable limits.

6. Drawings & Documents Reviewed

At the time of this assessment, no architectural and structural drawings were available for review by CCE.

Extracted from the Scope of Services provided by Macroplan, the proposed project will consist of a commercial and residential unit, that will span an area of 2818 m², and is directly adjacent, approximately 26m, to the Paramatta Train Station.

The development will consist of 40 storeys and have basement parking. As the proposed development is a multi-storey building, the construction work is likely to involve the addition of reinforced concrete in contact with soil, which may be subject to stray current corrosion.

7. Conclusion

Based on the site testing results, the present stray traction currents at the proposed development site may present a corrosion hazard to on-ground and in-ground metallic structures.

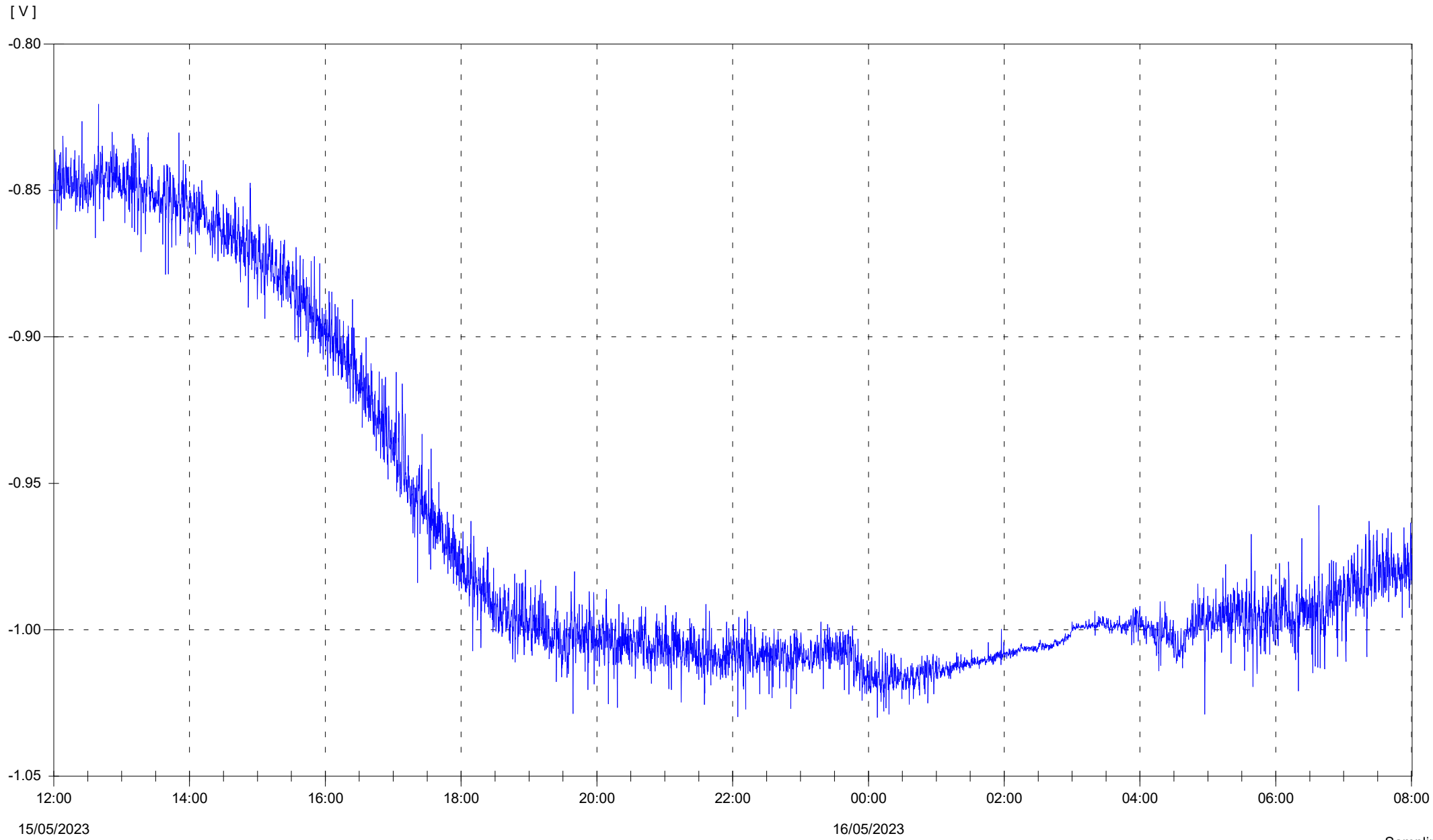
8. Recommendations

Based on the site testing and review of the available development drawings/documents, CCE recommend all the following conservative protective measures, where possible/practical, be applied to mitigate against long-term stray current corrosion at on-ground and in-ground metallic structures:

1. The installation of heavy plastic membrane (e.g. Fortecon) under (or behind) all reinforced concrete slabs, permanent retaining walls, permanent anchors, piers/piles, and metallic posts/bollards to electrically isolate from soil and stray currents. *Note, this may not always be possible/practical at piers/piles.*
2. Ensure the high strength (minimum 32 MPa), high cover (minimum 50 mm) concrete is used to effectively prevent/limit soil moisture penetrating through to the steel/metal.
3. The use of plastic, rather than metallic, in-ground pipework and tanks. In the event buried metallic pipework and/or cables are installed within the site, installation within sealed non-metallic conduit is recommended.

In order to comply with the TfNSW standard 'THRCI 12051 ST: Development Near Rail Tunnels, Version 2.0, section 9.2.1' and Sydney Metro Guideline 'Sydney Metro Underground Corridor Protection Technical Guidelines, Version 2, section 9.4', CCE recommend installation of basement rebar test points to allow for future electrolysis testing of the basement rebar post-construction. This can be achieved via SS316 welded test studs that protrude from the basement walls, at approximately knee-high level (see Appendix A). CCE recommend 2-off rebar test points be installed for each basement level, with one at each end of the basement level. Note, these welded studs can be installed relatively flush with or recessed in the concrete surface, allowing sufficient space (minimum 10 mm) for a temporary electrical connection (e.g. via alligator clip or similar). Alternatively, the Erico Earthbridge DB12CS701 can be installed for test points.

