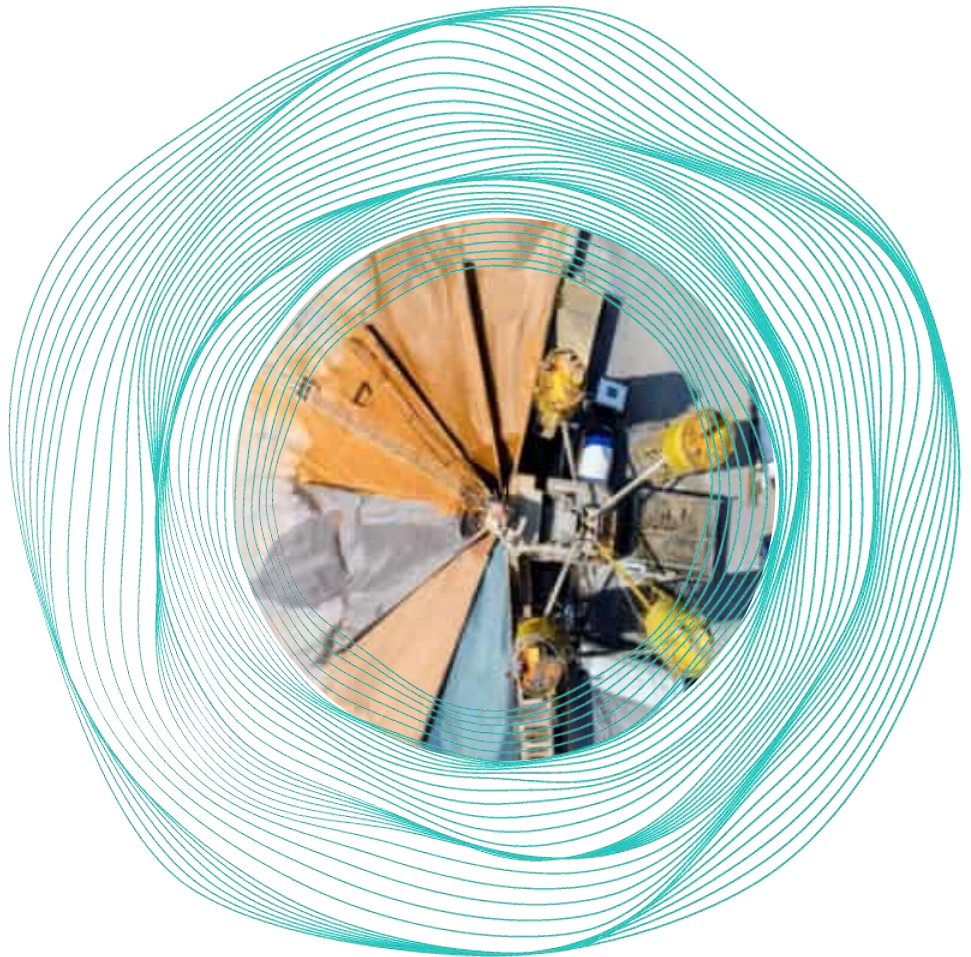


RIO TINTO WINU PTY LTD

Winu Mine Access Road Surface Water Management Plan Update 2024

Winu Copper Gold Project

Document no. Rev 1: REP-HY-027



6 Nov 2024

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PROJECT 311012-01475 - REP-HY-027: Winu Mine Access Road Surface Water Management Plan Update 2024 - Winu Copper Gold Project

Rev	Description	Originator	Reviewer	Worley Approver	Revision Date	Customer Approver	Approval Date
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1%, 5% and 10% AEP Events

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Executive summary

The Winu Copper-Gold Project involves the development of a below-water-table open cut mining operation with a mineral processing plant located adjacent to the mine. Access to the mine site is currently via the existing graded roads; Nyangumarta Highway, Wirrkirr Wirrkirr Road, and Copperhead Road. A new Mine Access Road (Access Road) is proposed, running parallel to the existing access roads.

This Surface Water Management Plan (SWMP) aims to characterise flooding behaviour adjacent to the proposed Access Road and develop conceptual risk management design measures to mitigate potential operational flood risks and impacts.

The project is located in an arid environment, with high-intensity rainfall events typically occurring between December and April. The topography is characterised by sand dunes and endorheic basins, with flood risk dominated by the infiltrative capacity of the underlying geomaterials.

A hydraulic model was developed using TUFLOW to simulate surface water runoff flows. Design rainfall inputs for the 1%, 5%, and 10% Annual Exceedance Probability (AEP) events were prepared using data from the Bureau of Meteorology (2016) and Australian Rainfall and Runoff (Ball et al., 2019). The existing access roads, proposed Access Road and borrow pits for the road construction have been included in the model topography.

Model results identified 11 major waterway crossings with peak flows over 50 m³/s in the 1% AEP event. Seven borrow pits were identified with inundation times exceeding a week in a conservative infiltration scenario. The impact of the Access Road on flooding behaviour was found to be minimal.

Recommendations include:

- Obtaining greater LiDAR coverage upstream of major waterway crossings and in areas which currently rely on STRM topography data.
- Conducting infiltrometer testing at pilot pit locations if ponding times pose an ecological risk.
- Including waterway crossing 11 as a design crossing in WSP's drainage design.

This SWMP provides a comprehensive assessment of potential flooding along the Access Road alignment and offers recommendations to mitigate flood risk and ensure the safe and efficient operation of the Access Road.

Acronyms

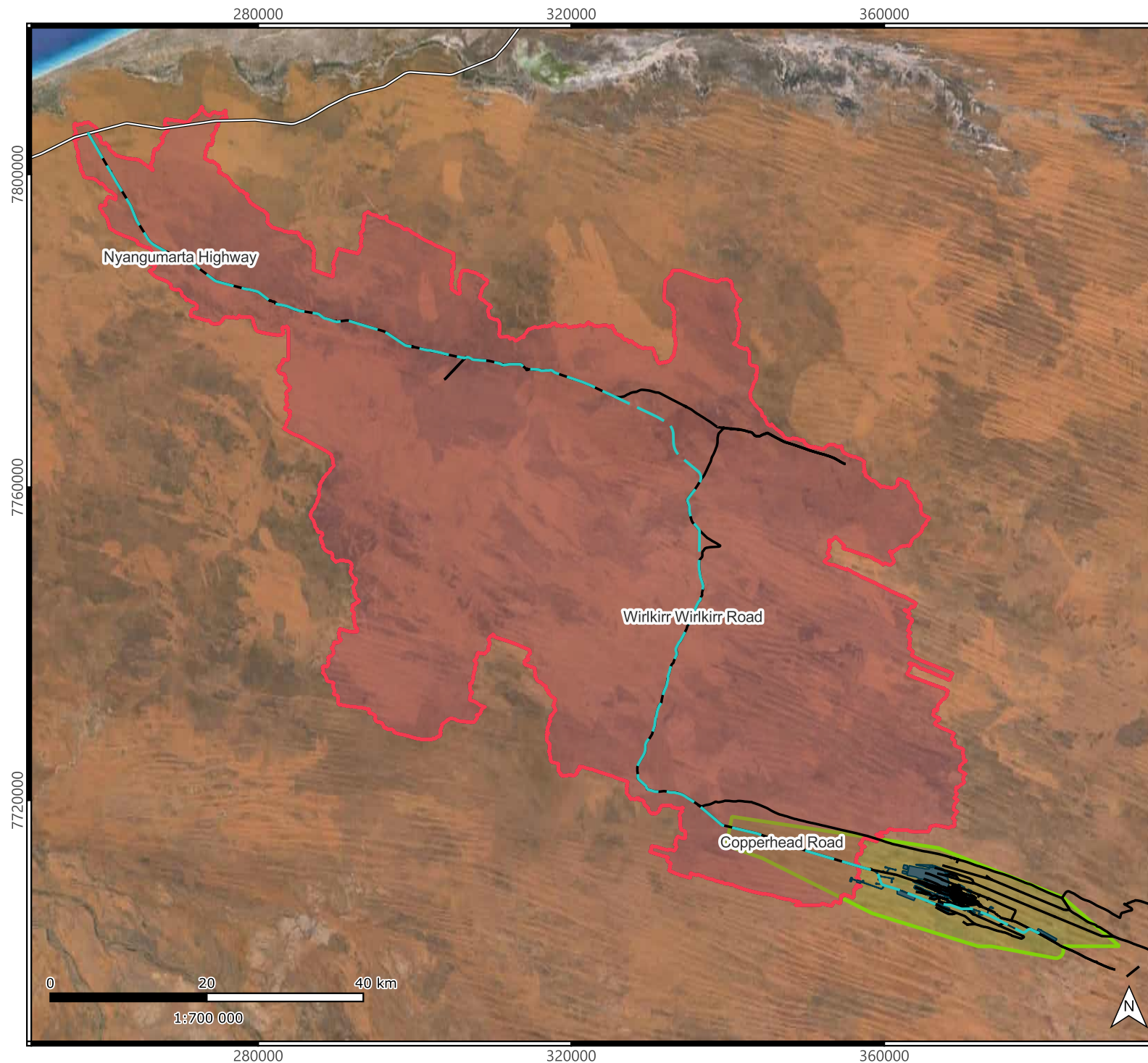
Acronym/Abbreviation	Definition
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARF	Aerial Reduction Factors
ARR	Australian Rainfall and Runoff
BoM	Bureau of Meteorology
CL	Continuing Loss
DEM	Digital Elevation Model
DMIRS	Department of Mines, Industry Regulation and Safety
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
GTSMR	Revised Generalised Tropical Storm Method
HME	Heavy Mobile Equipment
HQ	Water Level Head versus Flow (TUFLOW Boundary Condition)
IFD	Intensity Frequency Duration
IEAust	Institution of Engineers Australia
IL	Initial Loss
ILb	Burst Initial Loss
ILs	Storm Initial Loss
LiDAR	Light Detection and Ranging
LME	Light Mobile Equipment
RoM	Run-of-Mine
RTC Winu	Rio Tinto Company Winu
SGS	Sub-Grid Sampling
SWMP	Surface Water Management Plan
TP	Temporal Pattern
WCGP	Winu Copper-Gold Project
WMO	World Meteorological Organization
WRL	Waste Rock Landform

1. Introduction

The Winu Copper-Gold Project (herein referred to as 'The Project') is located approximately 350 km east of Port Hedland in the arid interior of Western Australia (Figure 1-1).

The Project involves the development of a below-water-table open cut mining operation with a mineral processing plant located adjacent to the mine. Access to the mine site is currently via the existing graded roads; Nyangumarta Highway, Wirlkirr Wirlkirr Road, and Copperhead Road.

RTC Winu have proposed a new Mine Access Road (Access Road) which will run parallel to the current access road and be elevated above the natural surface level. The Access Road will extend 195 km from the Great Northern Highway to the airstrip east of the Mine (Figure 1-1). The purpose of this Surface Water Management Plan (SWMP) is to characterise flooding behaviour adjacent to the proposed Mine Access Road and develop conceptual risk management design measures to mitigate any potential operational flood risks and impacts.



Winu Copper Gold Project Surface Water Management Plan Figure 1-1. Site layout

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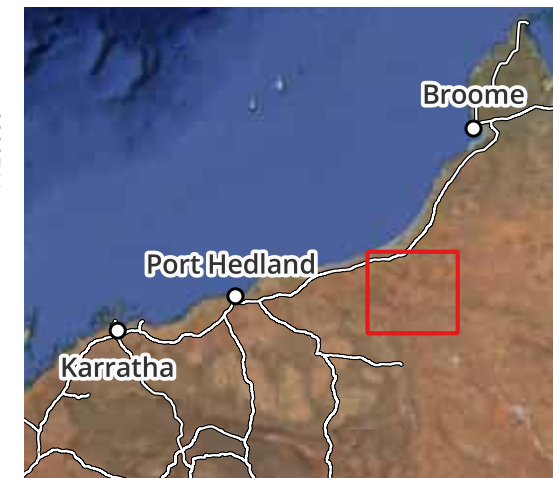
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Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Towns
- State Road Network
- Proposed Mine Access Road
- Current Mine Access Roads
- Access Road Model Extent
- Mine Model Extent
- Mine Site



1.1 Data sources

Table 1-1 lists the sources of information that were used in this study.

Table 1-1. Data sources

Data Type	Filename(s)	Source	Date Supplied
Existing Access Road Corridor Light Distance and Ranging derived Digital Elevation Model (DEM)	1m_DEM_RT_ACCESS MERGE_EPSG28351.tiff	RTC Winu	17/06/2022
Landgate Digital Elevation Model (DEM)	Warrawagine_3056_Isabella_3156_Aug_2012_DEM_Metadata.txt Absolon_3257_Aug_2014_DEM_Metadata.txt Bulamulgardy_3157_Cardoma_3057_Aug_2012_DEM_Metadata.txt Mandora_3058_Radi_3158_Aug_2012_DEM_Metadata.txt	Landgate	17/06/2022
Hydrologically Enforced Shuttle Radar Topography Mission (SRTM-H) Data	e122s22demh.adf	USGS	17/06/2022
Proposed Access Road 3D Design triangles and strings	DESN RDZ4 TRIANGLES.dwg DESIGN RDZ101 TRIANGLES.dwg DESIGN RDZ201 TRIANGLES.dwg DESN RDZ3 TRIANGLES.dwg Road design all.dwg	WSP	13/05/2024
Borrow Pit Layout	Winu_Disturbance_Footprint_BorrowPits_Indicative.shp	RTC Winu	14/05/2024
Proposed Mine layout	Mine_Layout_20240202_ar.shp Mine_Layout_20240202_pl.shp	RTC Winu	02/02/2024
Conceptual Drainage Design	Culverts_floodways_diversion drains_240611.kmz	WSP	11/06/2024

2. Project setting

2.1 Climate

2.1.1 Rainfall

The Site is located within an arid environment within the Great Sandy Desert bioregion of Western Australia. The Site can experience high intensity rainfall events often associated with cyclonic activity, typically between the months of December and April.

The nearest BoM rainfall station Telfer Aero (ID: 13030) is located 100 km south of the Site. This rainfall station has recorded daily rainfall data from January 1974 to the current day. Hence only a short overall period of record is available from which to draw climatic conclusions. Figure 2-1 presents the annual rainfall by water year (period between October to September) and monthly rainfall totals over the total period of record. The average annual rainfall (by water year) over the period of record is 362.4 mm. Considering the most recent period of record since the year 2000, this average has increased to 392.6 mm, suggesting a wetter period in the overall gauge record, however a trend back to drier conditions is evident over the last 5 years.

The plot highlights the high variability in annual rainfall experienced in the region, with some years annual totals made up from one or two months.

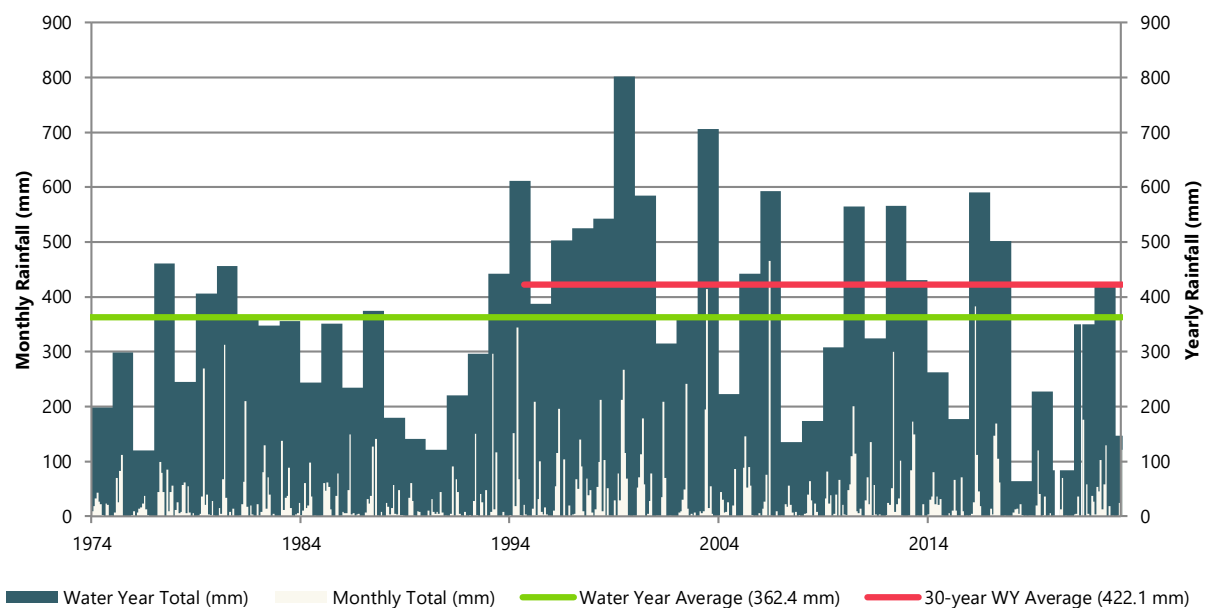


Figure 2-1. Average monthly and annual rainfall (by water year) recorded at Telfer Aero (Bureau of Meteorology identification no. 13030) (BoM, 2021a)

2.1.2 Evaporation

Daily evaporation was recorded at the Telfer Aero weather station between 1974 to 1995. The average annual evaporation over the 20 years of complete record is 4,125 mm. The average daily evaporation rate per month is presented in Figure 2-2. The daily evaporation over averaged over the course of the year is 9 mm/day.

Average evaporation clearly exceeds rainfall throughout the water year and hence the project is situated in a water limited environment.

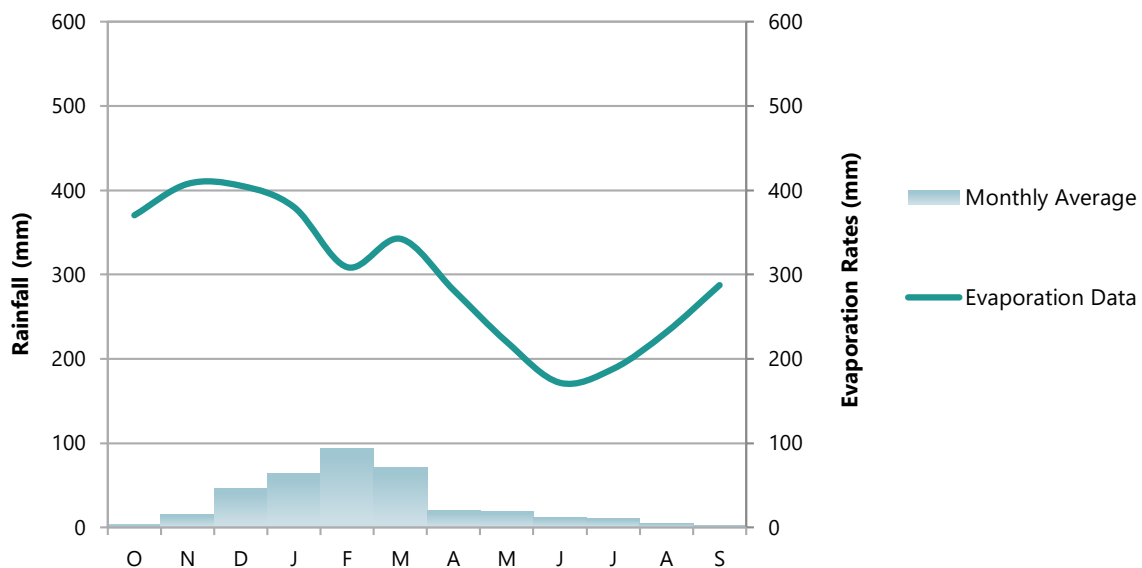


Figure 2-2. Average monthly rainfall and evaporation over the period 1974 to 1995

2.1.3 Topography

A Digital Elevation Model (DEM) was developed for the study area using the provided topographic survey data described in Section 1.1. The DEM presented in Figure 2-3 shows natural surface elevations varying from 15 mAH to 315 mAH.

The topography within the study area is characterised by northwest-southeast orientated longitudinal aeolian sand dunes separated by interdunal corridors and endorheic basins. Flood risk is, accordingly, typically dominated by infiltrative capacity of the underlying geomaterials.

The height of dunes in the Winu mine area typically range from 5 m to 15 m above the adjacent basin floor.

Three different topographic survey datasets were used to develop the regional scale TUFLOW model, specifically:

- **SRTM:** data is a public access global elevation dataset (1 arc-second resolution) generated by radar topography from the NASA space shuttle program (USGS, 2022), with +/- 9 m vertical accuracy. SRTM is coarse resolution data due to the larger distance between sample points. The data is therefore reasonable to assess larger regional features but is unable to capture smaller terrain features. The hydrologically enforced

version of this dataset (SRTM-H) was utilised to preserve flow paths. This dataset was available for the entire study area.

- **LandGate:** a set of four DEM datasets derived from ortho-imagery were utilized for the majority of the model extent. These datasets have 5 m sample grid spacing with +/- 2 m vertical accuracy. The four overlapping datasets presented differences in overlapping elevations. Bulk elevations were adjusted to best match interfaces at flow paths, while considering the priority elevations of the LiDAR dataset. LandGate data is more accurate than SRTM but less accurate than LiDAR. This data was available from the Great Northern Highway to a location close to the Winu mine site (Figure 2-3).
- **LiDAR:** is a locally acquired dataset using light detection and ranging, typically from light aircraft. The LiDAR derived DEM datasets supplied have a rectilinear resolution of 1 m and 0.5 m. The metadata report was not provided for this dataset however vertical accuracies for modern LiDAR-derived DEMs are normally in the order of +/- 0.1 m on open/hardstand areas. The LiDAR dataset provided by RTC Winu for use on this project covered the Mine Access Road corridor and the Winu mine site only.

LiDAR data available for the Access Road corridor presented differences in overlapping elevations which made it difficult to merge with the Landgate dataset. GIS elevation manipulation of the Landgate datasets was first processed, before a buffered interpolation along the Access Road LiDAR extent was carried out to match the interface between the merged Landgate datasets and the LiDAR in the Access Road corridor. This process preserved flow paths and ensured the finer features of the LiDAR in the Access Road corridor were utilised.

The resolution of the terrain data has a significant influence on the accuracy and reliability of the direct rainfall modelling in TUFLOW. Therefore, the results of modelling are expected to be most reliable in the Access Road corridor (LiDAR data), followed by the results within the Landgate data and least reliable in the area with SRTM data. Figure 2-3 Displays the extents of these datasets.

2.2 Hydrology

2.2.1 Catchment analysis

Catchment delineation was performed using a combination of SRTM, Landgate and LiDAR data to determine the areas that contribute surface water flows to the Access Road route.

The delineated catchment areas and streamlines are presented in Figure 2-4. Catchment show the numerous internally draining storage areas located between sand dunes. These storages would need to fill with rainfall-runoff and overtop for the entire catchment areas to contribute flow to the Access Road.

The presence of storage areas and predominately sandy soils within the catchments means not all the catchment areas will contribute flow to the access road during smaller, frequently occurring rainfall events. Conversely, the size of the catchment area contributing flow to the Access Road will increase for larger, less frequent storm events with more rainfall volume.

2.2.2 Streamflow data

There is no publicly available streamflow data for the creek systems within or close to the study area.

2.2.3 Peak flow estimation

2.2.3.1 Flood frequency analysis

Flood frequency analysis of streamflow data is a method recommended by ARR2019 (Ball *et al.*, 2019) for the estimation of peak flows. In the absence of streamflow data, it was not possible to complete flood frequency analysis.