Appendix A: Data Logger Charts



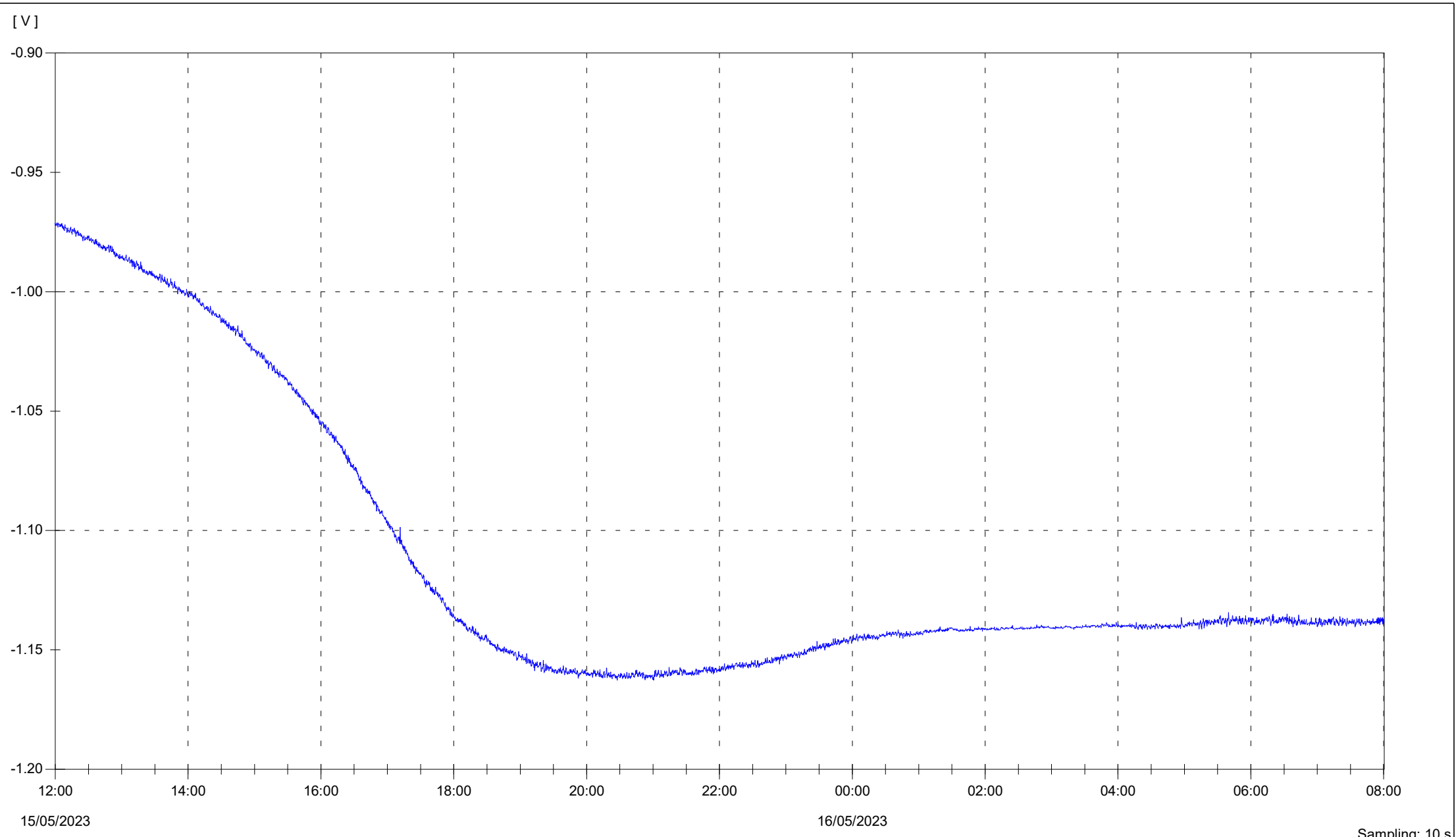
Sampling: 10 s

— : Volts Vs Cu/CuSO4

	Min	Max	Average	Std. dev.
DC 1	-1.030 V	-0.821 V	-0.967 V	0.058 V

Electrolysis Risk Testing
Fitzwilliam and Argyle Street, Parramatta NSW 2150
Logger Serial Number: 2742 Channel 1
Parallel to Rail





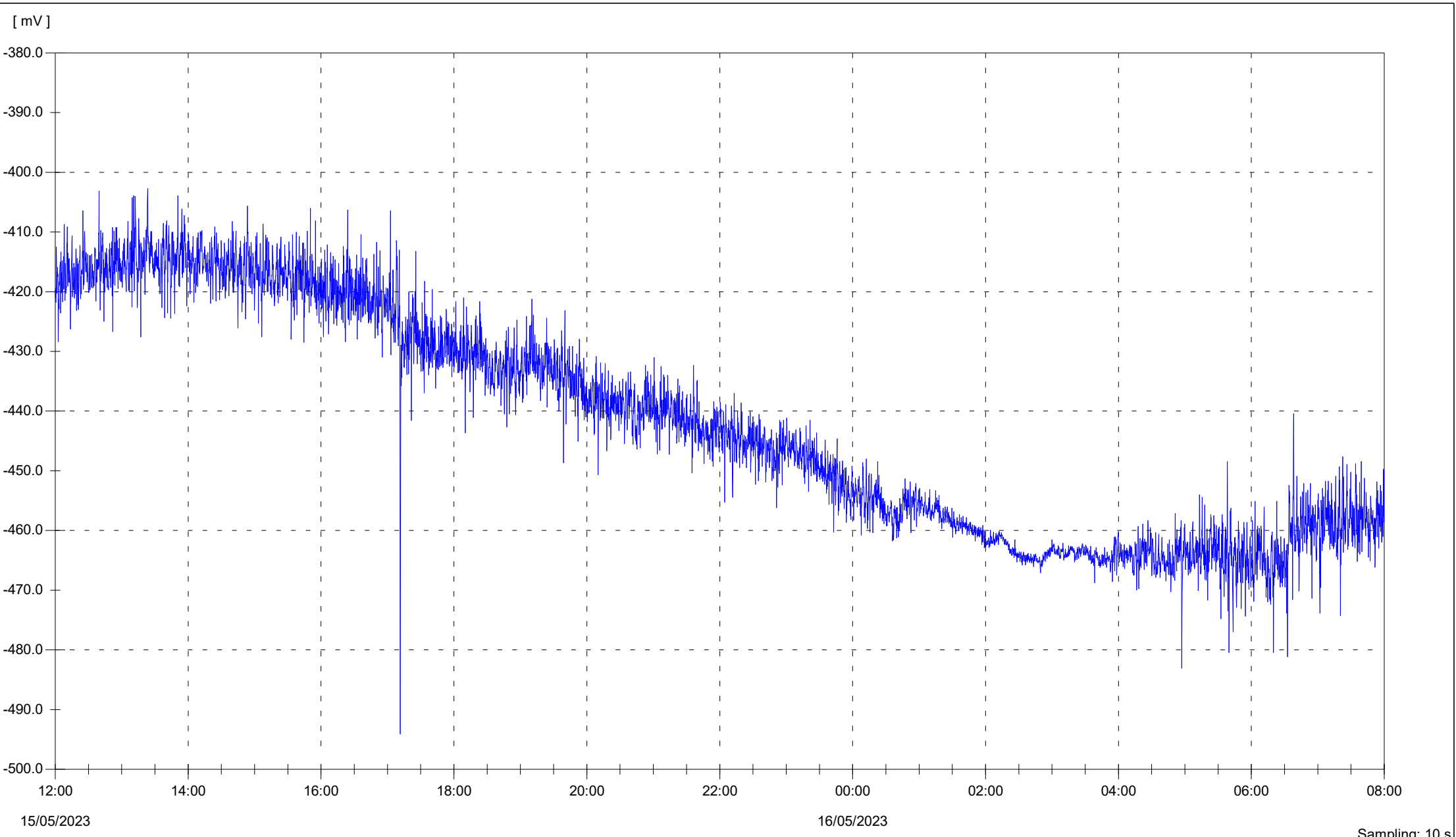
Sampling: 10 s

— : Volts Vs Cu/CuSO4

	Min	Max	Average	Std. dev.
DC 2	-1.163 V	-0.971 V	-1.113 V	0.058 V

Electrolysis Risk Testing
Fitzwilliam and Argyle Street, Parramatta NSW 2150
Logger Serial Number: 2742 Channel 2
Perpendicular to Rail