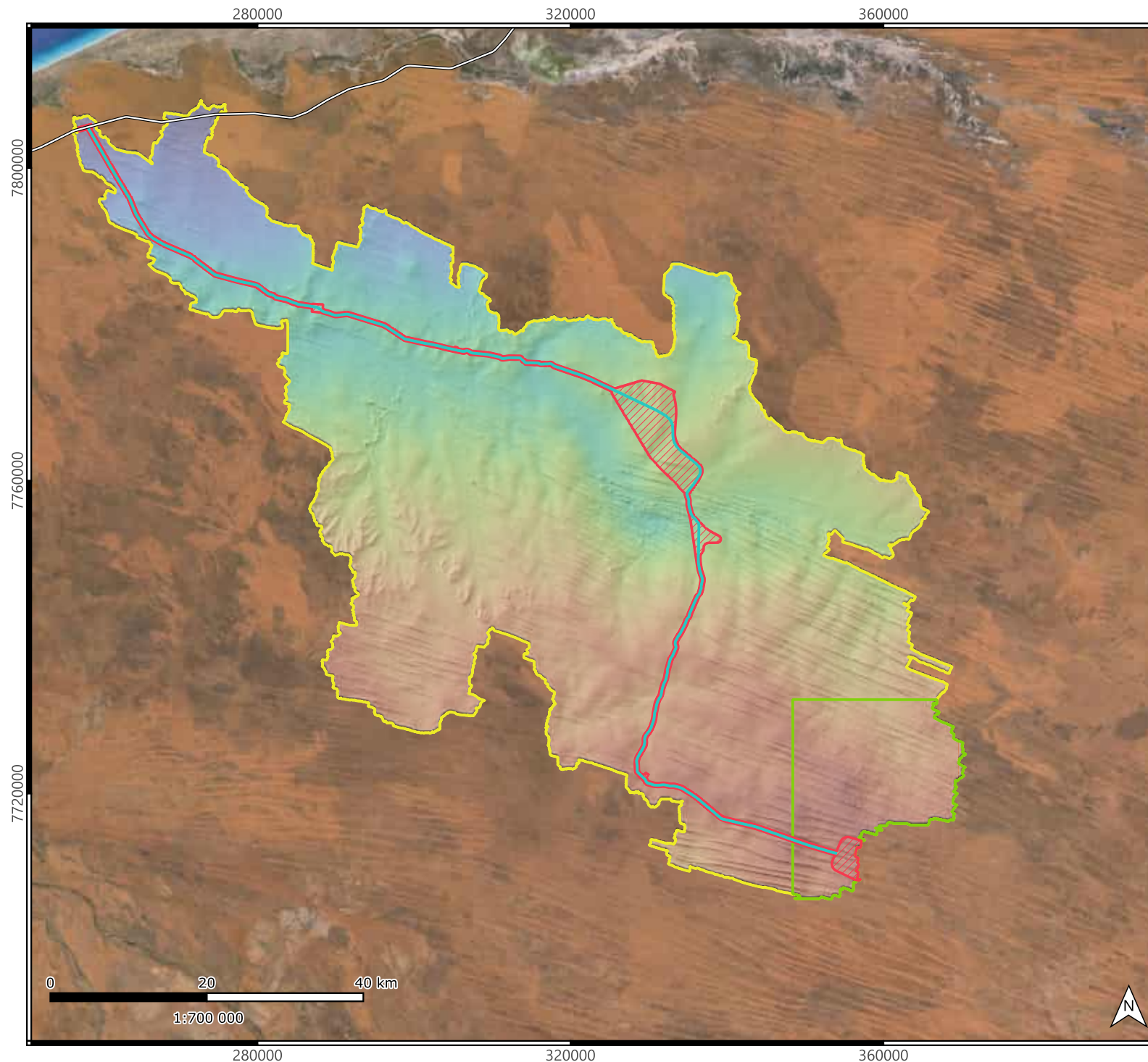
2.2.3.2 Regional methods

The Regional Flood Frequency Estimation Model (RFFE) published by ARR2019 (Ball *et al.*, 2019) was developed to provide an Australia-wide flood estimation method. The RFFE method is not available for the Arid Interior Region of Western Australia where this site is located.

There are no other suitable regional equations available to estimate peak flows in the study area.

2.2.3.3 Design flow estimates

In the absence of streamflow data and regional equations, design flows were estimated using hydrological and hydraulic modelling described in section 4



Winu Copper Gold Project Surface Water Management Plan Figure 2-3. Digital Elevation Model

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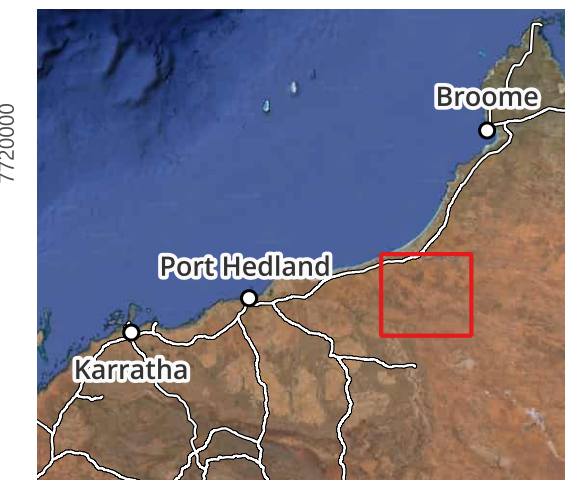
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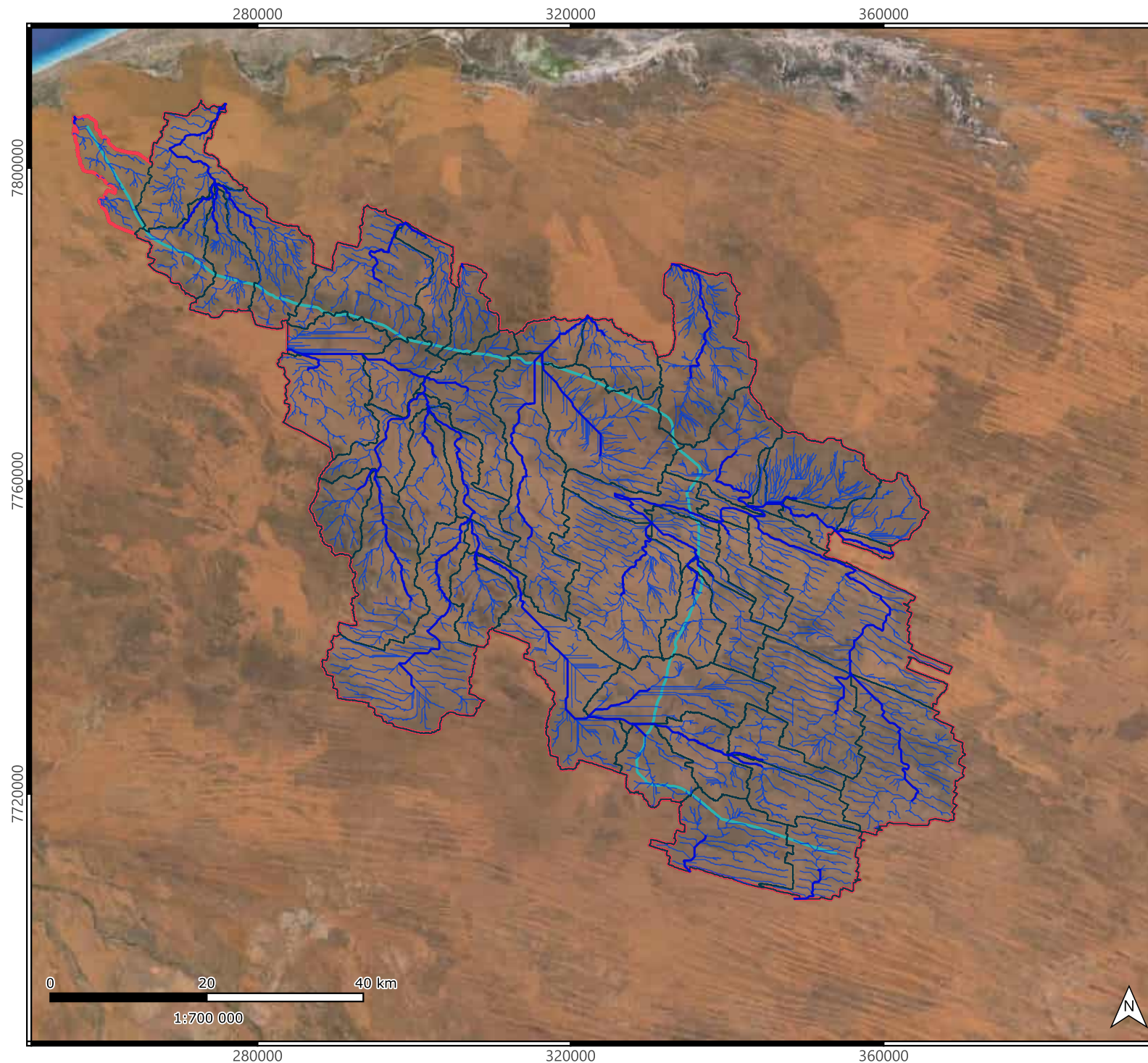
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Damon.Hortle
Date: 03/07/2024



Legend

- State Road Network
- Access Road
- 1m Access Road LiDAR extent
- 5m Landgate DEM Extent
- 30m SRTM extent
- Merged Topography (mAHD)
 - 315
 - 15





Winu Copper Gold Project Surface Water Management Plan Figure 2-4 Catchment Analysis

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Legend

- Access Road
- State Road Network
- Streamlines
- Model Extent
- Catchments



2.3 Existing access track

It is understood that track maintenance and grading over time has resulted in compaction of the existing Access Road surface, lowering of formation level and creation of large mounds of spoil on both sides of the road. This combination of maintenance works results in reduced infiltration capacity due to the high level of compaction of the running surface, as well as no alleviating drainage outlets such as run out drains for the road given grading works have lowered the running surface to an elevation that is lower than the surrounding natural terrain. Site photographs taken along the Access Road following rainfall events (Figure 2-5) show long-term ponding of runoff following rainfall events which limits access and reduces serviceability of the road. This also impacts the emergency egress serviceability of the main egress route (besides aerial evacuation means).

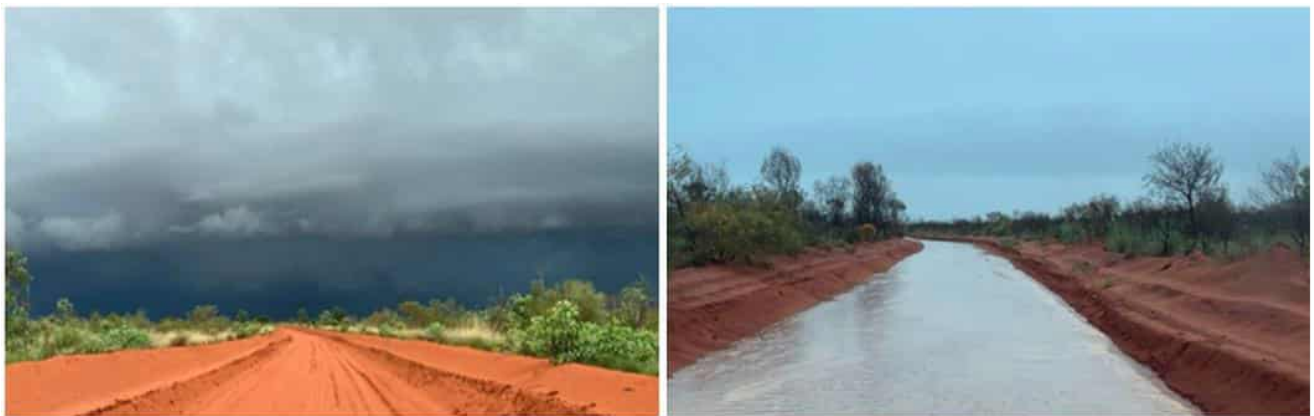


Figure 2-5. Access Road: photographs taken before and after a rainfall event. Long term ponding on the road

3. Basis of design

A basis of design was developed at the direction of the Winu project team to inform the conceptual engineering and design of the Access Road. Table 3-1 presents the basis of design criteria for each surface water infrastructure component. Conceptual design criteria are detailed below.

Table 3-1. Surface water management measures and design criteria

Infrastructure	Design Event	Surface Water Management Measures *
Rock protection	1% AEP	Scour protection
Access Road Waterway crossings	5% AEP	Culvert and/or waterway crossings
Diversions and flood bunds	10% AEP	- Creek diversion channels - Downstream flood bunds

3.1 Access Road waterway crossings

Waterway crossings are required to prevent ponding upstream, water shadows downstream of access roads and maintain flows downstream. Waterway crossings can be in the form of:

- Culverts
- Floodways
- Culverts with floodways

RTC Winu have noted that Light Mobile Equipment (LME) will not be using road often due to main site access being via the aerodrome. RTC Winu stated LME are to be excluded from road use during flood events. Heavy Mobile Equipment (HME) is to follow the threshold of serviceability in inundation flooding events.

The 5% AEP design standard for floodway crossings was adopted for surface water management measures as per PS137427-WSP-PER-CIV-REP-00001 Rev1. Floodways must not exceed the threshold of serviceability in the design AEP event, stipulating a maximum of 0.5 m depth over the crest of the floodway and a maximum velocity of 2 m/s. A typical floodway long section is included in Figure 3-1.

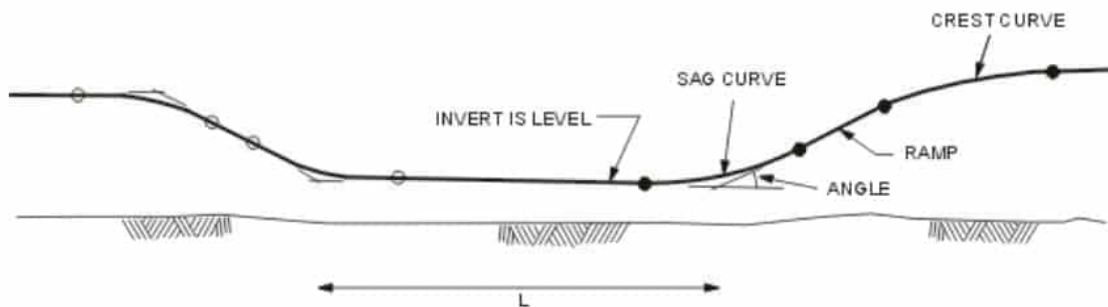


Figure 3-1. Long section of a typical floodway (MRWA, 2006)

3.2 Rock protection

Austrroads (2019) provides guidance on the hydraulic design of waterway structures, which includes methods for the selection and design of rock protection of earth embankments. Rock classes recommended by Austrroads (2019) are presented in Table 3-2 and Table 3-3. The peak velocity maps produced for the study area were used to identify areas potentially requiring rock protection to protect infrastructure from scour/erosion. Table 3-2 suggests rock protection is not required when peak velocities are less than 2 m/s.

Table 3-2. Design of rock slope protection (Austrroads, 2019)

Velocity Range (m/s)	Class of Rock Protection (tonne)	Section Thickness (m)
<2	None	---
2.0-2.6	Facing	0.50
2.6-2.9	Light	0.75
2.9-3.9	¼	1.00
3.9-4.5	½	1.25
4.5-5.1	1.0	1.60
5.1-5.7	2.0	2.00
5.7-6.4	4.0	2.50
>6.4	Special	---

Table 3-3. Standard classes of rock protection (Austrroads, 2019)

Rock Class (tonne)	Rock Size (m)	Rock Mass (kg)	Minimum Percentage of Rock Larger Than
Facing	0.40	100	0
	0.30	35	50
	0.15	2.5	90
Light	0.55	250	0
	0.40	1010	50
	0.20	10	90
¼	0.75	500	0
	0.55	250	50
	0.30	35	90
½	0.90	1000	0
	0.70	450	50
	0.40	100	90
1.0	1.15	2000	0
	0.90	1000	50
	0.55	250	90
2.0	1.45	4000	0
	1.15	2000	50
	0.75	500	90
4.0	1.80	8000	0
	1.45	4000	50
	0.90	1000	90

3.3 Diversions and flood bunds

Operational diversion channels should be constructed as trapezoidal channels cut into in-situ material. No guidance on freeboard requirements are stipulated in the Civil and structural design criteria (RTC Winu, 2021). As such a nominal 1 m freeboard has been selected for this study. Spoil from the diversion cut should be placed on the downstream side of the channel to form a flood bund where required to maintain a nominal 1 m of freeboard to the design AEP event, as shown in Figure 3-2. The nominal 1 m freeboard can be provided either in the channel, in the case that the diversion is in deep cut, or by a flood bund adjacent to the channel.

Rock protection should be included in the flood bund design if/as required to prevent scour.

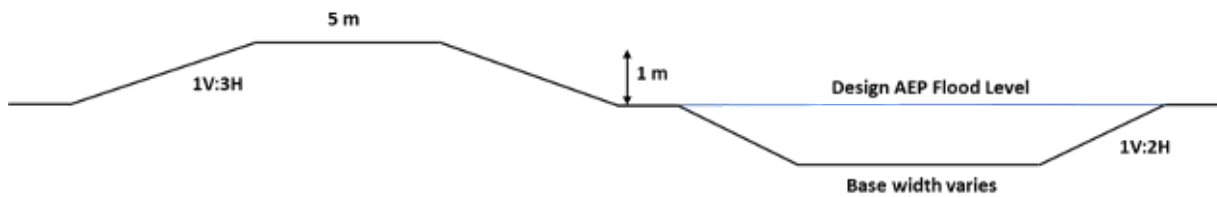


Figure 3-2. Diversion channel and flood bund

4. Hydraulic modelling

4.1 Modelling approach

4.1.1 Design events

A hydraulic model of the study area was developed using the modelling program TUFLOW (version 2023-03-AC-iSP – HPC GPU). A direct rainfall modelling approach was undertaken, where design rainfall was applied directly to the model topography to simulate surface water runoff flows.

Given the typically internally draining nature of much of the study area landforms, an infiltration loss model approach rather than a rainfall excess approach was applied to best represent the effects of ponding and infiltration during and following the rainfall events. The method applies constant infiltration losses as the rainfall falls over the catchment and as it is routed through the catchment and storage areas.

As agreed with RTC Winu, the 1%, 5%, and 10% AEP events were assessed for derivation of flood risk and operational flood risk management. An 'ensemble' approach was used to determine the critical storm duration at the locations of interest, as described in ARR 2019 (Ball *et al.*, 2019) and conceptualised in Figure 4-1.

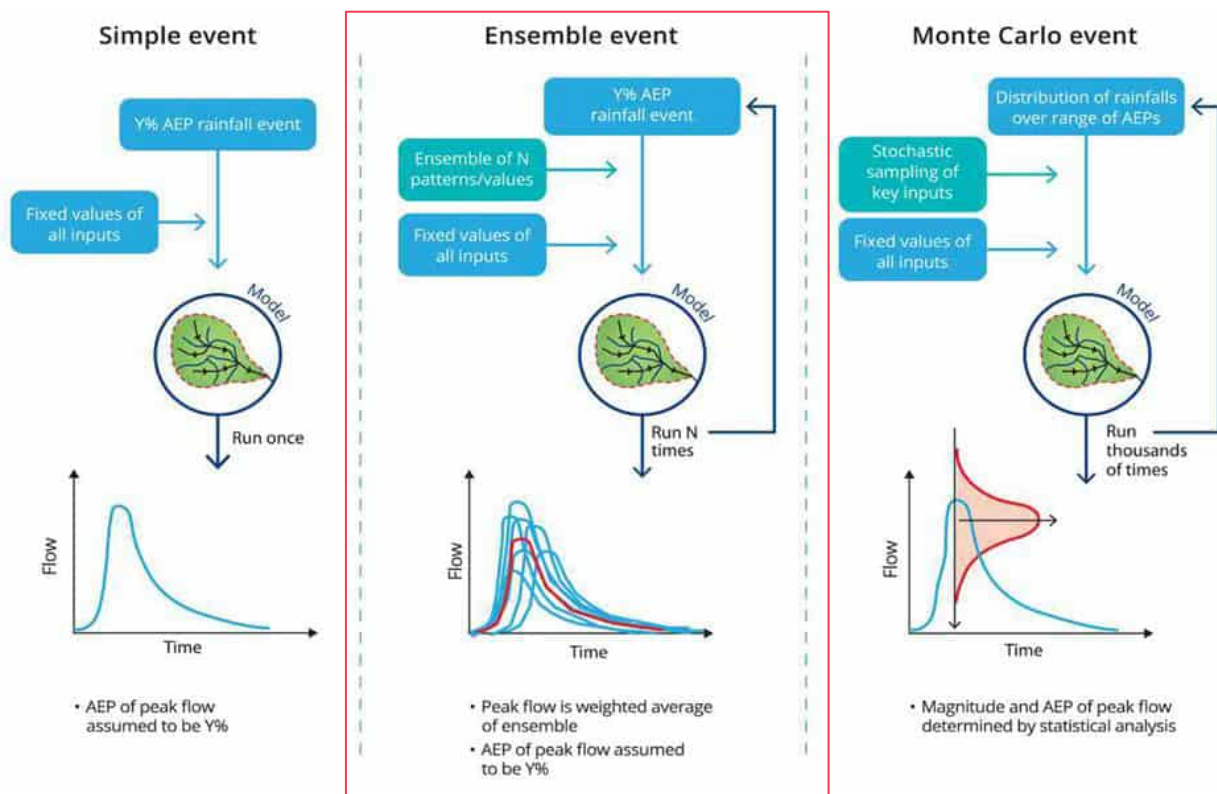


Figure 4-1. Ensemble simulation approach (Ball *et al.*, 2019)

4.1.1.1 Model setup

The TUFLOW model setup for the 1%, 5% and 10% AEP events is described in the following sections and summarised in Table 4-1. The setup for the TUFLOW model shown in Figure 4-2.

Table 4-1. TUFLOW model setup parameters

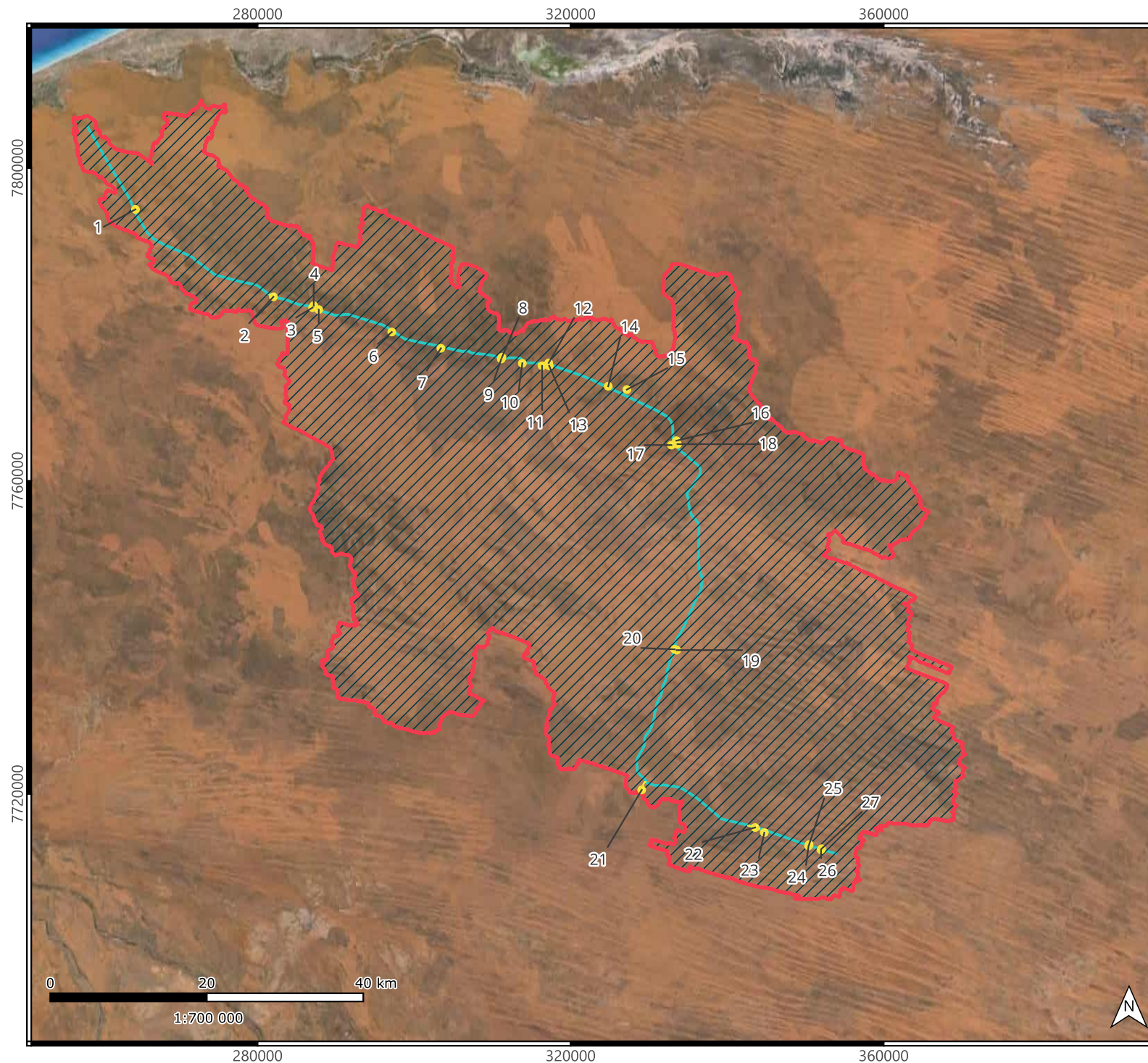
Parameter	Adopted										
Grid Size	Regional: 32 m, Sub-Grid Sampling (SGS) distance of 5 m Adjacent to Access Road Area: 8 m, SGS of 4 m										
Manning's 'n' roughness	Depth varying Manning's 'n': <table border="1"> <thead> <tr> <th>Layer</th><th>Depth (m)</th><th>n</th></tr> </thead> <tbody> <tr> <td>1</td><td>< 0.1</td><td>0.10</td></tr> <tr> <td>2</td><td>> 0.2</td><td>0.04</td></tr> </tbody> </table>		Layer	Depth (m)	n	1	< 0.1	0.10	2	> 0.2	0.04
Layer	Depth (m)	n									
1	< 0.1	0.10									
2	> 0.2	0.04									
Rainfall	BoM Intensity, Frequency, and Duration (IFD) point rainfall depths (BoM, 2016)										
Temporal Pattern Region	Rangelands (Ball et al., 2019)										
Rainfall Infiltration Losses	Initial Loss (mm)	80									
	Continuing Loss (mm/hr)	10									
Outflow Boundary Conditions	Normal depth (HQ in TUFLOW)										

4.1.1.2 Terrain modifications

The following terrain modifications were employed in the model to ensure realistic flooding behaviour. The data sources used are found in Table 1-1.