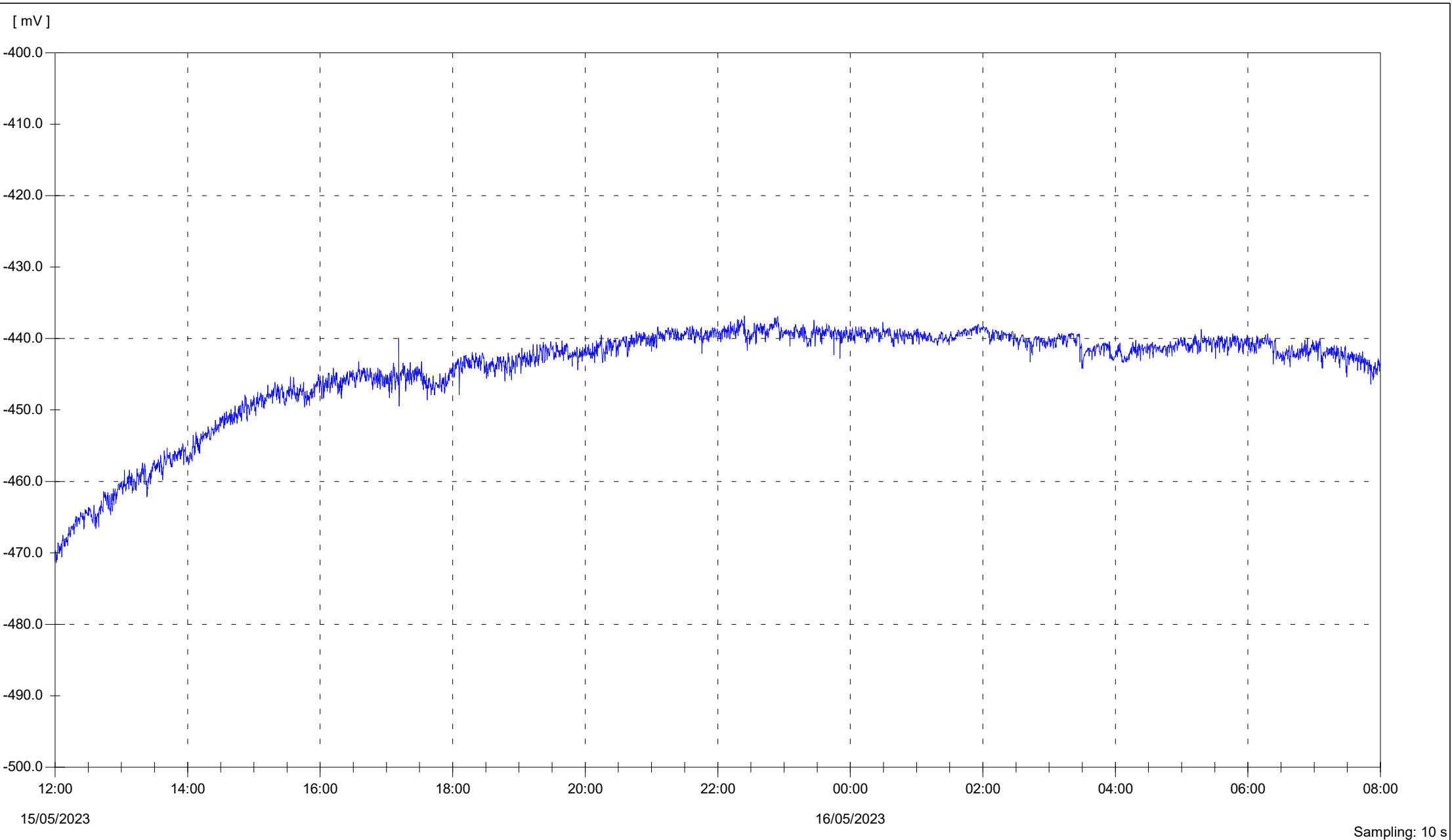
— : Volts Vs Cu/CuSO4

MiniLog2

	Min	Max	Average	Std. dev.
DC 1	-0.494 V	-0.403 V	-0.442 V	0.019 V

Electrolysis Risk Testing
Fitzwilliam and Argyle Street, Parramatta NSW 2150
Logger Serial Number: 3383
Earthing Point