- The crest of the proposed access road (designed by WSP) was extracted from the provided design strings and enforced in the model as a breakline to ensure the critical design surface was accurately represented in the hydraulic model and resultant flood impacts assessed correctly.
- The borrow pit layout was enforced into the topography at a depth of 4 m below the mean LiDAR surface elevation of each polygon (at the direction of RTC Winu).

The Landgate DEM sources were modified to approximately match the Access Road LiDAR elevation. The interfaces of these datasets were then buffered by 100 m and the elevation differences were interpolated to ensure hydrologic continuity between datasets as described in section 2.1.3.



Winu Copper Gold Project Surface Water Management Plan Figure 4-2.TUFLOW Model Setup

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311012-01475

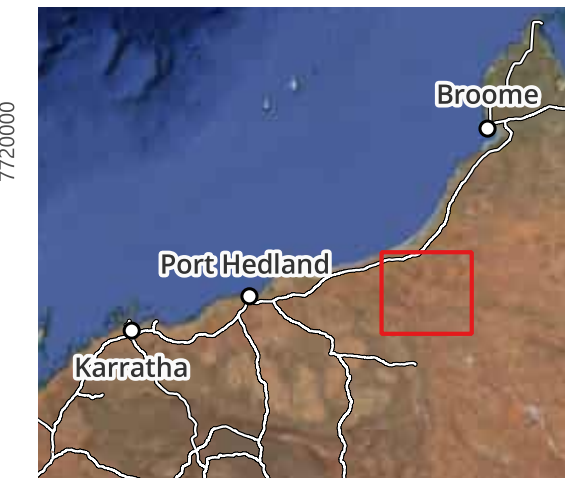
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Access Road
- State Road Network
- Model Extent
- ▨ Direct Rainfall
- Borrow Pits



4.1.2 Cell size

TUFLOW's Sub-Grid Sampling functionality was utilised to which allowed for the finer topographic features of the Landgate and LiDAR DEM data sources to be used to better define inter-cell hydrologic routing when adopting the larger base grid cell sizes.

The ensemble simulations were run using a 32 m base grid cell size with a Sub-Grid Sampling (SGS) distance of 5 m. This was sufficient to represent the main waterways and floodplains for the purpose of determining critical storm durations and temporal patterns whilst conveying the runoff to the Access Road. Quadtree functionality was used within the TUFLOW model to a 25 m wide corridor encapsulating the existing and proposed Access Roads. This resulted in an 8 m grid cell size with a Sub-Grid Sampling (SGS) distance of 4 m to simulate the flow patterns adjacent to the Access Road with a higher level of detail. Due to the extremely large model area (4,907 sq.km), to model resolutions any finer than this resulted in excessive RAM requirements during model initialisation (> 220 Gb) and resultant impacts on simulation runtimes.

4.1.3 Roughness

Manning's 'n' roughness was adopted based on analysis of aerial imagery and site observations and consideration of surface geomaterials. Given the sparse vegetative clusters when considering the model resolution, the adopted Manning's 'n' roughness value was depth varied, specified as a value of 0.10 for depths under 0.1 m and 0.04 for depths above 0.1 m.

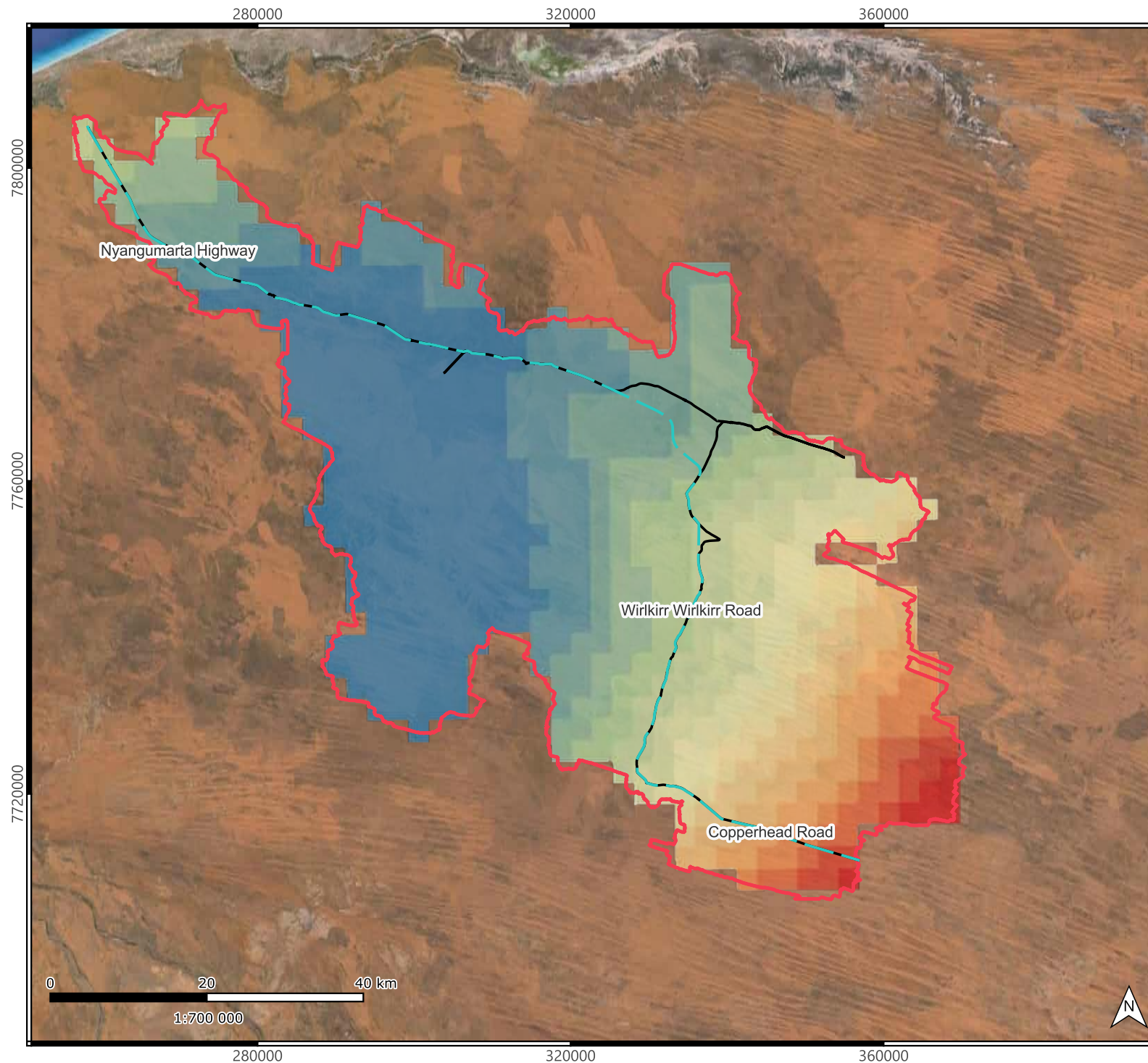
4.1.4 Boundary conditions

A 'HQ' (water level vs. flow) boundary condition was set at the model boundary. This approach allows the model to calculate outflows based on the water level, channel geometry, roughness, and a specified water surface elevation slope at the outlet locations. A representative channel slope was specified, assuming a normal depth at the outlets. The locations of these outflow boundary conditions were placed sufficiently downstream of the Access Road to eliminate any potential boundary condition errors affecting the areas of interest.

4.1.5 Rainfall

Rainfall inputs for the 1%, 5% and 10% AEP events were prepared using IFD data obtained from BoM (2016) and additional parameters from the ARR Data Hub (Babister *et al.*, 2016). No ARF was applied for local rainfall around the road area as the endorheic basin catchment areas are generally less than 1 km² - 5 km².

The rainfall depths were distributed temporally using the Rangelands temporal pattern dataset obtained from the ARR Data Hub (Babister *et al.*, 2016). Inspection of the design IFD grids overlaid on the region revealed that there is little spatial variability in design rainfall depths over the catchments (when considered in the context of other hydrologic uncertainties in the region) and therefore, spatial distribution of rainfall was not applied with design rainfall obtained for the model area centroid (224 mm for the critical 9-hour 1% AEP event). The ensemble simulations were run for storm durations between 1 hour and 72 hours to determine the critical durations. The critical 9-hour IFD rainfall depth for the 1% AEP event is shown in Figure 4-3, which displays rainfall depths ranging from 210 - 225 mm along the Access Road.



Winu Copper Gold Project Surface Water Management Plan Figure 4-3. 1% AEP - 9-hour Rainfall

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311012-01475

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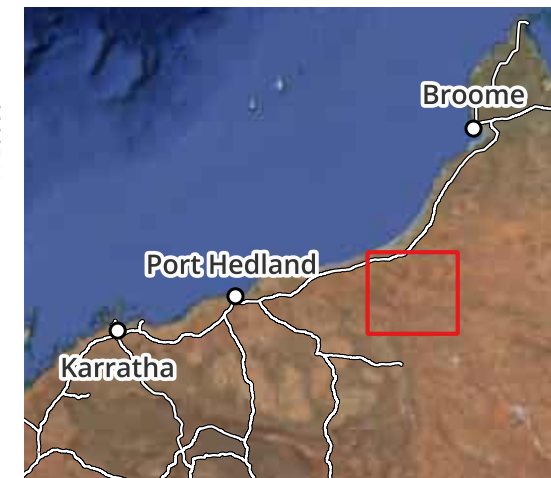
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Project CRS: GDA94 / MGA zone 51
Exported by User: Damon.Hortle
Date: 03/07/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Rainfall Depth (mm)



4.1.5.1 Design rainfall data

The BoM 2016 IFD data for the study area (Latitude: -20.3045, Longitude: 121.2885) is presented in Table 4-2.

Table 4-2. Intensity, frequency, and duration data for the study area (BoM, 2016)

Annual Exceedance Probability (AEP)							
Duration (Hours)	63.2%	50%	20%	10%	5%	2%	1%
1	30.0	34.6	49.0	58.7	68.2	80.7	90.2
1.5	34.1	39.5	56.4	67.9	79.2	94.2	106
2	37.1	43.1	62.1	75.1	88.0	105	119
3	41.4	48.5	71.0	86.6	102	123	140
4.5	46.1	54.4	81.2	100	119	146	167
6	49.7	59.0	89.3	111	133	164	189
9	55.2	66.0	102	128	155	193	224
12	59.5	71.4	112	142	173	216	251
18	65.7	79.5	126	161	198	249	289
24	70.4	85.5	137	175	216	271	315
30	74.1	90.1	145	186	229	286	332
36	77.1	93.8	151	194	239	298	344
48	81.7	99.6	160	205	253	313	359
72	88.1	107	172	219	268	327	371

4.1.6 Pre-burst data

Median pre-burst rainfall depths were extracted from ARR Data hub (Babister *et al.*, 2016). Pre-burst rainfall was removed from the IL_S prior to simulation in the model to represent the Burst Initial Loss (IL_B). Pre-burst rainfall depths are dependent on storm location, duration, and intensity, as tabulated in Table 4-4.

Table 4-3. Storm pre-burst depths

Storm Duration (hours)	Pre-burst Depth (mm)		
	10% AEP	5% AEP	1% AEP
1	1.7	2	7.1
1.5	1.9	2.6	11.4
2	1.9	2.6	16.9
3	8.7	12.1	43.8
4.5	16.8	23.2	44.3
6	24.9	34.4	44.8
9	18.3	25.3	38.5
12	11.8	16.2	32.3

18	7.8	10.7	22.9
24	4.8	6.7	14.6
30	2.7	3.8	9.8
36	0.6	0.8	5.1
48	0	0	2.1
72	0	0	0

4.1.7 Empirical loss parameters

Empirical rainfall loss parameters were selected based on the losses estimated from the ARR Data hub (Babister et al., 2016), provided in Table 4-4. Consideration was given to infiltrometer tests undertaken by Golder (2020a) and the associated derived empirical loss estimates. However, the Golder (2020a) losses are significantly higher than the losses recommended by the ARR Data hub (Babister et al., 2016) and standard infiltrometer testing is not applicable to design event modelling of flood risk. Without any other available supporting data, the ARR Data hub (Babister et al., 2016) values losses were adopted for the study [80 mm Storm Initial Loss (IL_S) and 10 mm/hr Continuing Loss (CL)], as they represent a referable source for loss estimation in a data scarce assessment area and also represents a potentially conservative approach for estimate of rainfall losses.

Table 4-4. Loss parameters and data sources

Data Source	Storm Initial Loss (mm)	Continuing Loss (mm/hr)
ARR Data hub (Babister et al., 2016)	80	10
Golder (2020a)	10% AEP: 98 5% AEP: 78 2% AEP: 40 1% AEP: 40	AB21: 39 AB22: 28 AB39: 34 AB40: 31
Golder (2020b)	80	10
Adopted Loss Parameters	80	10

4.1.7.1 Loss model modifications

The infiltration parameters were modified for selected areas of the model extent. Impervious factors were applied to the following areas to reduce the adopted loss parameters presented in Table 4-4. The infiltration in these areas have been reduced to represent the effects of compaction of the Access Road running surface, a combination of the assumed geological characteristics at the base of the borrow pits and impacts of working machinery compaction in these areas. It is noted that the current understanding of likely borrow pit infiltrative capacity is poor, and as such the adopted value represents a possibly conservative value. Depending on construction approaches adopted by the contractor, ripping of the borrow pit base at completion of construction works may improve infiltrative capacity and reduce ponding times.

- Existing and designed Access Road corridor: 90% impervious (8 mm IL_S , 1 mm/hr CL)
- Borrow pits: 75% impervious (20 mm IL_S , 2.5 mm/hr CL)

5. Model results

5.1 Ensemble results

The 1%, 5%, and 10% AEP peak flood elevations were derived by extracting the upper median peak flood elevation for each design storm duration (from the ensemble of 10 temporal patterns), before calculating the maximum of these median results from all storm durations for each AEP event to determine the critical design flood surface. This approach to determine design flood levels is consistent with that recommended by ARR 2019 (Ball *et al.*, 2019). The resulting critical durations and temporal patterns for the site are presented in Table 5-1.

Table 5-1. Ensemble simulation results

Rainfall Event (AEP)	Critical Duration (Hours)	Representative Upper Median Ensemble Temporal Pattern	Point Rainfall Depth (mm)
1%	9	2	224
5%	12	7	173
10%	12	7	142

5.2 Duration of inundation

The time-series flood depth data for 25 representative reporting locations adjacent to the Access Road have been analysed and to estimate the potential duration of surface water ponding. This calculation assumes 10 mm/hr infiltration and 9 mm/day evaporation. The evaporation rate is based on the mean daily evaporation rate recorded at Telfer Aero detailed in Section 2.1.2. The infiltration rate was based on the continuing loss flood parameter described in section 4.1.7. Furthermore, this value aligns with the static water infiltration rates for flood plains listed in RTIO-PDE-0053914 - Pilbara Surface Water Management Strategy (RTIO, 2011). The time-series flood depth data for the 27 borrow pits within the model extent were also analysed to estimate the duration of inundation with two estimated infiltration rates;

- 10 mm/hr: The continuing loss value adopted for this study as described in section 4.1.7. This value represents an untouched floodplain or could be used for indicative estimates if the basin floor is ripped of the upon completion of construction activities to improve infiltration capacity
- 2.5 mm/hr: A conservative infiltration rate based on a nominally estimated 75% imperviousness of the soil in the basin of the borrow pits. This value assumes the basin floor is left compacted from construction activities/machinery. An infiltration rate of 2.5 mm/hr is in alignment with the impervious value (75% impervious reduction of 10 mm/hr) adopted for the base of the borrow pits in the TUFLOW model setup, for more information see section 4.1.7.1.

5.3 Results

The 1% AEP flood modelling results were initially used to identify the main waterway crossing locations along the Access Road corridor route. These waterway crossing locations are shown in Figure 5-1.

The flood modelling results for the 10%, 5%, and 1% AEP events were then interrogated to extract the following information over the crest of the road at each of waterway crossings and presented in Table 5-2.

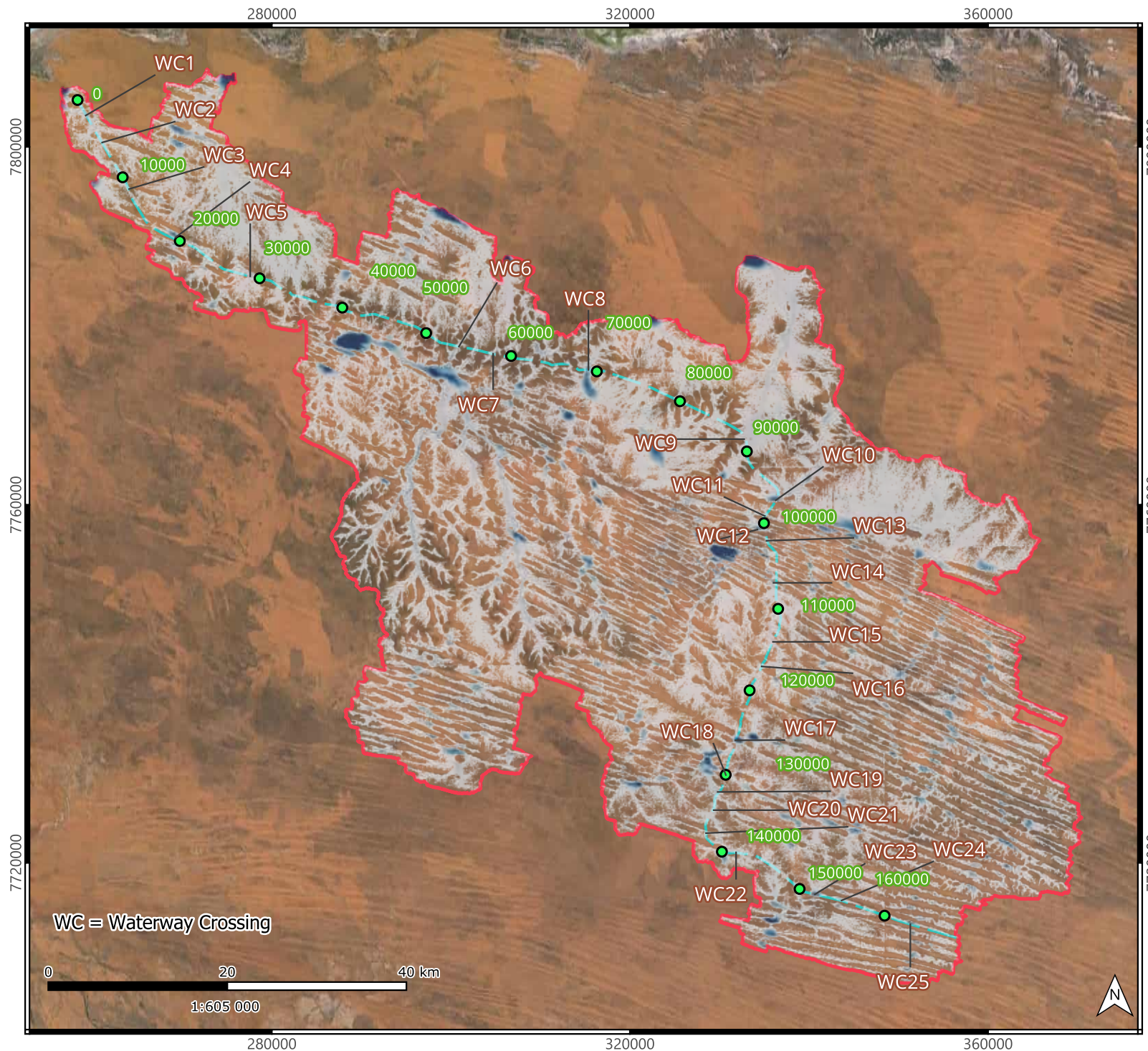
- maximum flood depth (over road crown level),
- duration of inundation (based on 10 mm/hr infiltration and 9 mm/day evaporation),
- peak flow, and
- peak velocity.

Waterway crossings 3, 4, 6, 7, 8, 10, 11, 18, 21, 22 and 24 have been identified as major crossings with peak flows over 50 m³/s in the 1% AEP event.

In addition, the following sets of data were extracted for each of the proposed borrow pit locations (Figure 5-2) and are presented in Table 5-3.

- maximum flood depth, and
- duration of inundation (based on the variable infiltration parameters described in section 5.2 and 9 mm/day evaporation)

Flood maps for the pre-development and post-development scenarios, presenting the maximum depth and velocity for the 10%, 5%, and 1% AEP events are presented in Appendix A. The depth differences between the pre-development and post-development scenarios are included to display the Access Road impacts on stream flow depth.