Sampling: 10 s

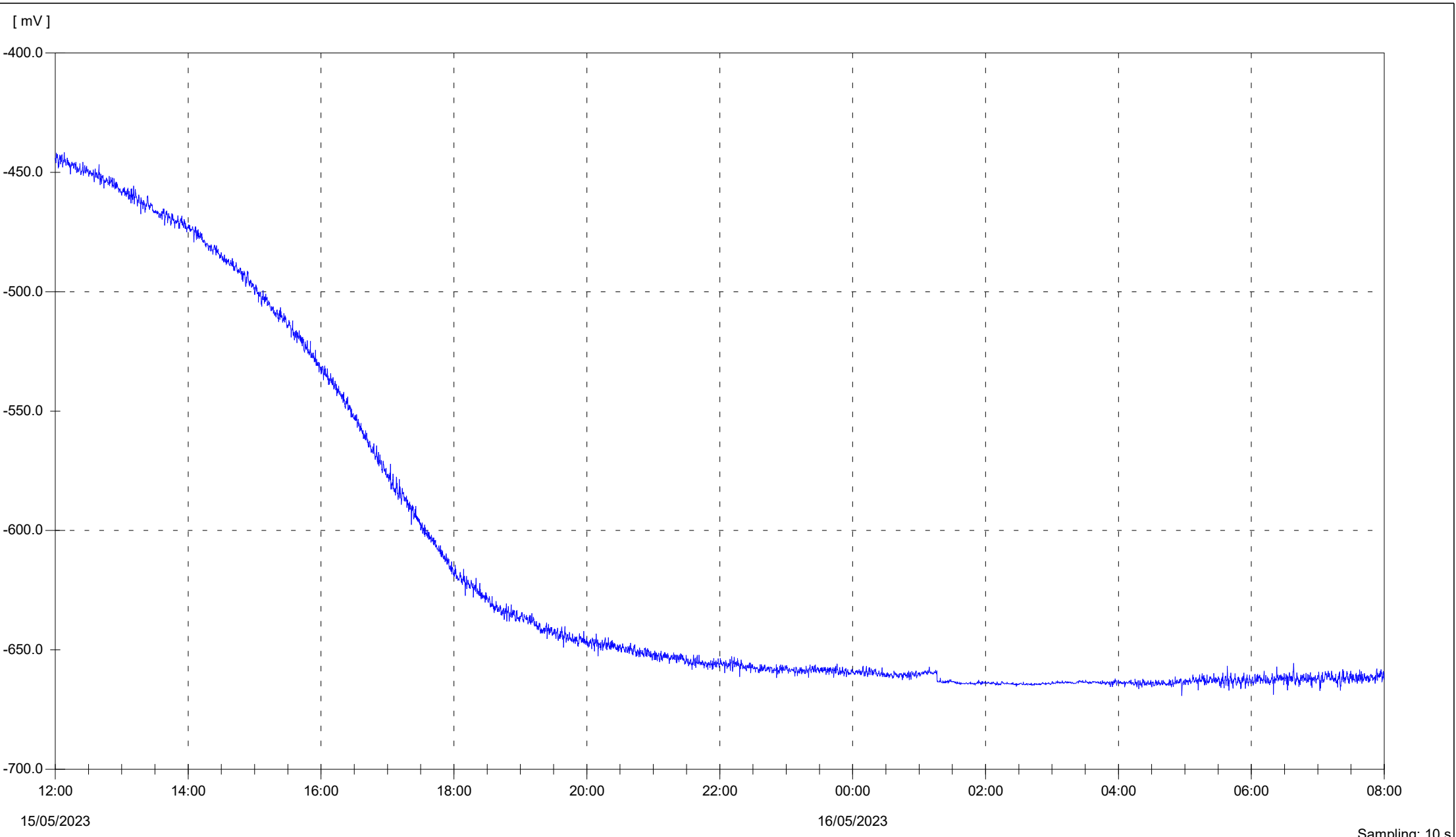
— : Volts Vs Cu/CuSO4

MiniLog2

	Min	Max	Average	Std. dev.
DC 1	-0.471 V	-0.437 V	-0.444 V	0.007 V

Electrolysis Risk Testing
Fitzwilliam and Argyle Street, Parramatta NSW 2150
Logger Serial Number: 3388
Water Service





— : Volts vs Cu/CuSO4

MiniLog2

	Min	Max	Average	Std. dev.
DC 1	-0.669 V	-0.442 V	-0.613 V	0.073 V

Electrolysis Risk Testing
Fitzwilliam and Argyle Street, Parramatta NSW 2150
Logger Serial Number: 2737
Fence Line



Sampling: 10 s

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