Winu Copper Gold Project Surface Water Management Plan Figure 5-1. Waterway Crossings

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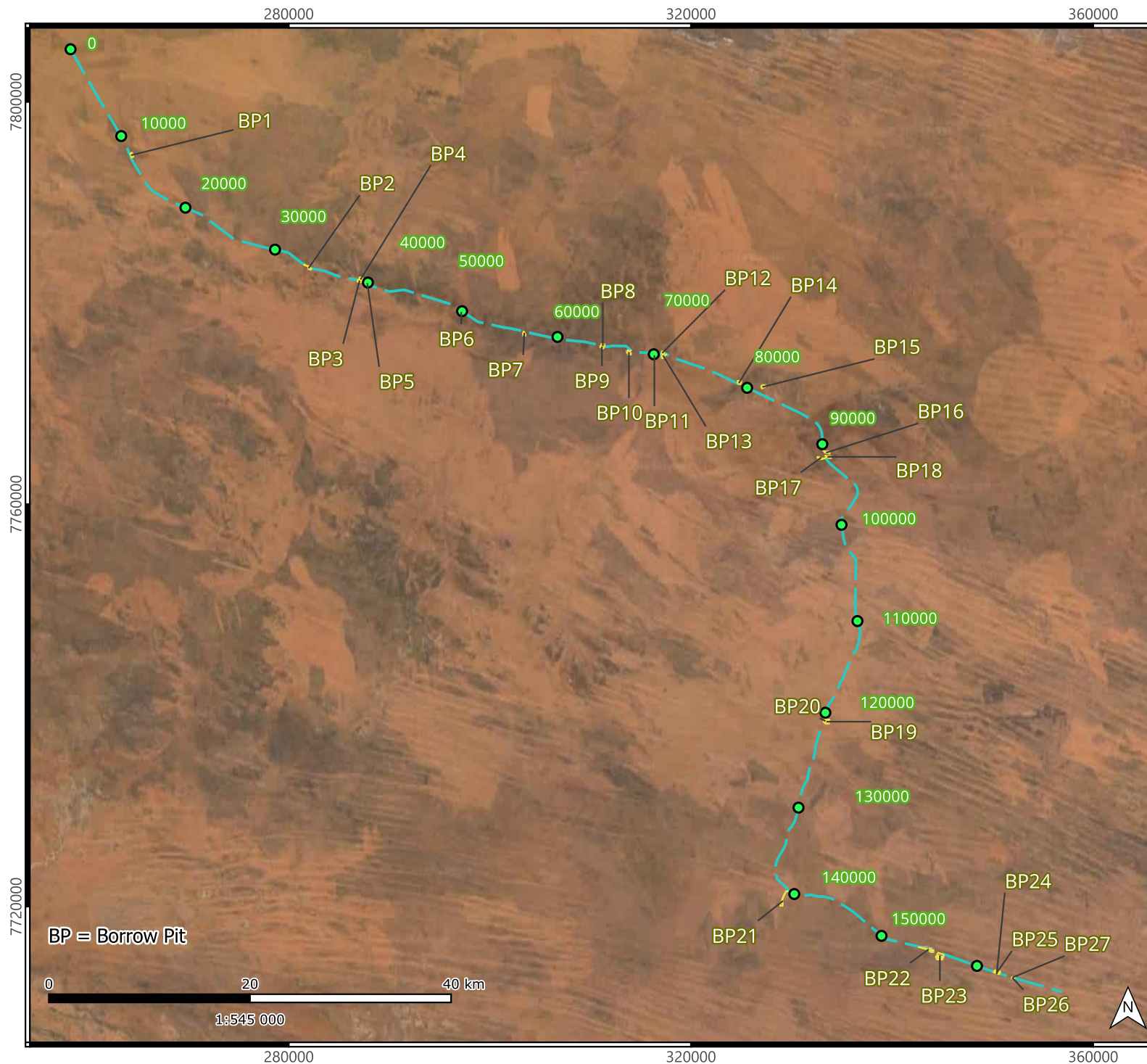
Notes:
Project CRS: GDA94 / MGA zone 51
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Date: 09/07/2024



Legend

- Chainage (m)
 - Access Road
 - Model Extent
- 1% AEP Flood Depth (m)
- | | |
|--|-------------|
| | <= 0.05 |
| | 0.05 - 0.50 |
| | 0.50 - 1.00 |
| | 1.00 - 1.50 |
| | 1.50 - 2.00 |
| | 2.00 - 2.50 |
| | 2.50 - 3.00 |
| | 3.00 - 3.50 |
| | > 3.50 |





Winu Copper Gold Project Surface Water Management Plan Figure 5-2. Borrow Pit Locations

Project No.
311012-01475

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Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
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Date:28/06/2024



Legend

- Chainage (m)
- Access Road
- Borrow Pits



Table 5-2. Access Road waterway crossing locations, maximum flood depths (m), duration of inundation (days), peak flows (m³/s), and peak velocity (m/s)

Waterway Crossing	Chainage (m)	Easting	Northing	Elevation (mAHD)	Max Depth (m)			Duration of Inundation (days)			Peak Flow (m ³ /s)			Peak Velocity (m/s)		
					10%	5%	1%	10%	5%	1%	10%	5%	1%	10%	5%	1%
1	1,960	259209.9	7803500.2	30.7	0.8	1.2	1.7	3.2	4.8	6.8	1.8	6.3	17.7	0.1	0.1	0.1
2	5,490	261054.4	7800488.8	43.8	0.3	0.4	0.7	1.2	1.6	2.8	2.8	6.3	13.5	0.2	0.2	0.3
3	11,490	264061.0	7795291.0	74.0	0.2	0.2	0.3	0.8	0.7	1.2	11.7	31.2	88.6	0.4	0.4	0.5
4	19,400	269243.7	7789879.0	79.0	0.2	0.6	1.8	0.8	2.4	7.2	8.1	18.8	65.7	0.2	0.2	0.4
5	28,930	277590.9	7785536.5	99.8	0.6	0.9	1.1	2.4	3.6	4.4	5.6	13.2	31.9	0.4	0.5	0.8
6	54,040	300908.3	7777691.8	123.2	0.8	1.0	1.2	3.2	4.0	4.8	11.6	42.0	125.2	0.3	0.5	0.7
7	57,970	304746.0	7776861.8	132.2	0.8	1.1	1.4	3.2	4.4	5.6	9.9	37.5	105.8	0.1	0.2	0.4
8	69,040	315369.7	7775077.0	114.3	0.9	1.1	2.3	3.6	4.4	9.2	6.4	19.1	77.2	0.3	0.5	0.6
9	88,550	332773.6	7767338.8	167.8	0.3	0.3	0.3	1.2	1.2	1.2	1.4	2.8	7.7	0.1	0.6	1.0
10	96,950	336299.6	7760509.7	160.8	0.1	0.3	1.8	0.4	1.2	7.2	5.1	23.5	78.7	0.4	0.7	1.3
11	99,120	335075.4	7758747.3	155.1	0.4	0.6	0.8	1.6	2.4	3.2	14.7	57.2	227.1	0.6	1.2	1.8
12	100,740	334254.3	7757232.5	147.9	0.2	0.2	1.0	0.8	0.8	4.0	2.5	10.3	37.2	0.0	0.1	0.1
13	101,990	335262.1	7755983.2	143.6	0.3	0.4	0.5	1.2	1.6	2.0	1.5	3.6	8.2	0.4	0.5	0.6
14	107,070	336050.6	7751283.0	155.0	0.1	0.2	0.2	0.4	0.8	0.8	1.9	4.3	10.5	0.2	0.2	0.3

Waterway Crossing	Chainage (m)	Easting	Northing	Elevation (mAHD)	Max Depth (m)			Duration of Inundation (days)			Peak Flow (m ³ /s)			Peak Velocity (m/s)		
					10%	5%	1%	10%	5%	1%	10%	5%	1%	10%	5%	1%
15	113,930	335988.7	7744686.1	199.4	0.5	0.7	1.0	2.0	2.8	4.0	1.7	2.4	3.9	0.1	0.1	0.1
16	116,980	334726.6	7741938.1	218.5	0.2	0.4	0.6	0.8	1.6	2.4	5.7	16.2	45.2	0.2	0.2	0.2
17	125,960	331773.6	7733681.0	233.0	0.1	0.2	1.8	0.4	0.8	7.2	0.9	1.9	4.8	0.4	0.4	0.4
18	130,020	330724.2	7729806.3	233.4	0.3	0.4	0.7	1.2	1.6	2.8	16.3	52.7	144.8	0.1	0.2	0.3
19	132,180	329808.8	7727912.3	236.5	0.2	0.3	0.7	0.8	1.2	2.8	3.0	6.9	16.5	0.1	0.1	0.1
20	134,260	329363.5	7725875.9	244.5	0.1	0.2	0.3	0.4	0.8	1.2	0.8	1.4	3.3	0.1	0.1	0.1
21	137,070	328507.4	7723309.3	258.2	0.3	0.4	0.5	1.2	1.6	2.0	5.2	25.0	79.9	0.1	0.1	0.2
22	141,610	331864.9	7721159.3	260.6	0.1	0.1	0.2	0.4	0.4	0.8	5.7	9.3	53.6	0.2	0.2	0.2
23	151,850	340676.3	7716474.2	257.7	0.5	1.3	2.6	2.0	5.2	10.4	1.1	1.5	2.2	0.1	0.1	0.1
24	154,910	343655.4	7715784.8	265.1	0.2	0.2	0.2	0.8	0.8	0.8	5.7	20.9	80.4	0.3	0.4	0.6
25	163,030	351330.7	7713140.7	262.7	0.6	1.3	2.6	2.4	5.2	10.4	0.9	2.5	3.8	0.1	0.2	0.4

Table 5-3. Access Road borrow pit chainages, locations, maximum flood depths (m), duration of inundation (days)

Borrow Pit	Chainage (m)	Centroid Coordinates		Elevation (mAHD)	Max Depth (m)			Duration of Inundation (10 mm/hr) (days)			Duration of Inundation* (2.5 mm/hr) (days)		
		Easting	Northing		10%	5%	1%	10%	5%	1%	10%	5%	1%
1	12,150	264399.3	7794715.9	73.8	0.3	0.5	1.1	1.0	1.9	4.4	3.8	6.9	15.9
2	33,950	282025.5	7783540.8	112.9	0.1	0.2	0.3	0.5	0.7	1.1	1.7	2.5	4.0
3	39,130	287027.7	7782153.2	109.6	1.3	2.9	3.1	5.3	11.5	12.6	19.0	41.4	45.4
4	39,240	287181.3	7782401.9	109.3	0.5	2.5	3.4	1.9	10.1	13.7	7.0	36.4	49.4
5	40,040	287822.2	7781901.9	125.5	0.1	0.1	0.2	0.4	0.5	0.7	1.6	1.8	2.5
6	50,010	297159.3	7779039.3	127.7	0.1	0.2	0.3	0.4	0.6	1.1	1.6	2.3	4.1
7	56,680	303433.4	7776960.2	132.3	0.1	0.2	0.3	0.4	0.7	1.0	1.5	2.4	3.7
8	64,590	311239.4	7775808.0	133.1	0.1	0.2	0.4	0.6	0.8	1.5	2.0	2.8	5.5
9	64,610	311148.8	7775587.0	135.6	0.1	0.1	0.2	0.3	0.6	1.0	1.3	2.0	3.6
10	67,650	313836.4	7775037.4	127.3	0.2	0.2	0.3	0.6	0.7	1.2	2.3	2.5	4.5
11	70,050	316367.2	7774716.3	119.9	0.1	0.2	0.3	0.5	0.7	1.0	1.8	2.6	3.7
12	70,910	317209.8	7775089.6	130.1	0.1	0.2	0.3	0.4	0.7	1.3	1.5	2.5	4.6
13	70,940	317270.5	7774714.1	129.6	0.2	0.4	0.7	1.0	1.7	2.9	3.6	6.1	10.6
14	79,070	324816.2	7772107.3	157.2	0.1	0.1	0.2	0.3	0.5	0.9	1.2	1.9	3.3
15	81,380	327198.1	7771677.6	161.1	0.1	0.2	0.5	0.5	0.9	1.8	1.9	3.3	6.5
16	90,940	333527.4	7765143.4	176.1	0.1	0.2	0.3	0.5	0.8	1.2	2.0	3.0	4.3
17	91,220	332892.9	7764584.6	173.2	0.3	0.3	0.4	1.1	1.2	1.4	3.9	4.3	5.1

Borrow Pit	Chainage (m)	Centroid Coordinates		Elevation (mAHD)	Max Depth (m)			Duration of Inundation (10 mm/hr) (days)			Duration of Inundation* (2.5 mm/hr) (days)		
		Easting	Northing		10%	5%	1%	10%	5%	1%	10%	5%	1%
18	91,470	333666.0	7764702.2	180.2	0.2	0.3	0.4	0.7	1.1	1.5	2.7	3.8	5.3
19	120,850	333569.6	7738371.2	246.0	0.2	0.3	0.5	0.7	1.1	2.2	2.4	4.1	7.8
20	120,870	333311.1	7738472.9	245.4	0.2	0.3	0.5	0.7	1.1	2.2	2.4	4.1	7.8
21	139,460	329097.8	7720502.0	260.1	0.3	0.5	0.7	1.3	2.0	2.9	4.8	7.1	10.6
22	154,870	343587.4	7715691.6	261.8	0.8	1.5	2.8	3.2	6.1	11.2	11.5	21.9	40.5
23	156,200	344764.3	7715052.7	266.7	0.1	0.1	0.2	0.4	0.5	0.7	1.3	1.7	2.6
24	162,100	350422.3	7713347.5	264.3	1.6	1.7	1.9	6.3	7.0	7.7	22.8	25.2	27.8
25	162,120	350489.8	7713520.8	264.8	0.6	1.0	1.2	2.2	4.0	4.9	8.1	14.4	17.6
26	163,760	352010.8	7712861.4	261.7	1.8	2.8	3.6	7.1	11.3	14.5	25.6	40.8	52.5
27	163,790	352080.7	7712978.7	261.8	2.7	2.9	3.5	10.9	11.5	14.2	39.5	41.4	51.2

* Duration of Inundation (2.5 mm/hr) is considered a conservative estimate in absence of geotechnical data. See Section 5.2.

6. Surface water management measures

6.1 Access track waterway crossings

Access track waterway crossings are to be designed to provide an acceptable level of serviceability for the 5% AEP event in accordance with the basis of design (Section 3), stipulating a maximum of 0.5 m depth over the floodway and a maximum velocity of 2 m/s. The flood modelling results presented in Table 5-2 for the 5% AEP event show 25 crossings, and with maximum depths of up to 1.1 m. The waterway crossings have been categorised if they meet the current BoD for serviceability and if they have been identified as a crossing by WSP in their road drainage design concept plan. Table 6-1 finds that Waterway Crossing 11 should be included as a design crossing in WSP's drainage design due to the depth of ponding in the 5% AEP event (0.6 m). All other all crossings that do not meet the basis of design have been identified as a design crossing by WSP and will subsequently exhibit reduced depths in future design phases.

Table 6-1. Access Road waterway crossing 5% AEP maximum flood depths (m) and BoD requirements

Waterway Crossing	5% AEP Max Depth (m)	Currently Meets BoD	Identified as a design crossing by WSP
1	1.2	No	Yes
2	0.4	Yes	Yes
3	0.2	Yes	Yes
4	0.6	No	Yes
5	0.9	No	Yes
6	1.0	No	Yes
7	1.1	No	Yes
8	1.1	No	Yes
9	0.3	Yes	Yes
10	0.3	Yes	Yes
11	0.6	No	No
12	0.2	Yes	Yes
13	0.4	Yes	Yes
14	0.2	Yes	Yes
15	0.7	No	Yes
16	0.4	Yes	Yes
17	0.2	Yes	Yes
18	0.4	Yes	Yes
19	0.3	Yes	Yes
20	0.2	Yes	No
21	0.4	Yes	Yes
22	0.1	Yes	No
23	1.3	No	Yes
24	0.2	Yes	Yes
25	1.3	No	Yes

6.2 Borrow pits

The 27 borrow pits located inside the model extent were analysed for duration of ponding at the cessation of the design rainfall event. Seven borrow pits (3, 4, 22, 24, 25, 26, 27) with durations exceeding a week for the 10% AEP flood depth to infiltrate (2.5 mm/hr) were identified. This reduced to less than 2 borrow pits with inundation times of greater than a week in the conservative infiltration scenario.

It is expected that once borrow pit locations are determined in more detail and geotechnical investigation of geomaterials is undertaken, infiltrative capacity of the basins and hence ponding times can be investigated to a greater degree of accuracy. Due to the absence of geotechnical infiltration data and the respondent conservative infiltration estimates, it is expected that duration of inundation calculated will reduce in future design stages.

Table 6-2. Borrow pit duration of inundation analysis

Borrow Pit	10% AEP Time to Infiltrate (days) (10 mm/hr)	10% AEP Time to Infiltrate (days) (2.5 mm/hr)	Ponding >7 Days (2.5 mm/hr)
1	1.0	3.8	No
2	0.5	1.7	No
3	5.3	19.0	Yes
4	1.9	7.0	Yes
5	0.4	1.6	No
6	0.4	1.6	No
7	0.4	1.5	No
8	0.6	2.0	No
9	0.3	1.3	No
10	0.6	2.3	No
11	0.5	1.8	No
12	0.4	1.5	No
13	1.0	3.6	No
14	0.3	1.2	No
15	0.5	1.9	No
16	0.5	2.0	No
17	1.1	3.9	No
18	0.7	2.7	No
19	0.7	2.4	No
20	0.7	2.4	No
21	1.3	4.8	No
22	3.2	11.5	Yes
23	0.4	1.3	No
24	6.3	22.8	Yes
25	2.2	8.1	Yes
26	7.1	25.6	Yes
27	10.9	39.5	Yes

6.3 Scour

The 1% AEP maximum velocity map in Appendix A shows velocities below 2 m/s at all waterway crossings, however, the hydraulic model resolution at this stage of design maturity does not allow for accurate assessment of floodway batter scour. This will be undertaken in future project phases once the design matures with more detailed modelling and/or desktop methods (Main Roads, 2006) to support floodway velocity estimates.

6.4 Access road impacts on flooding behaviour

The water level difference maps in Appendix A predict that the impacts on flooding behaviour due to the proposed Access Road modifications are;

- Minor differences in peak water levels directly adjacent to the Access Road (generally below 0.1 m in all AEP events), and
- Minor differences in peak water levels adjacent to the borrow pits, with reductions in peak water levels of up to 0.1 m in areas surrounding the pits. Peak water levels within the pit areas show greater differences, as would be expected, due to the change in terrain level associated with the pit extraction.

7. Conclusions

The 2024 Mine Access Road SWMP has assessed the potential flooding along the Access Road alignment.

- 11 waterway crossings (3, 4, 6, 7, 8, 10, 11, 18, 21, 22 and 24) have been identified as major crossings with peak flows over 50 m³/s in the 1% AEP event. The model and adopted resolution has been developed to assess broad scale impacts associated with the access road and hence cannot accurately quantify plunging velocities on embankment batters. The current regional-scale model estimates predict that the 11 major waterway crossings do not require rock protection (<2 m/s). However, as the access road design matures and the assessment model is split into more discrete packages to assess hydraulic behaviours around the access road in finer detail, future results may deem rock protection necessary to ensure head cutting of the road formation does not occur in the BoD event.
- Seven borrow pits (3, 4, 22, 24, 25, 26, 27) were identified to have inundation times of greater than a week in the conservative infiltration scenario. This reduced to less than 2 borrow pits with inundation times of greater than a week in the conservative infiltration scenario. Geotechnical investigation of the final borrow pit locations will allow for more accurate determination of borrow pit infiltrative capacity. Nonetheless, it is expected therefore that any risks to fauna could be adequately managed through ripping of the basin floor upon completion of construction activities to improve infiltration capacity and/or batter softening to facilitate fauna egress from the basin. These measures would only be needed where ecological investigations deem the estimated ponding times a tangible risk to native fauna.
- In all modelled AEP events, differences in water levels directly adjacent to the Access Road between the Pre-Development and Post-Development scenarios are minor and generally below 0.1 m.

Some sections of the road were shown to be conceptually located in natural depressions and hence recommendations in the following sections detail potential changes to these locations to minimise flood risk.

8. Recommendations

Based on the technical assessment and outcomes, the following recommendations are made for future works:

- LiDAR data is collected in the area where there is no Landgate and LiDAR to replace the SRTM-H used in this study (as depicted in Figure 2-3). In particular, runoff behavior in the catchments adjacent to the access road corridor in this area are largely unknown due to the data limitations. As this area is close to the Mine Site, it would be beneficial to understand the catchment behaviour at a higher resolution to accurately inform design works.
- As the flood modelling has been based predominately on Landgate data (5 m DEM), the capacity of the storage areas may not be accurately captured and there is some uncertainty associated with the size (AEP) of the flood event needed to fill catchment storages and contribute larger flows to the crossings. Greater LiDAR coverage upstream of the major waterway crossings 3, 4, 6, 7, 8, 10, 11, 18, 21, 22 and 24 would be advantageous to have a higher confidence in hydrological understanding of the flows reporting to each location.
- If the presented high level estimate of ponding times in the borrow pits are deemed an ecological risk to native fauna, it is recommended that once the design methodology for the road is developed and borrow pit locations become confirmed, RTC Winu obtain infiltrometer testing results from a pilot pit location to reduce uncertainty in inundation duration calculations. This can then be used to better estimate ponding durations and develop risk mitigation plans for any borrow pits that have ponding times deemed in excess of acceptable limits.
- Waterway crossing 11 should be included as a design crossing in WSP's drainage design due to the depth of ponding in the 5% AEP event (0.6 m) which does not meet the BoD for floodway crossings.

9. References

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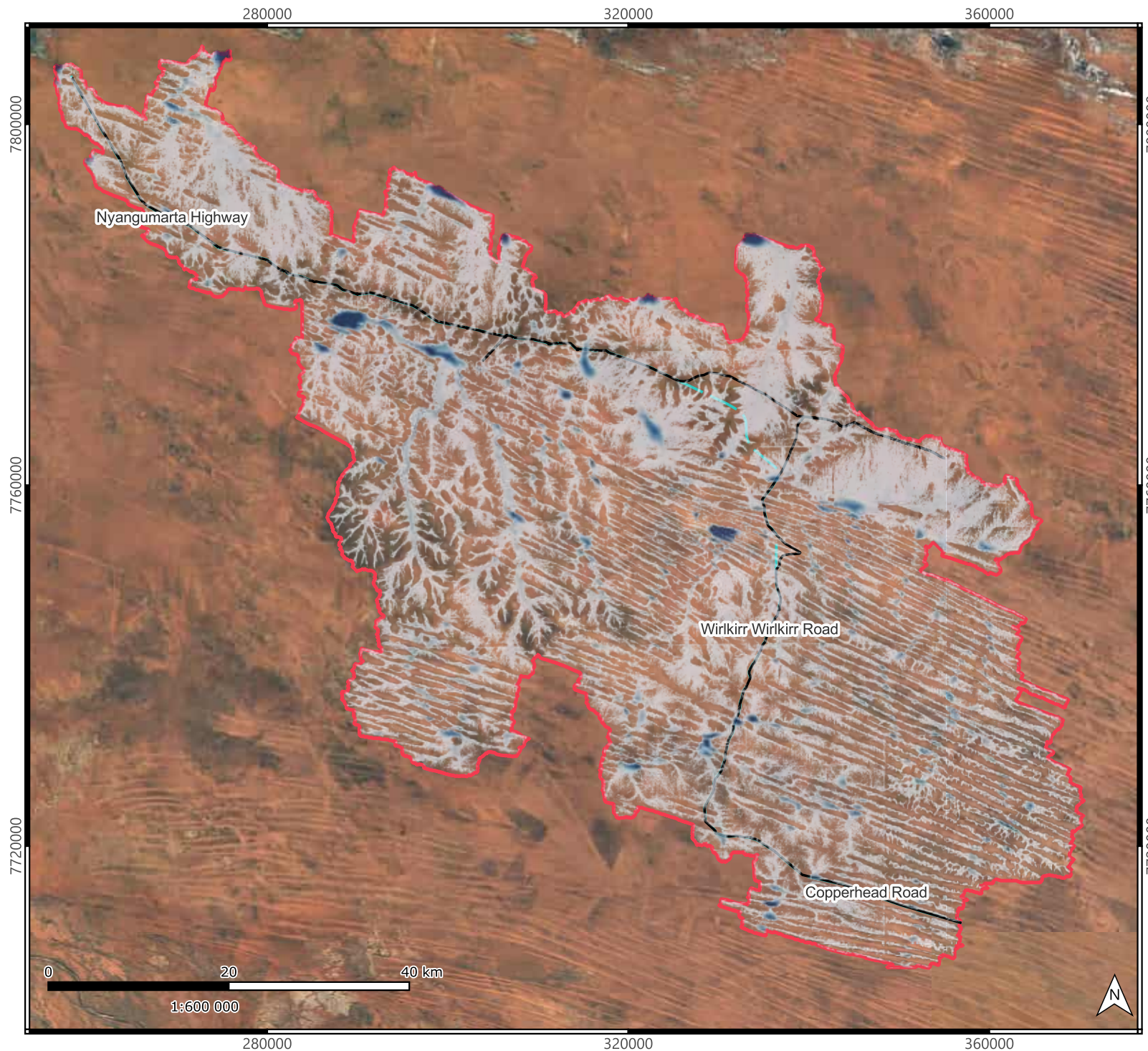
Rio Tinto, 2021, Civil and structural design criteria, DC-C001_5, RTIO-AM-0017814

Rio Tinto, 2021, Environmental design criteria – Permanent and temporary facilities, DC-N001_5, RTIO-AM-0032910

USGS. (2022). Shuttle Radar Topography Mission (SRTM)

Appendix A. Flood Maps

1%, 5% and 10% AEP Events



Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flood Depth

Project No.
311012-01475

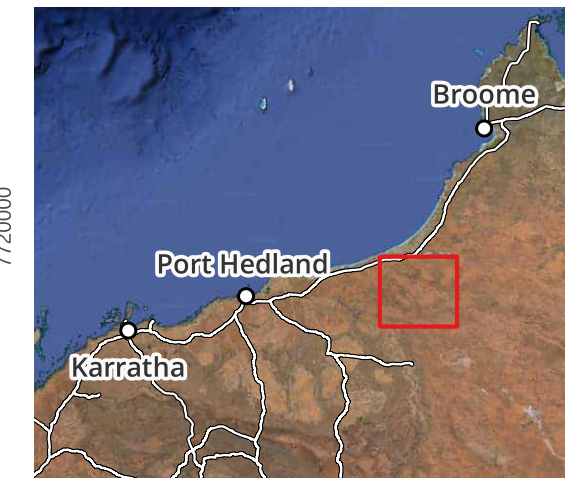
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



7800000

280000

Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

 Model Extent

Flood Depth (m)

 <= 0.05

 0.05 - 0.50

 0.50 - 1.00

 1.00 - 1.50

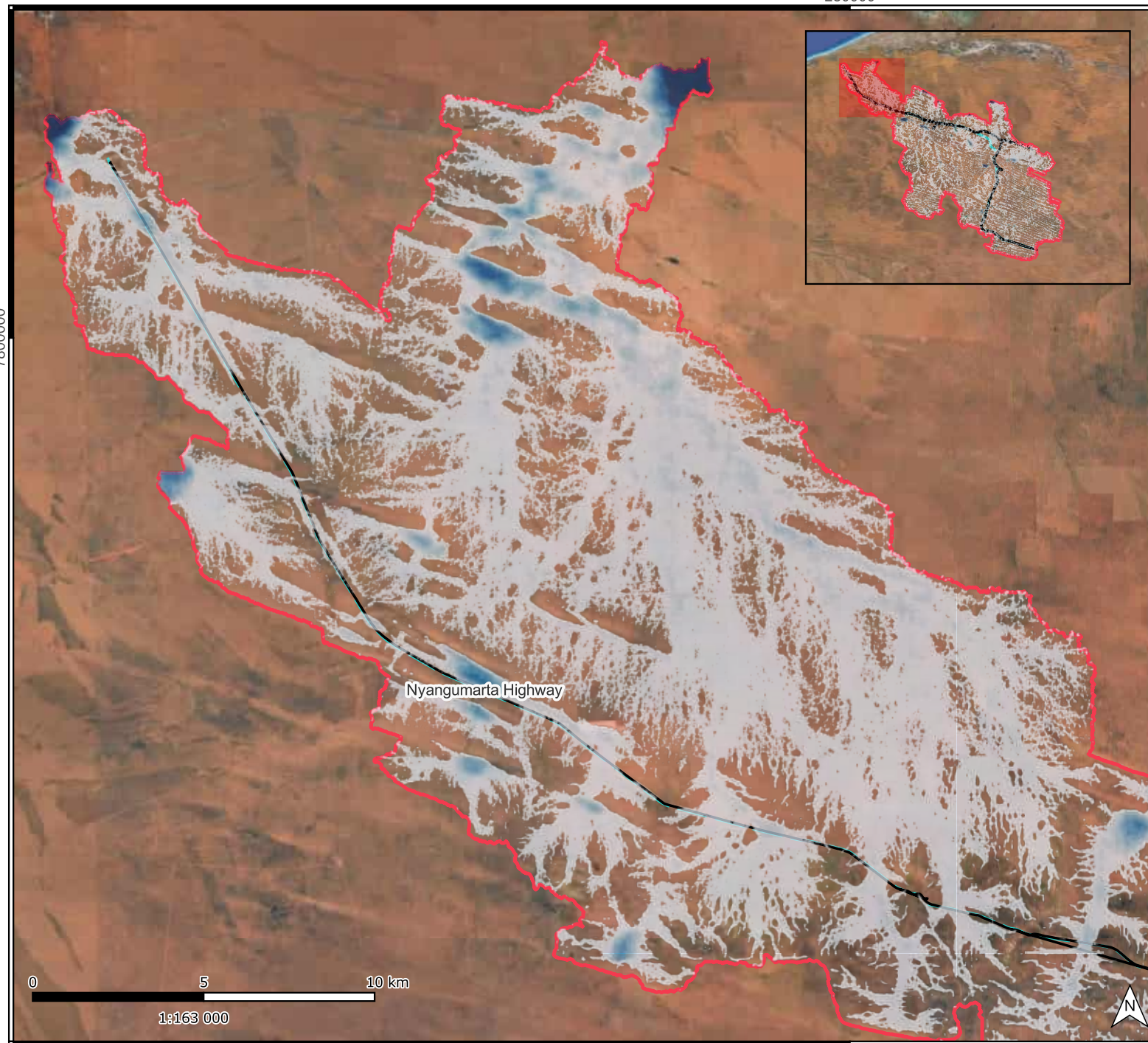
 1.50 - 2.00

 2.00 - 2.50

 2.50 - 3.00

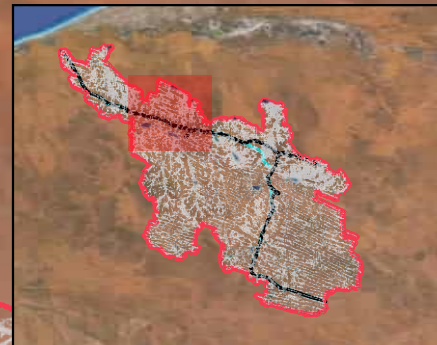
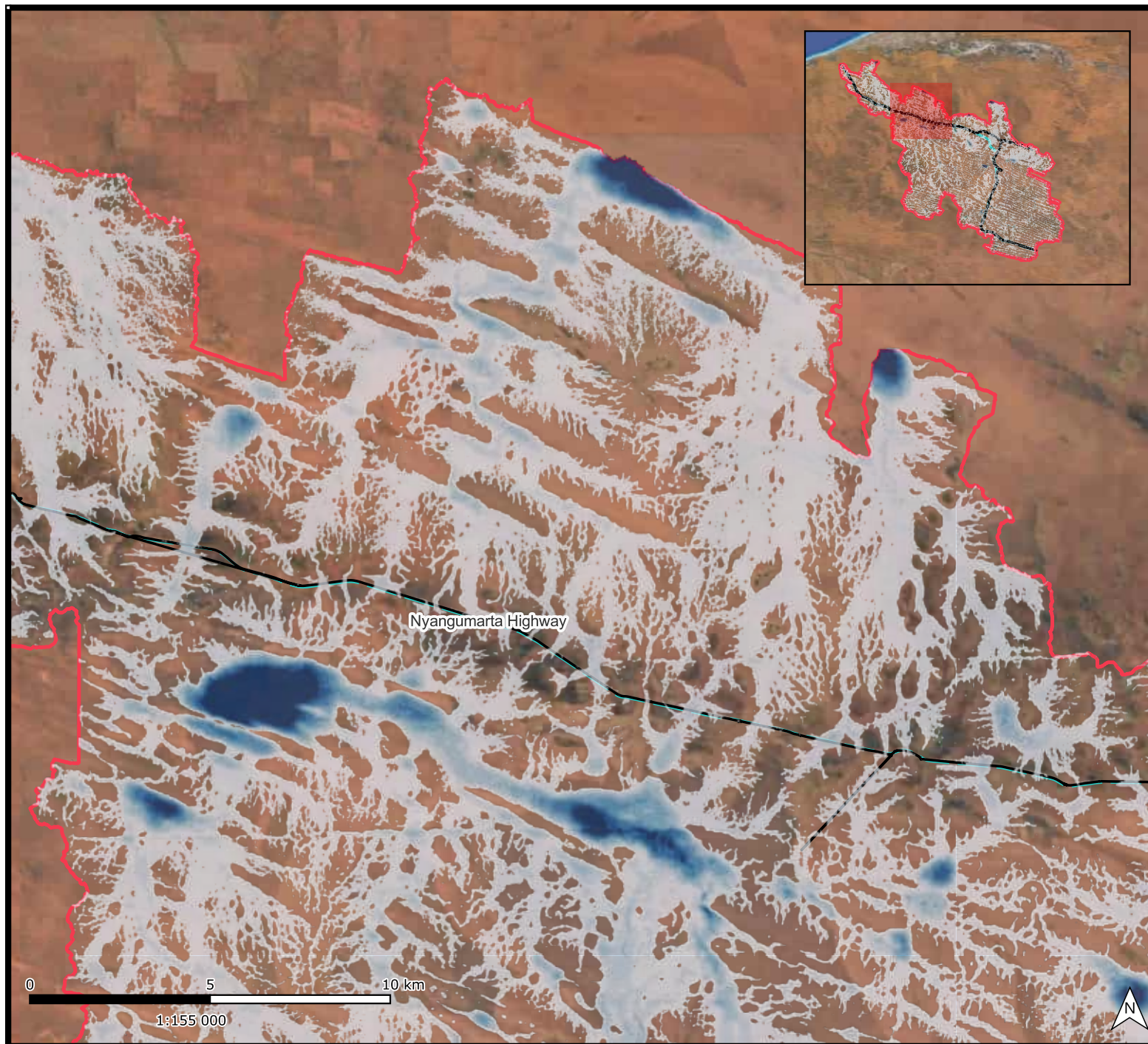
 3.00 - 3.50

 > 3.50



1:163 000

280000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flood Depth (m)

<= 0.05

0.05 - 0.50

0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

2.00 - 2.50

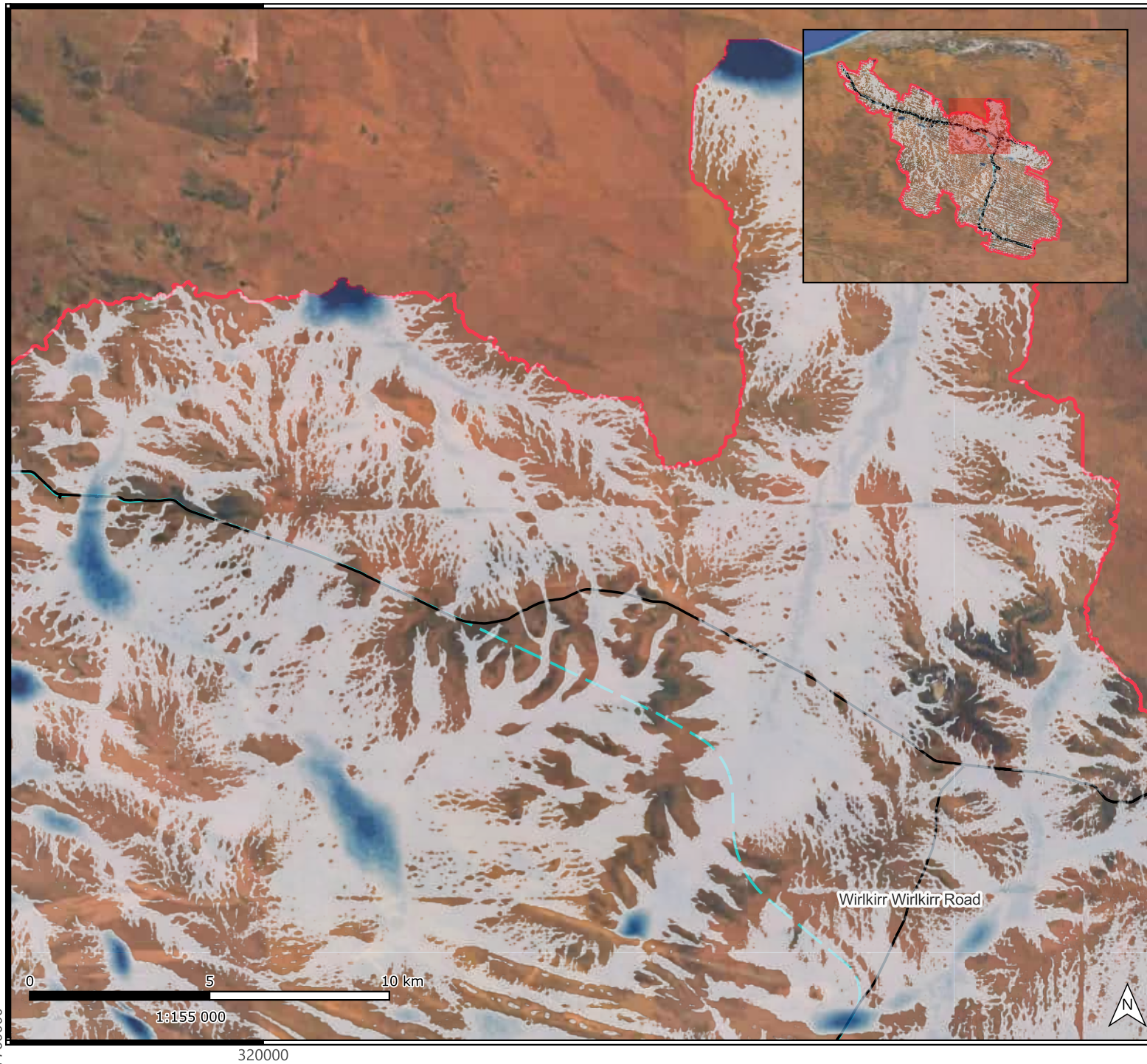
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3.00 - 3.50

> 3.50



320000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flood Depth (m)

□ ≤ 0.05

□ 0.05 - 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 2.50

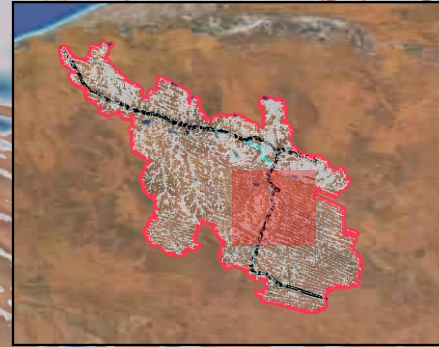
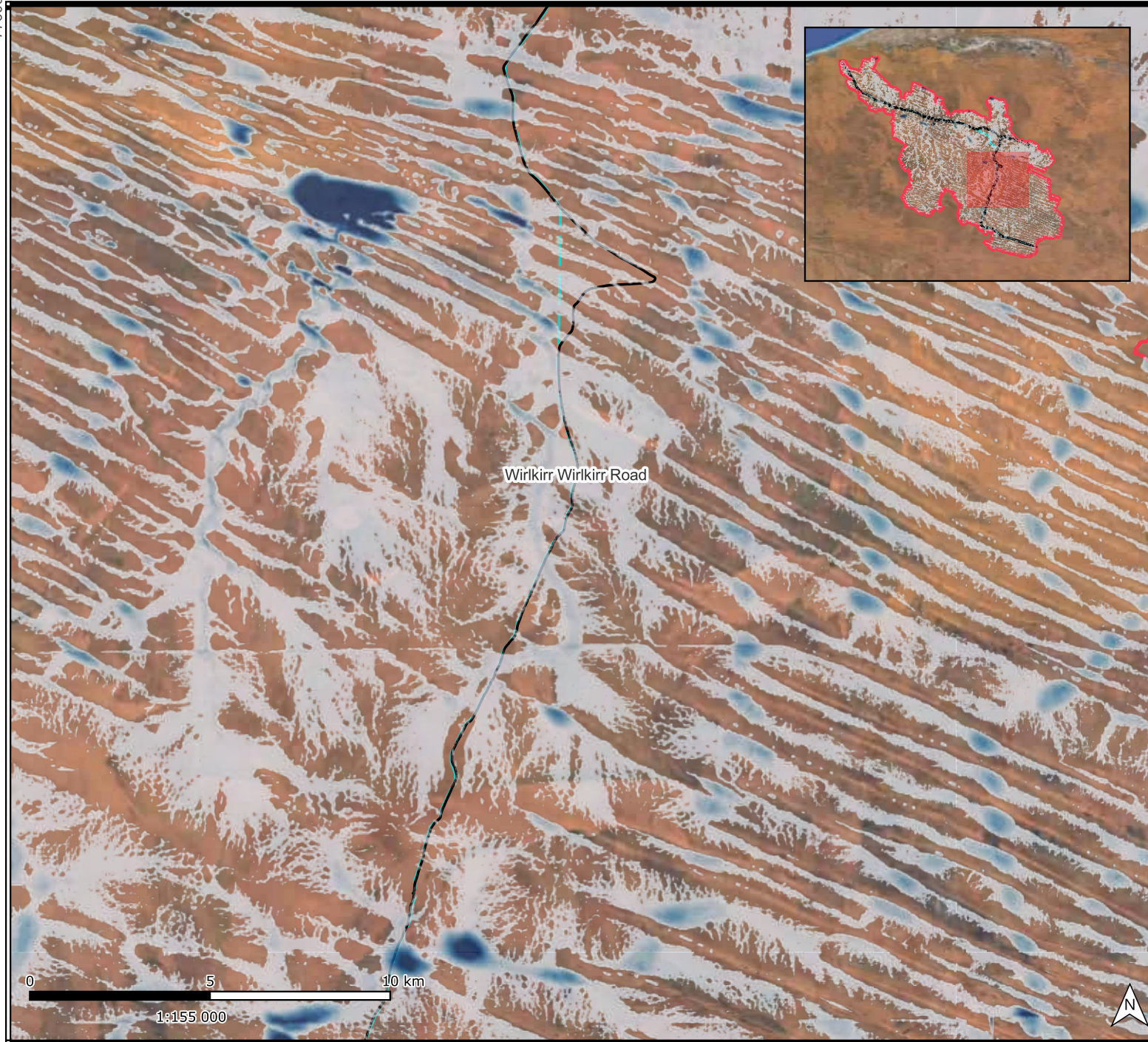
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□ 3.00 - 3.50

□ > 3.50



7760000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

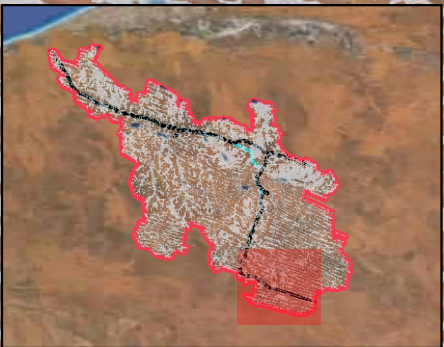
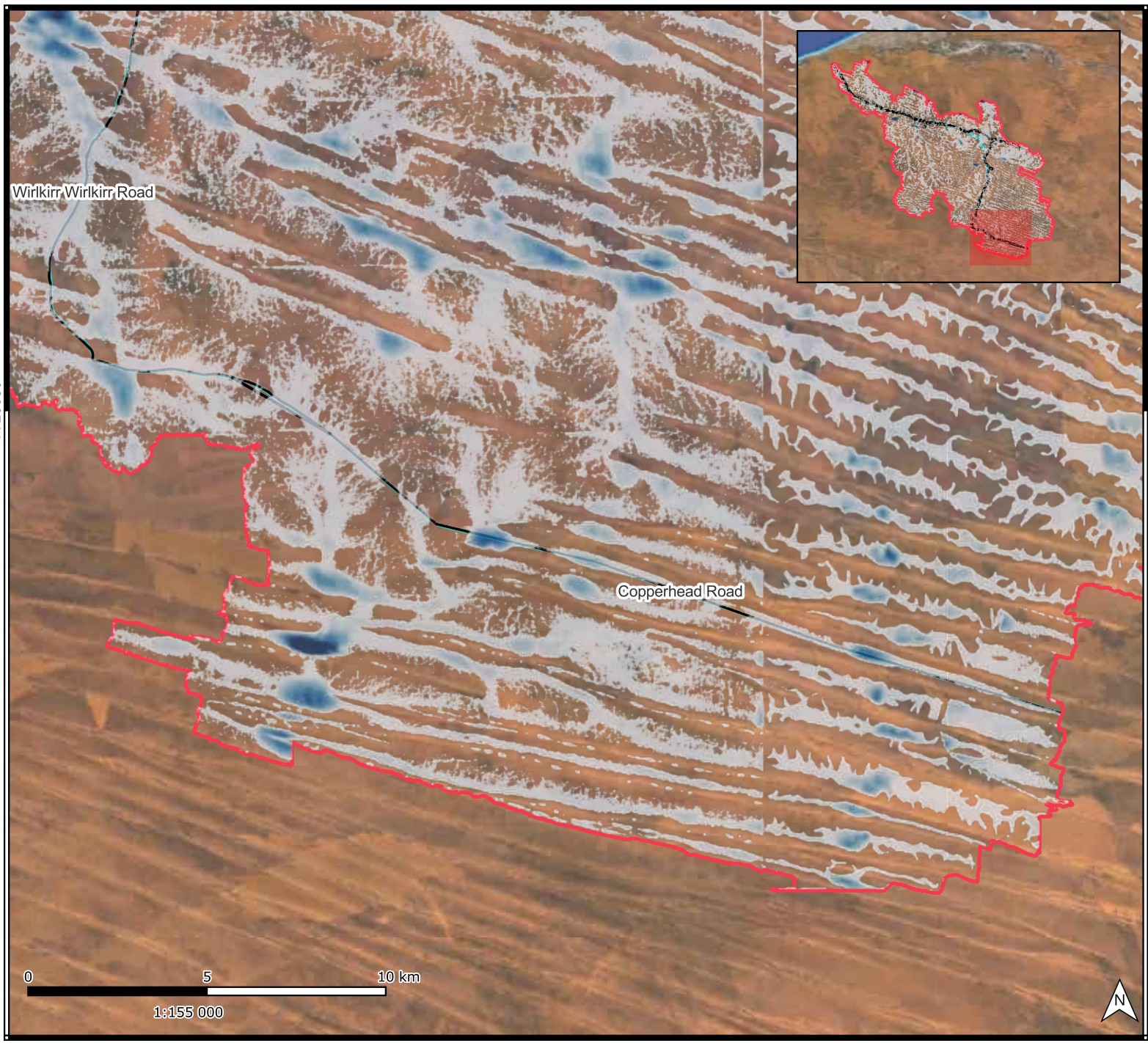
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Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50





Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
1% AEP Flood Depth (Location E)

Project No. 311012-01475 Client Rio Tinto

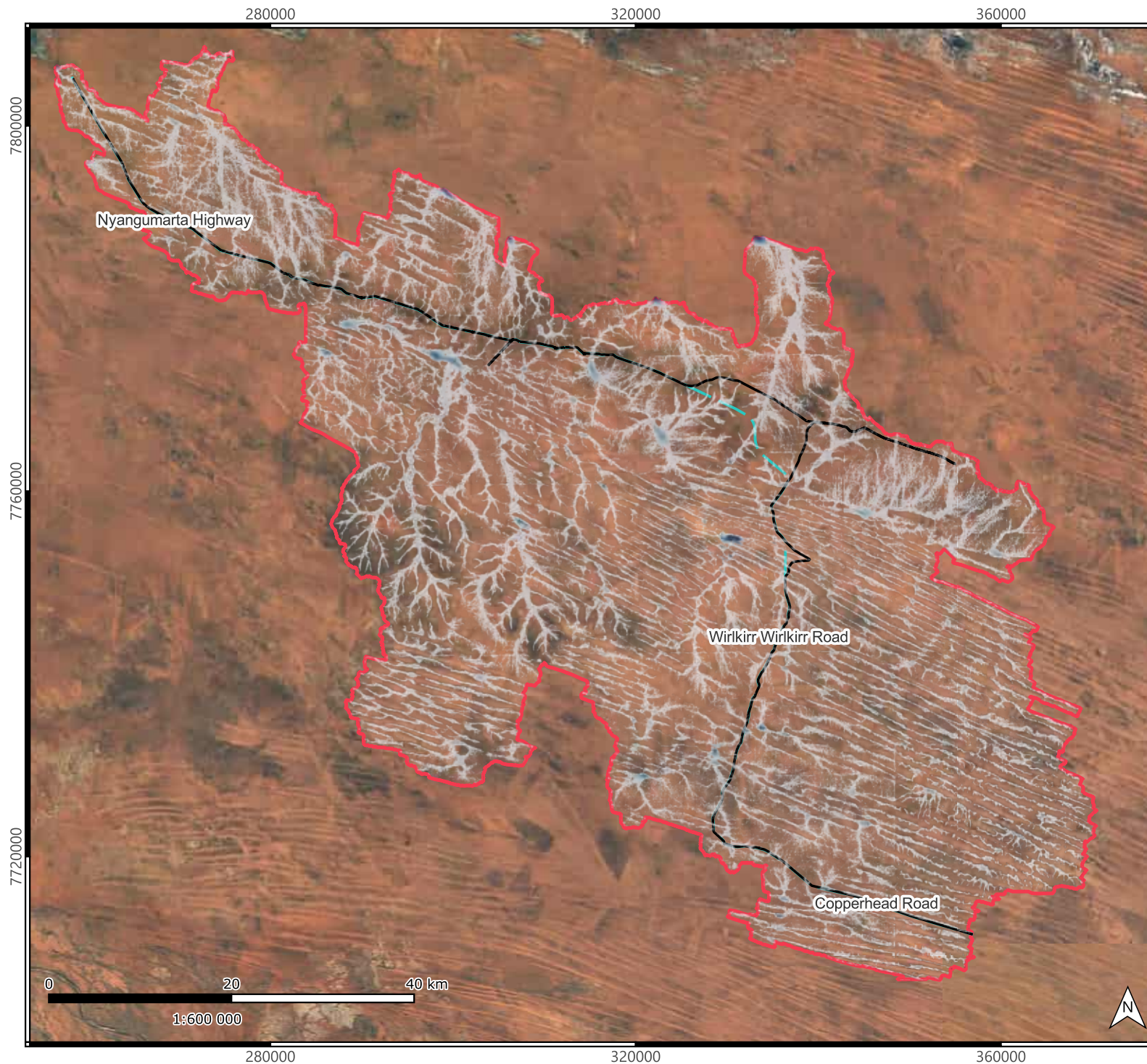
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Date:20/06/2024



Legend

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- Model Extent
- Flood Depth (m)
 - <= 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flood Depth

Project No.
311012-01475

Client
Rio Tinto

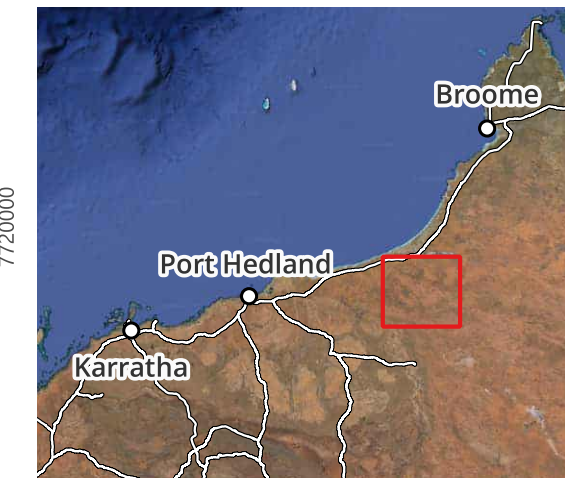
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Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
5% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flood Depth (m)

<= 0.05

0.05 - 0.50

0.50 - 1.00

1.00 - 1.50

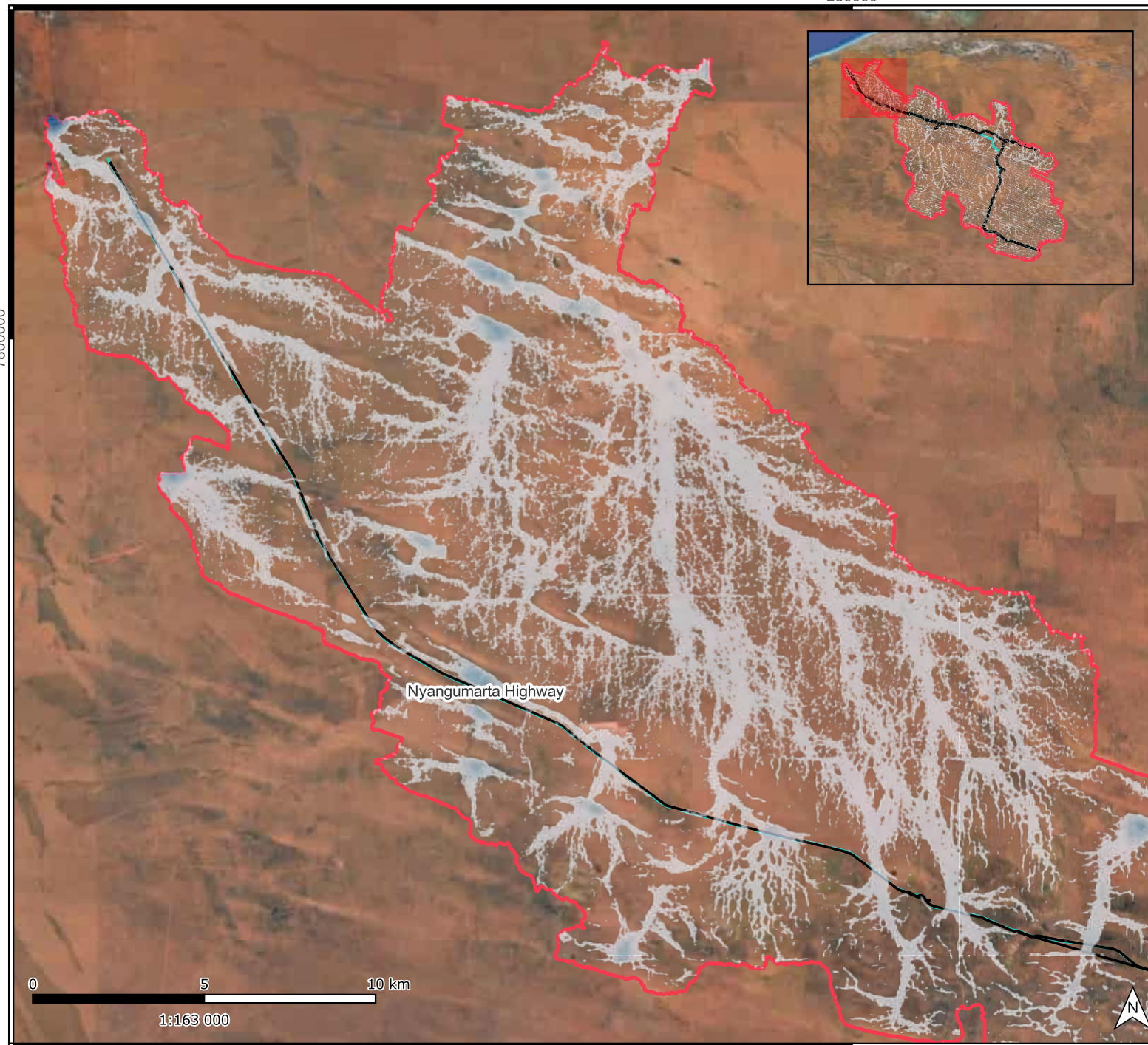
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2.50 - 3.00

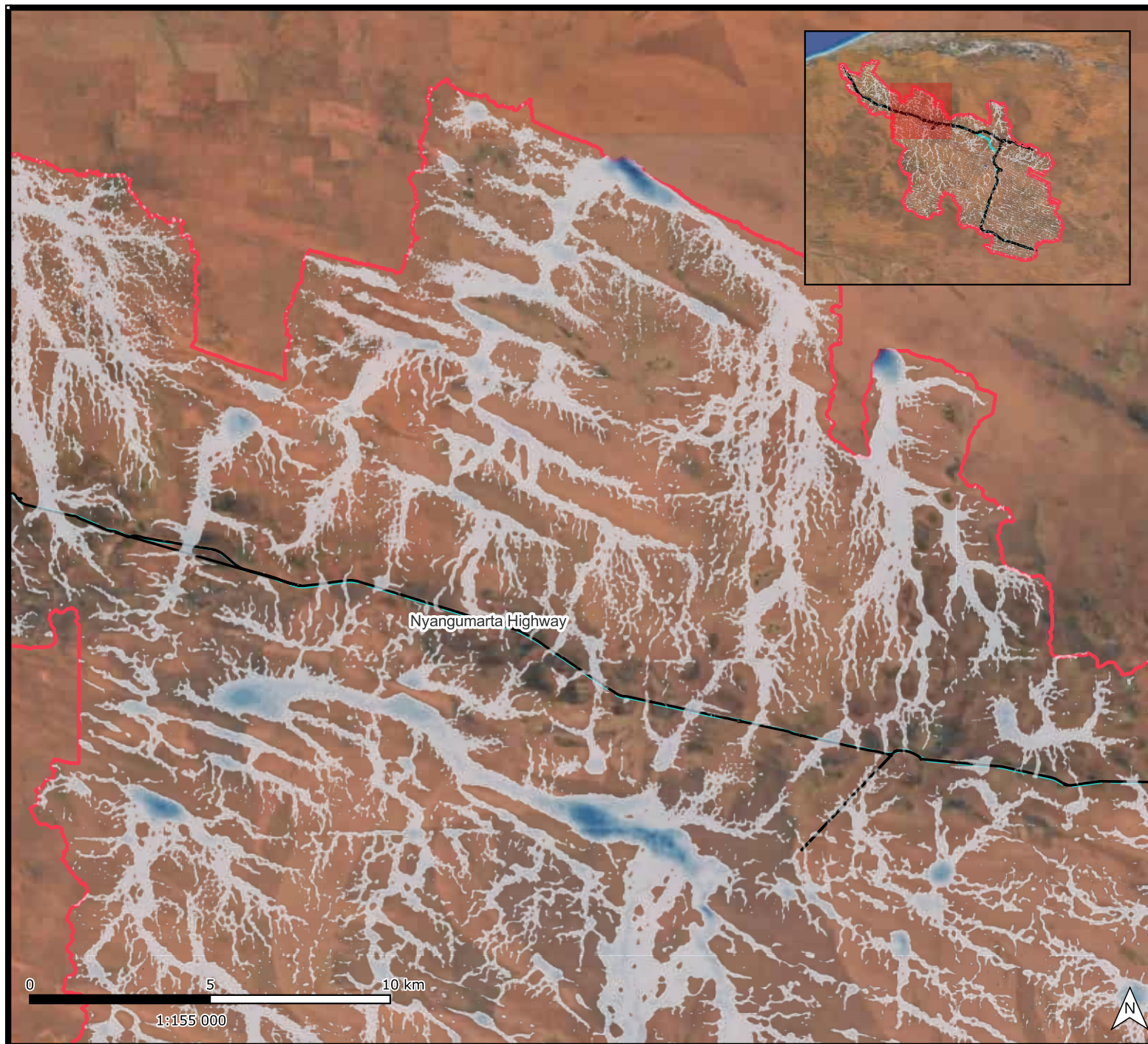
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Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

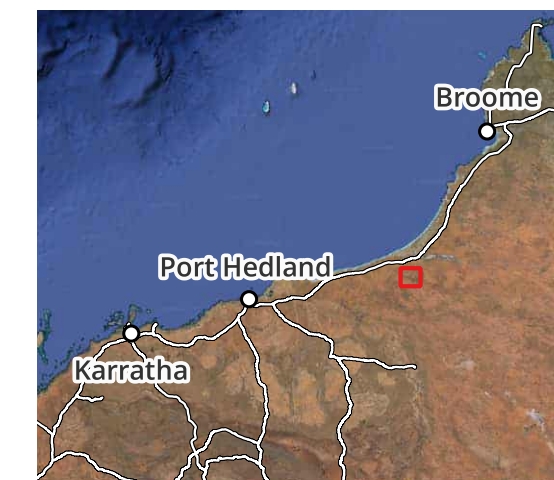
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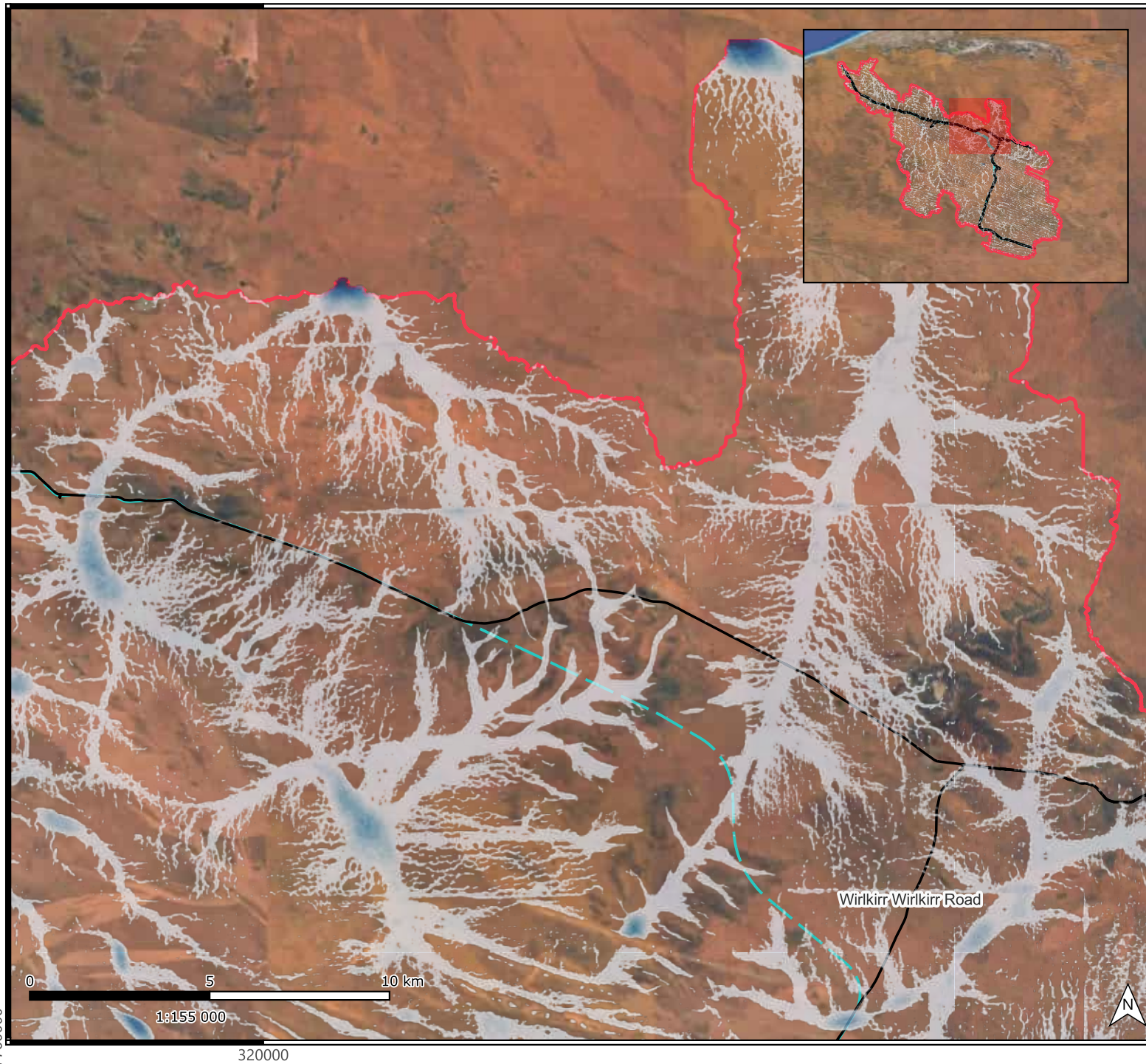


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
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- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



320000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024

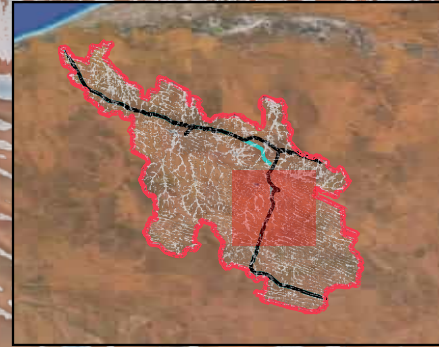


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



7760000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

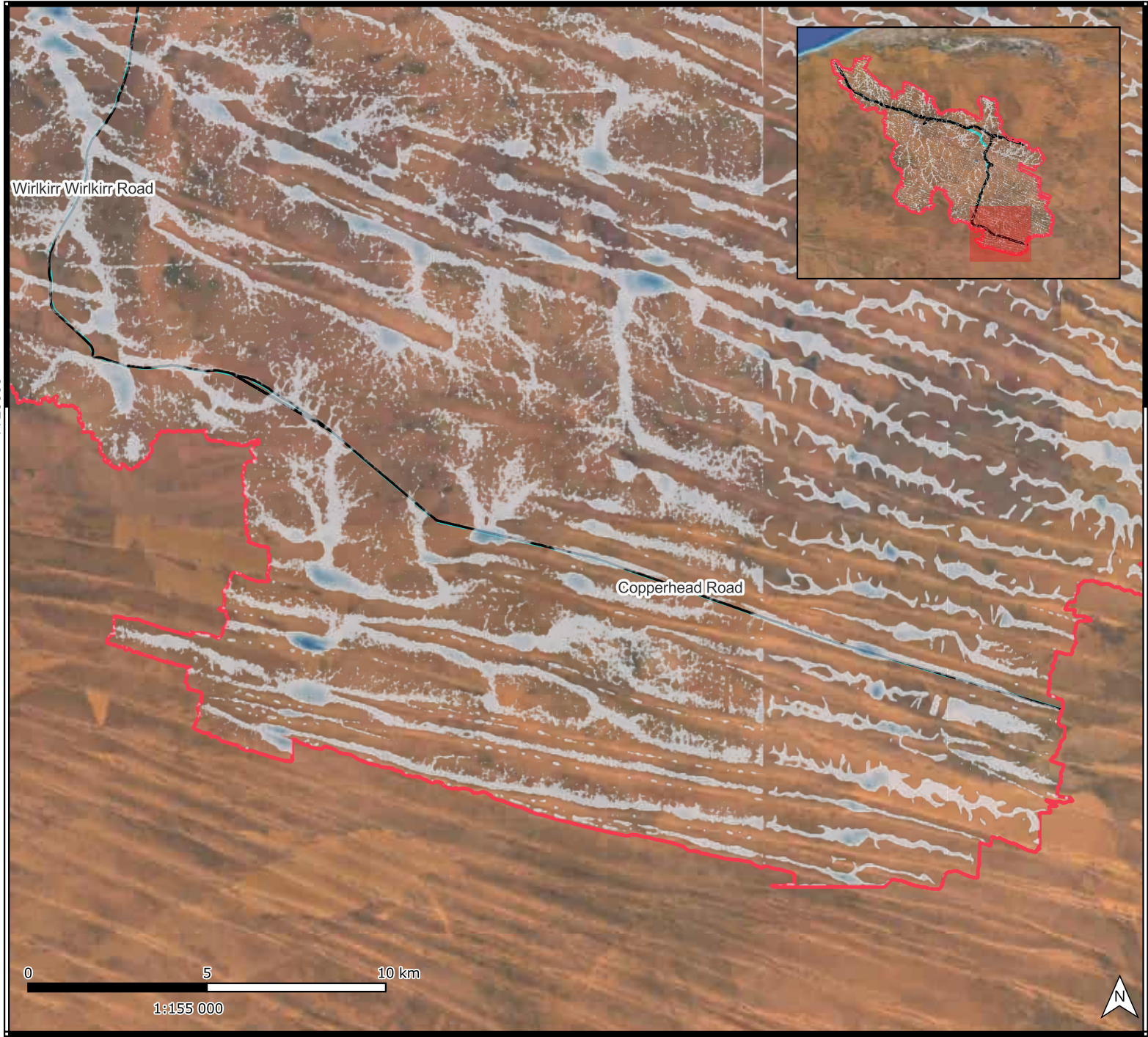
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Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50





Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
5% AEP Flood Depth (Location E)

Project No.
311012-01475

Client
Rio Tinto

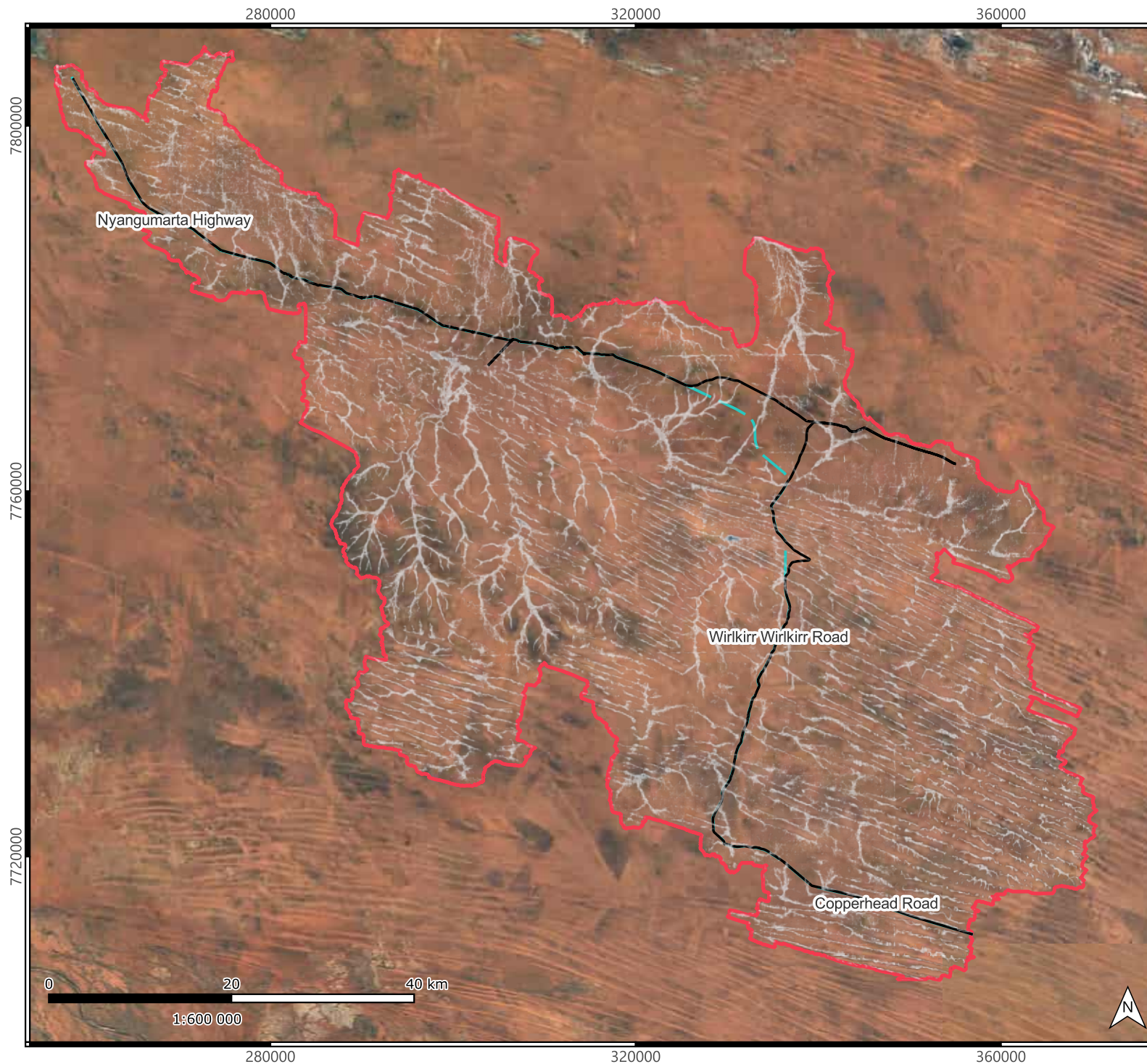
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Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flood Depth

Project No.
311012-01475

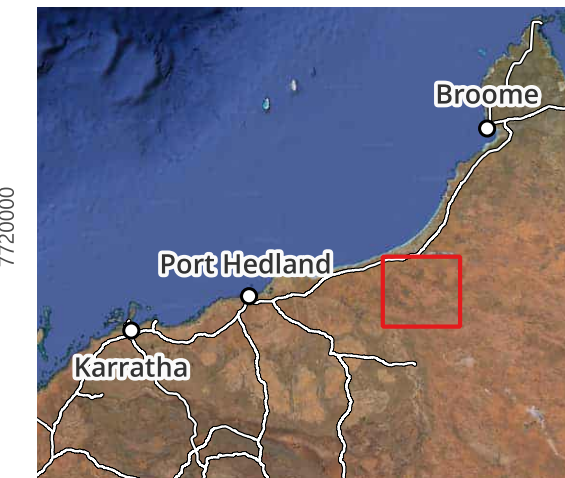
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Rio Tinto

Notes:
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Date:20/06/2024



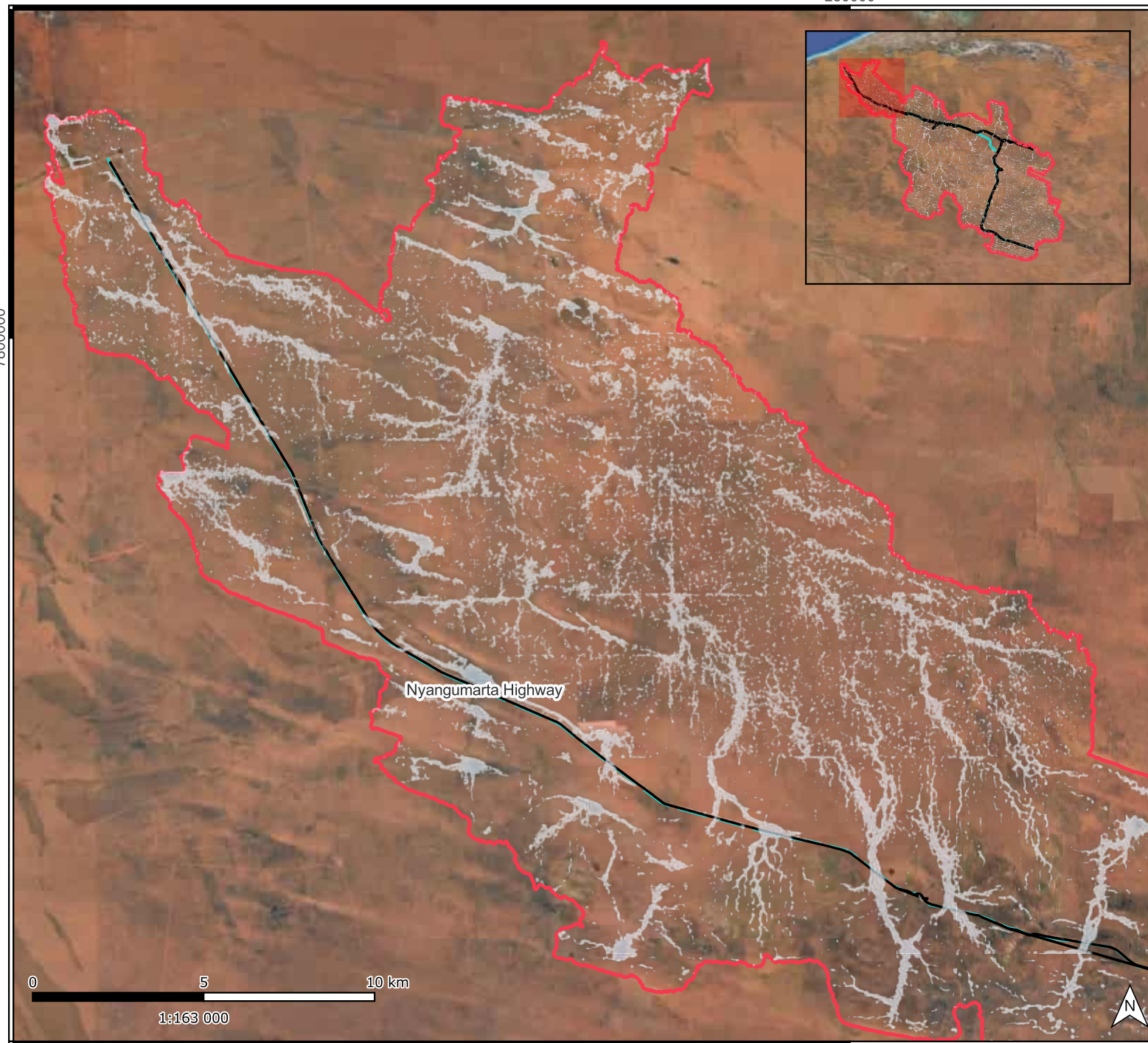
Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



7800000

280000



280000

Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
10% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

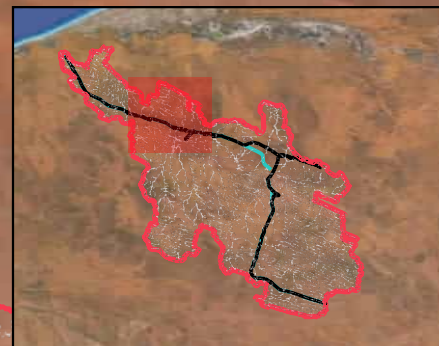
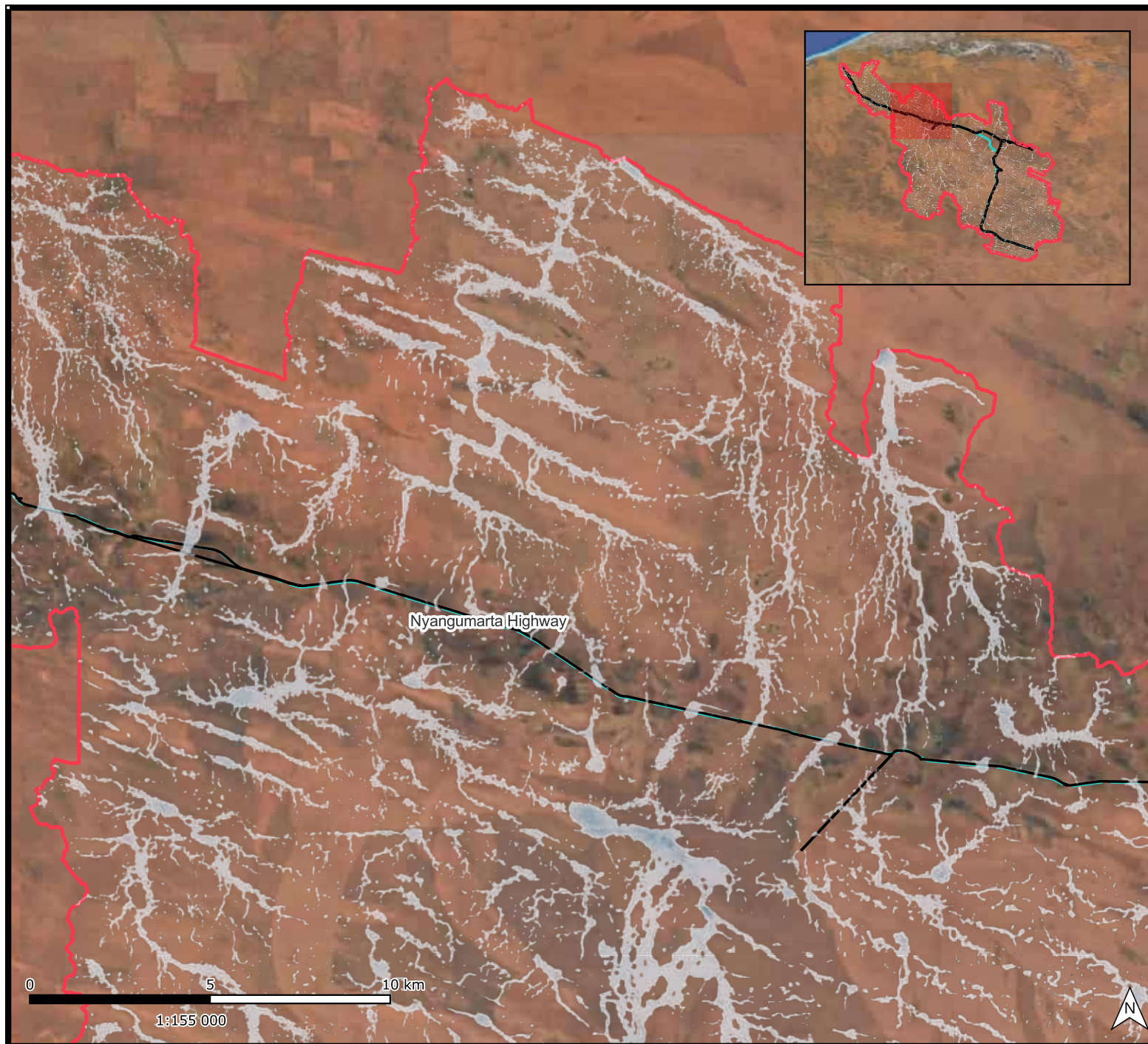
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024

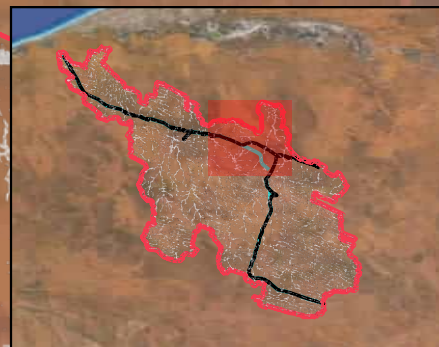
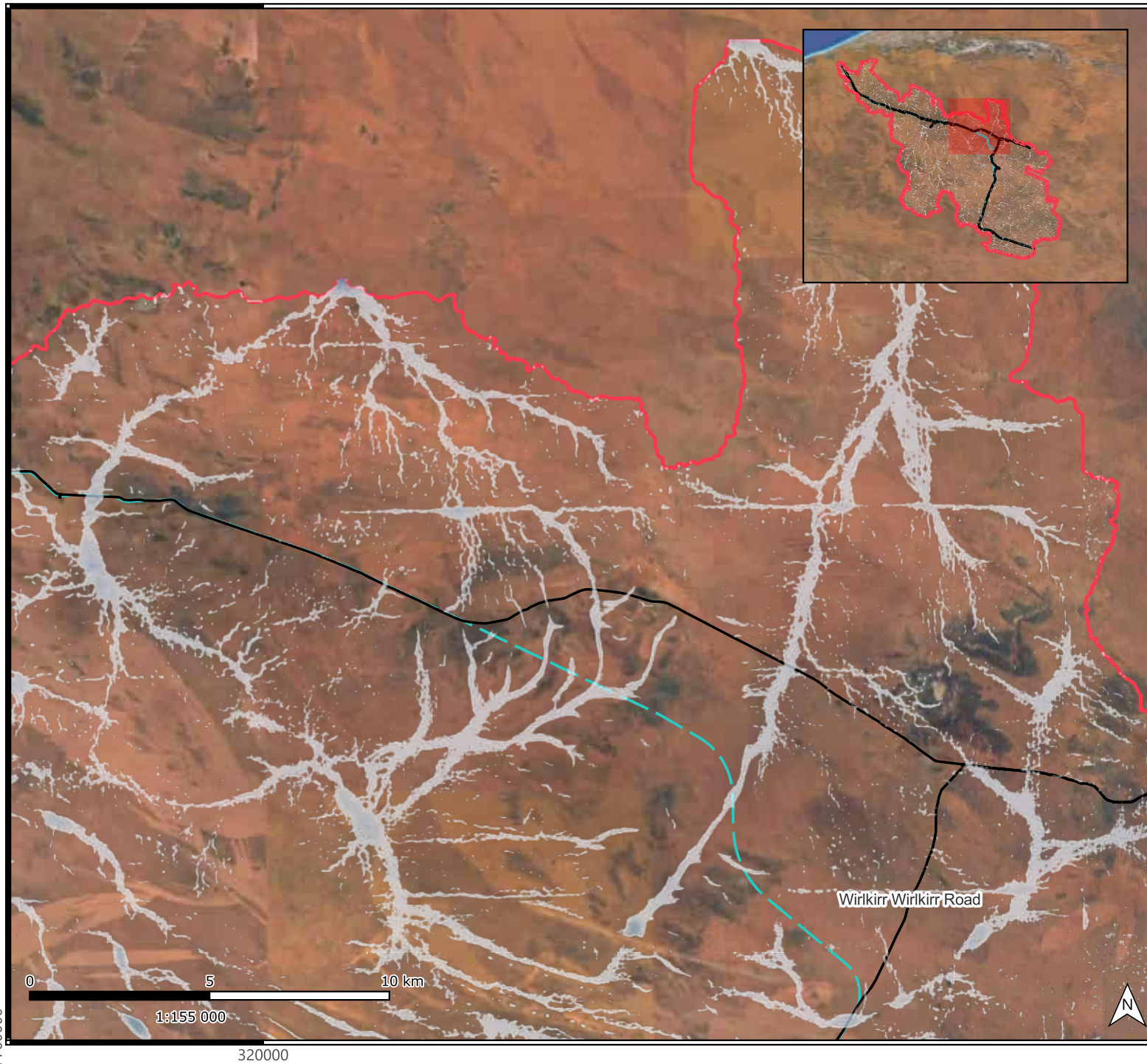


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



320000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



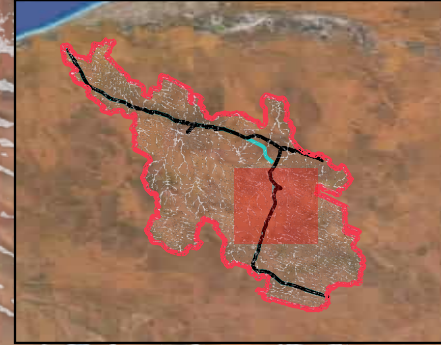
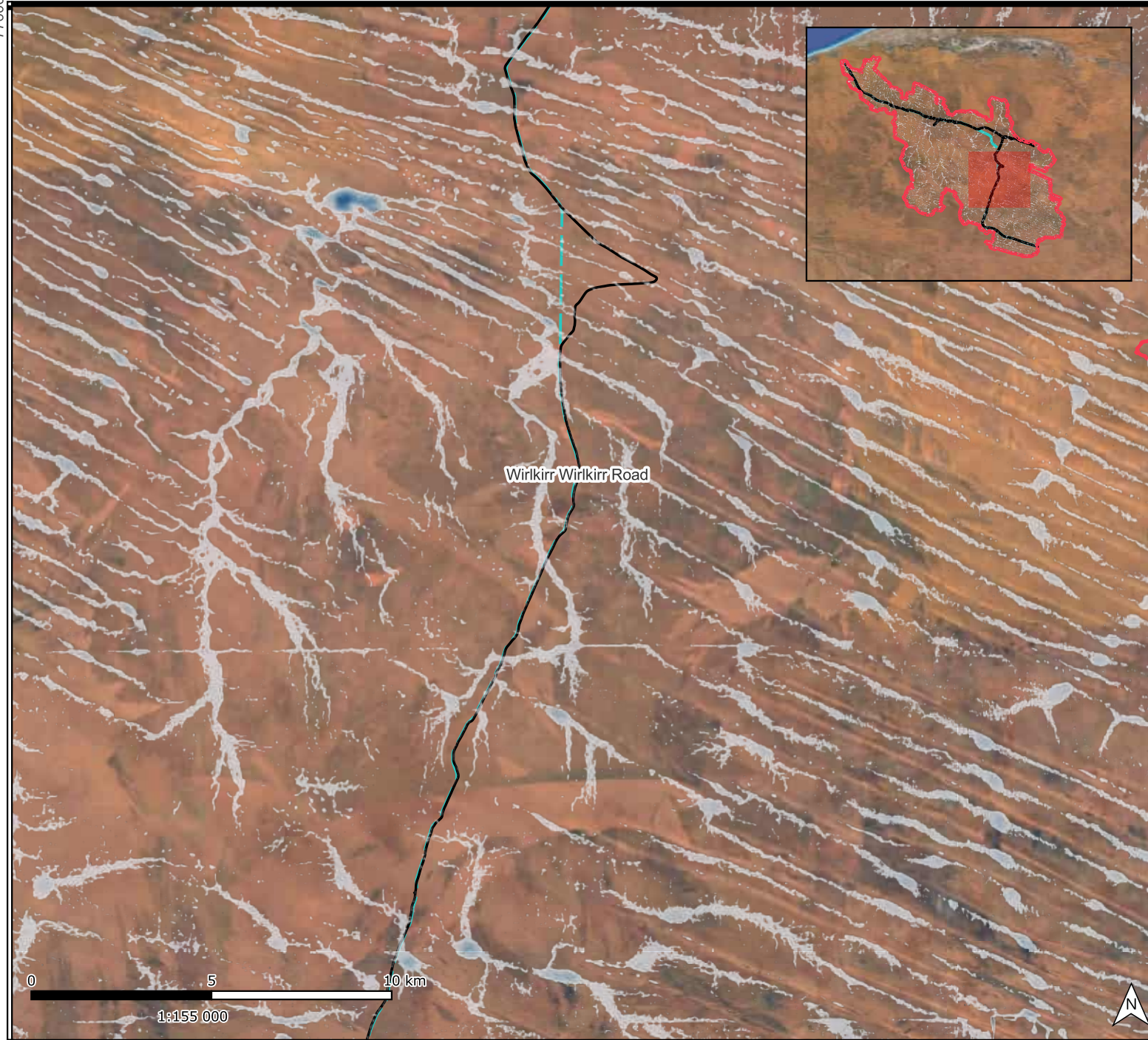
Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

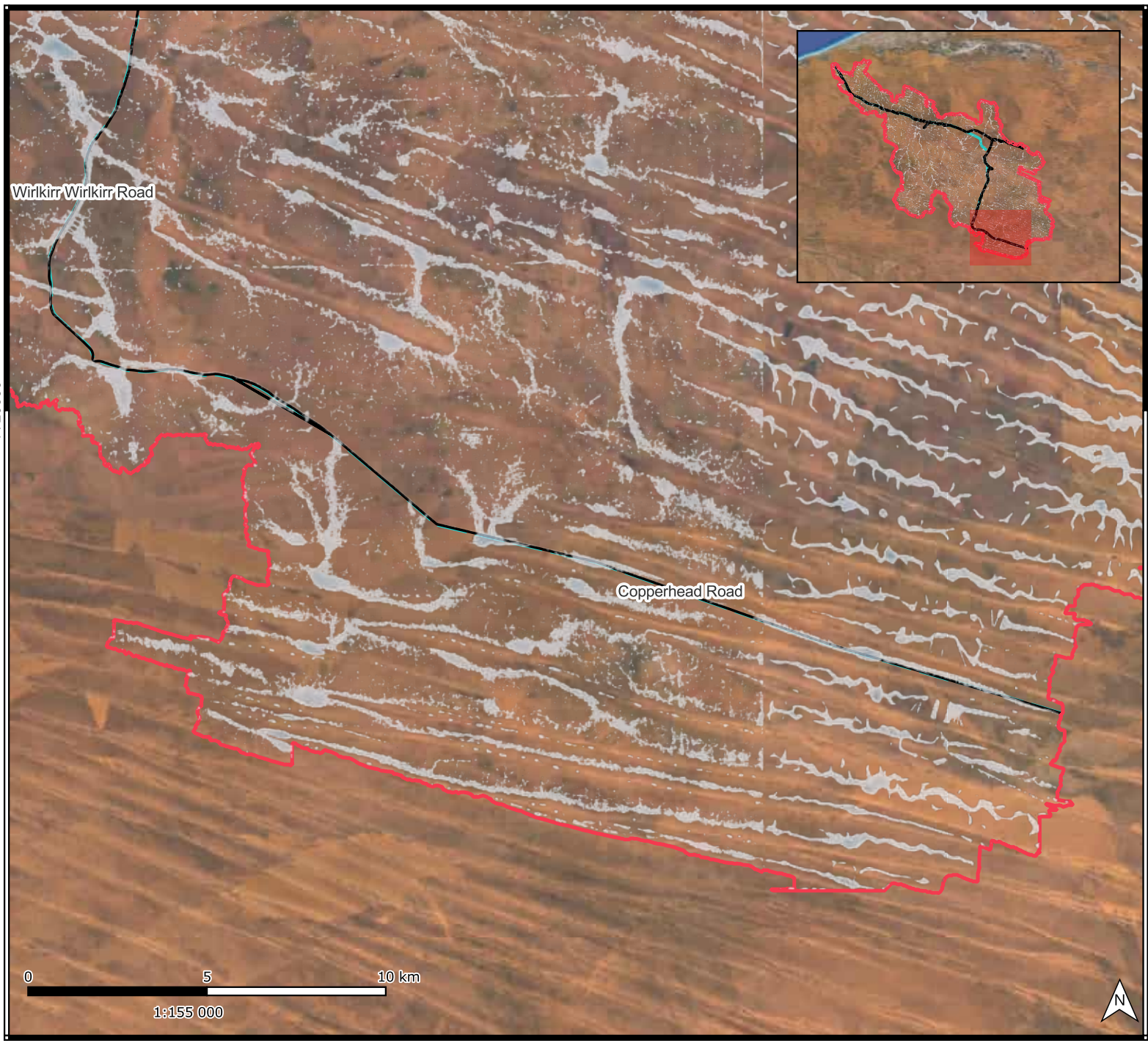
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50





Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
10% AEP Flood Depth (Location E)

Project No. 311012-01475 Client Rio Tinto

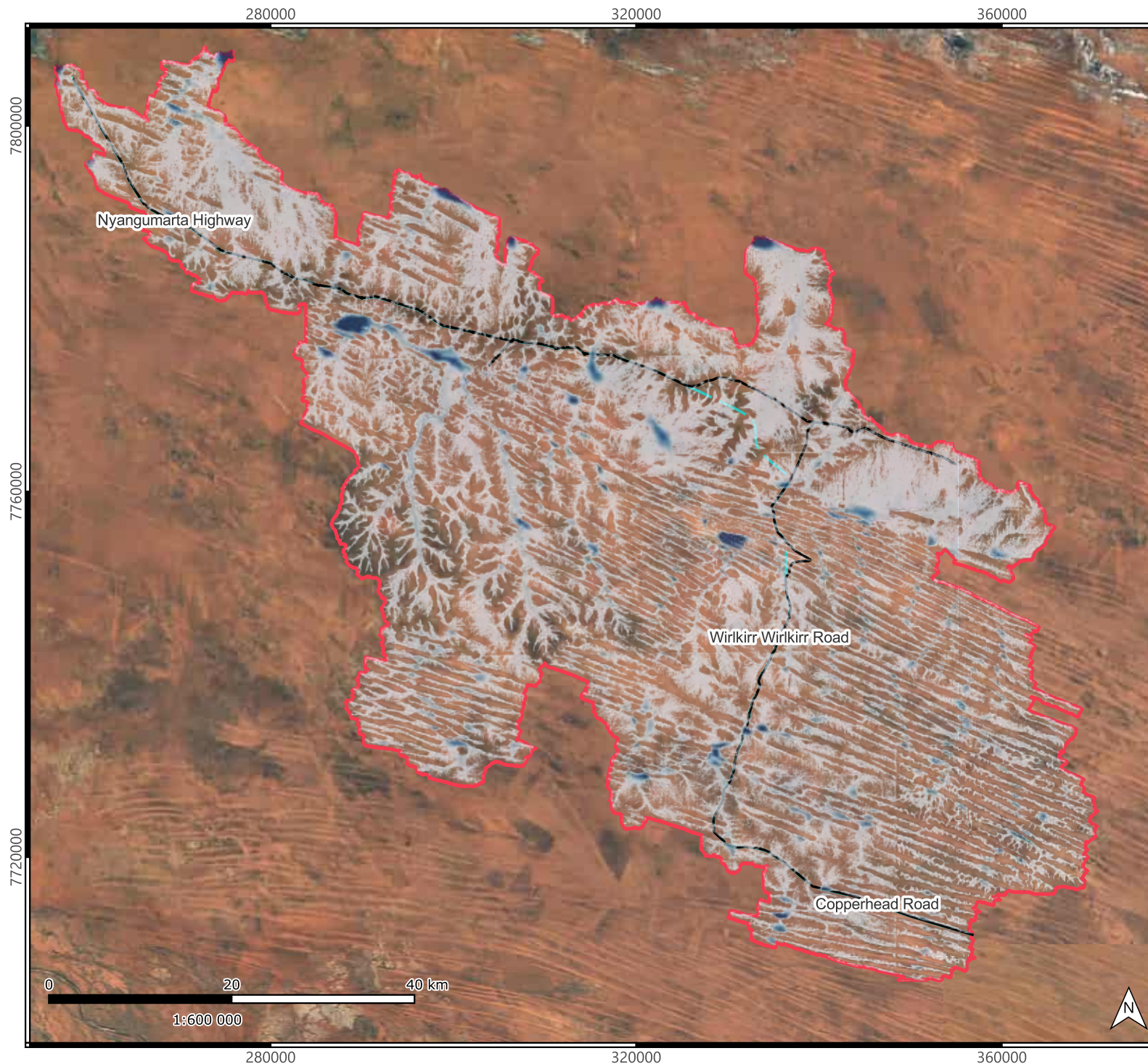
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - <= 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flood Depth

Project No.
311012-01475

Client
Rio Tinto

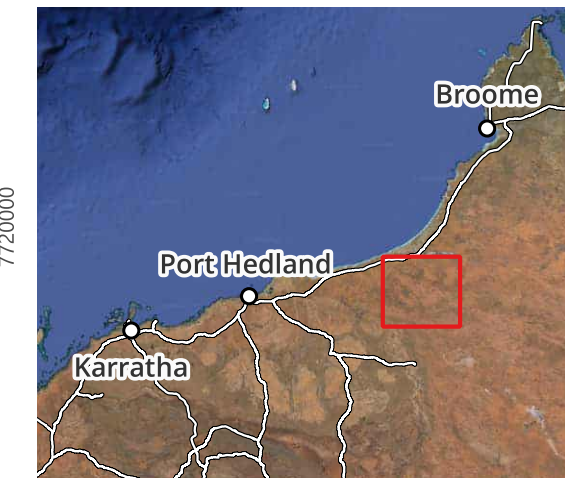
Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



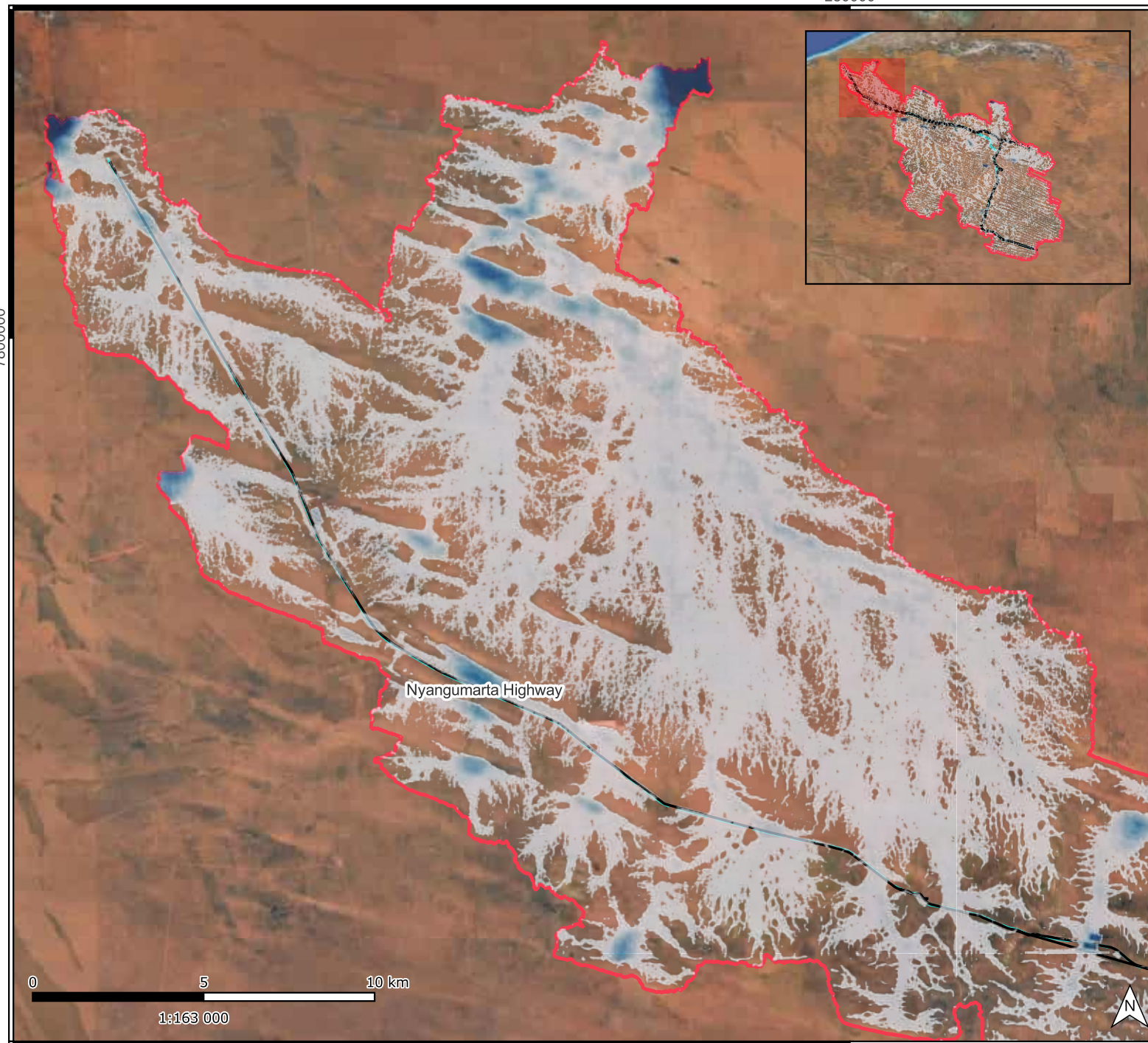
Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project
Surface Water Management Plan
Post-Development
1% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flood Depth (m)

≤ 0.05

0.05 - 0.50

0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

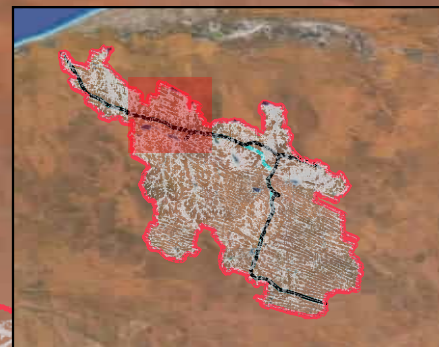
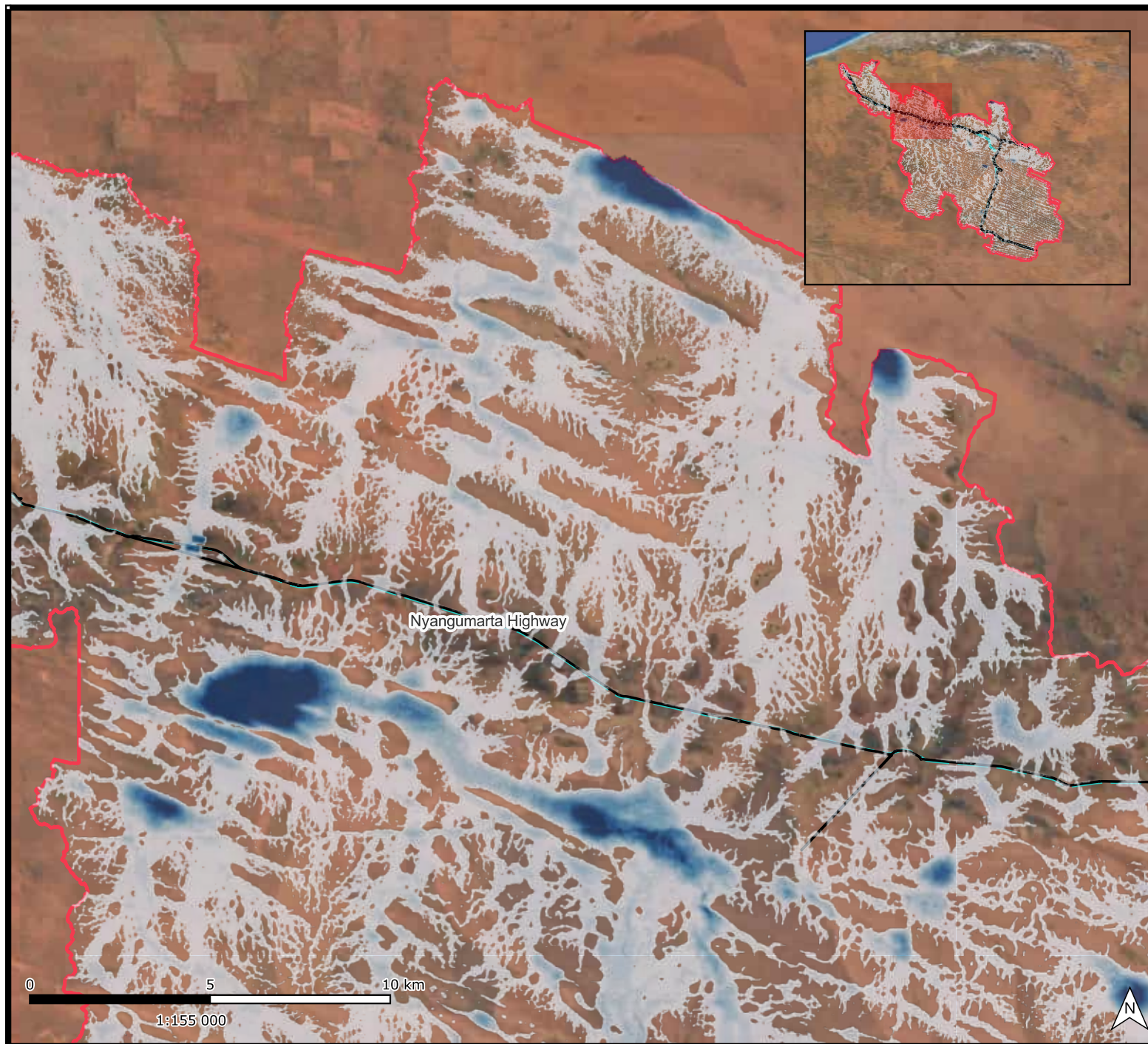
2.00 - 2.50

2.50 - 3.00

3.00 - 3.50

> 3.50





Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flood Depth (m)

≤ 0.05

0.05 - 0.50

0.50 - 1.00

1.00 - 1.50

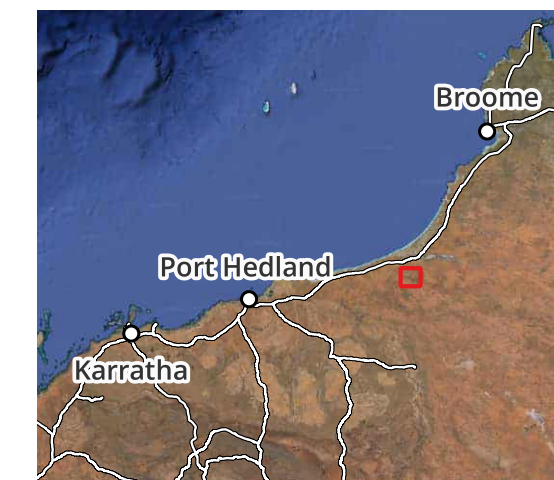
1.50 - 2.00

2.00 - 2.50

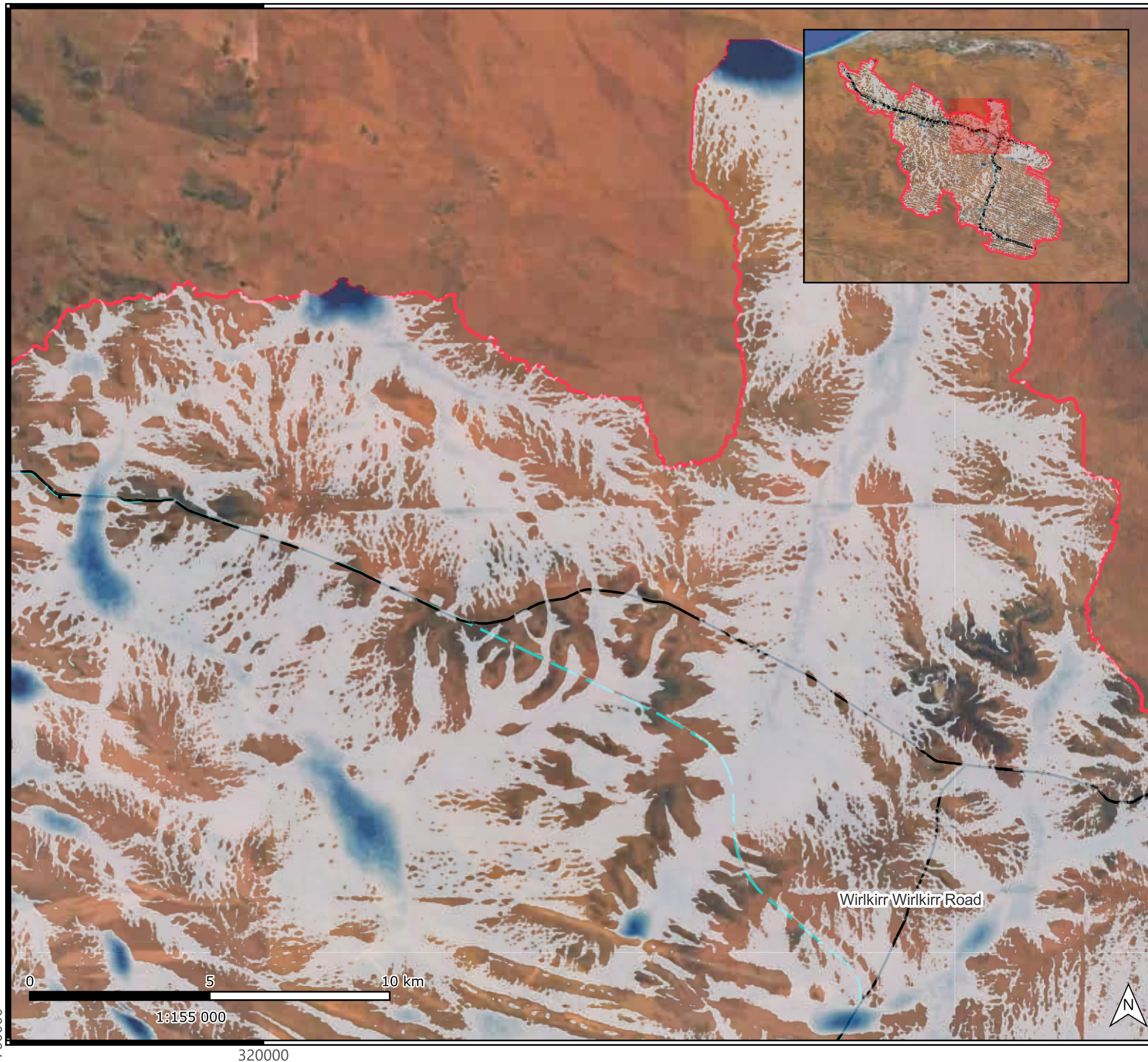
2.50 - 3.00

3.00 - 3.50

> 3.50



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Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024

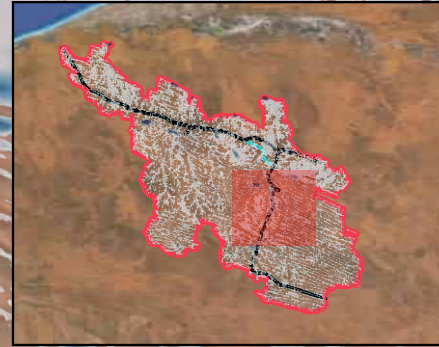
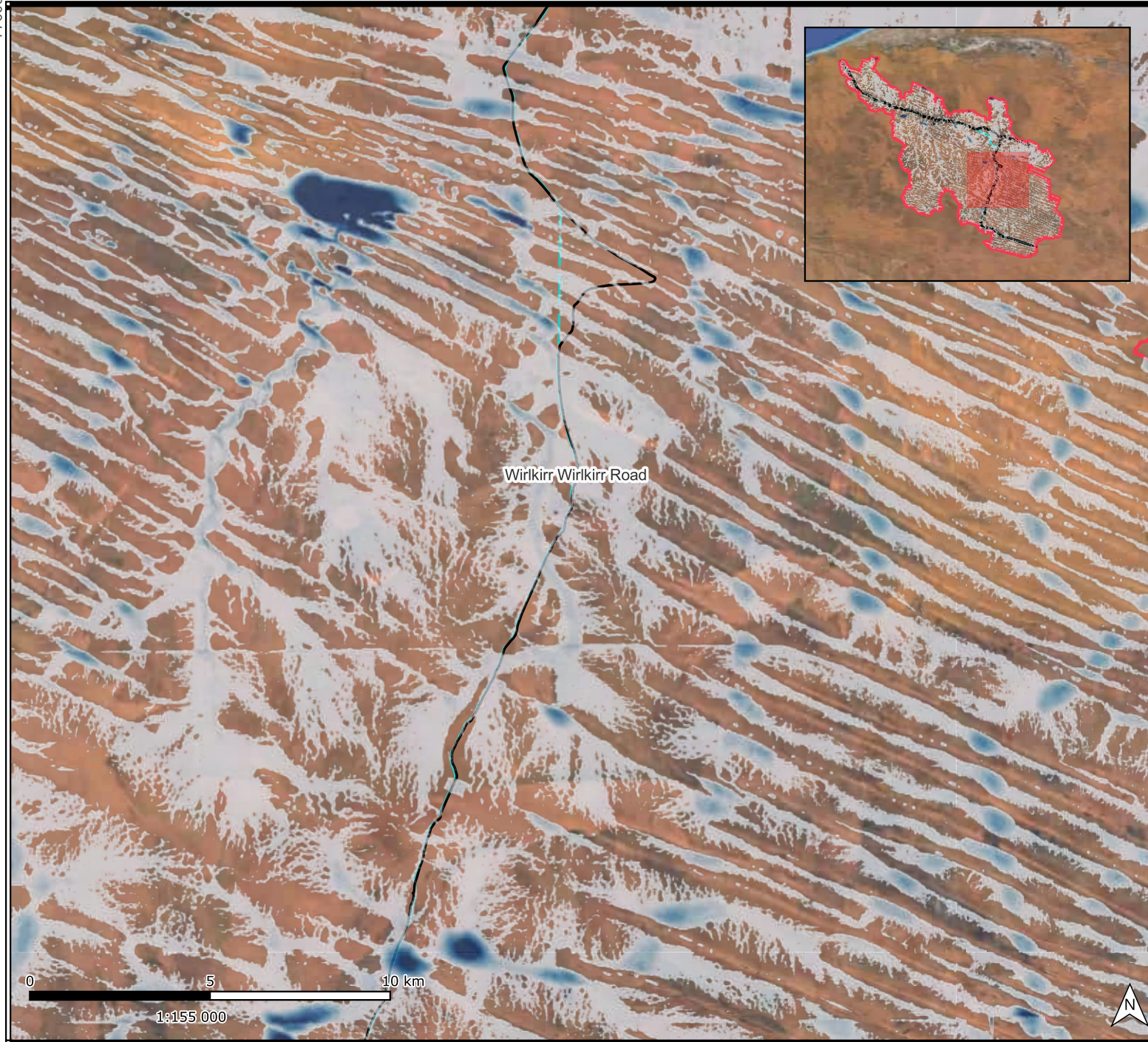


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:

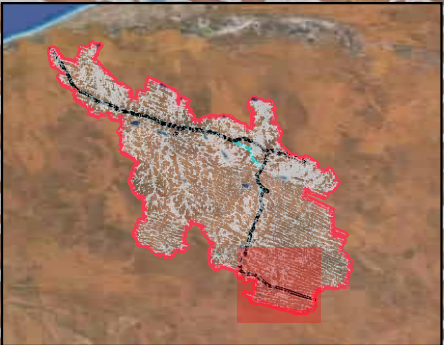
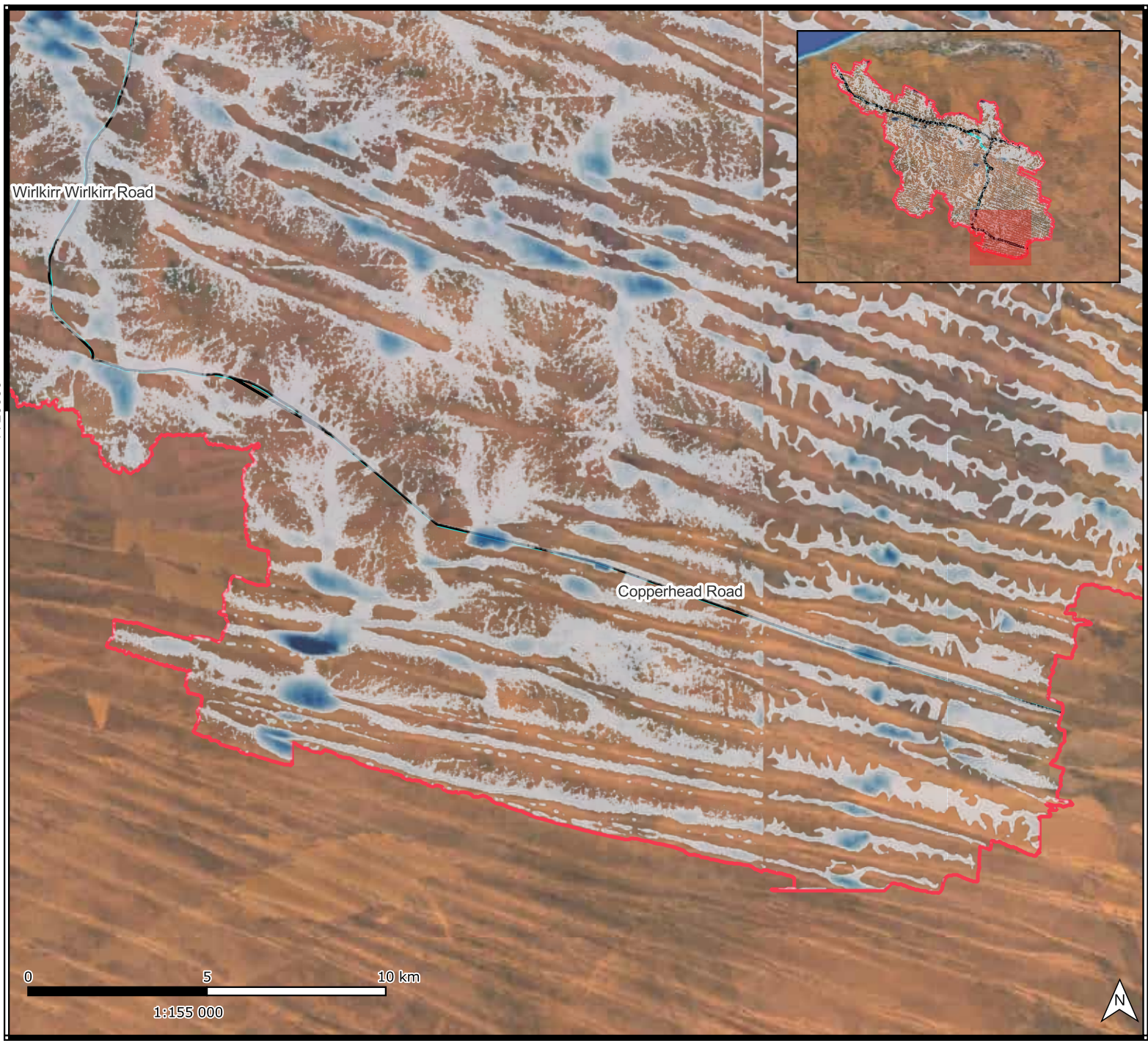
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50





Winu Copper Gold Project
Surface Water Management Plan
Post-Development
1% AEP Flood Depth (Location E)

Project No. 311012-01475 Client Rio Tinto

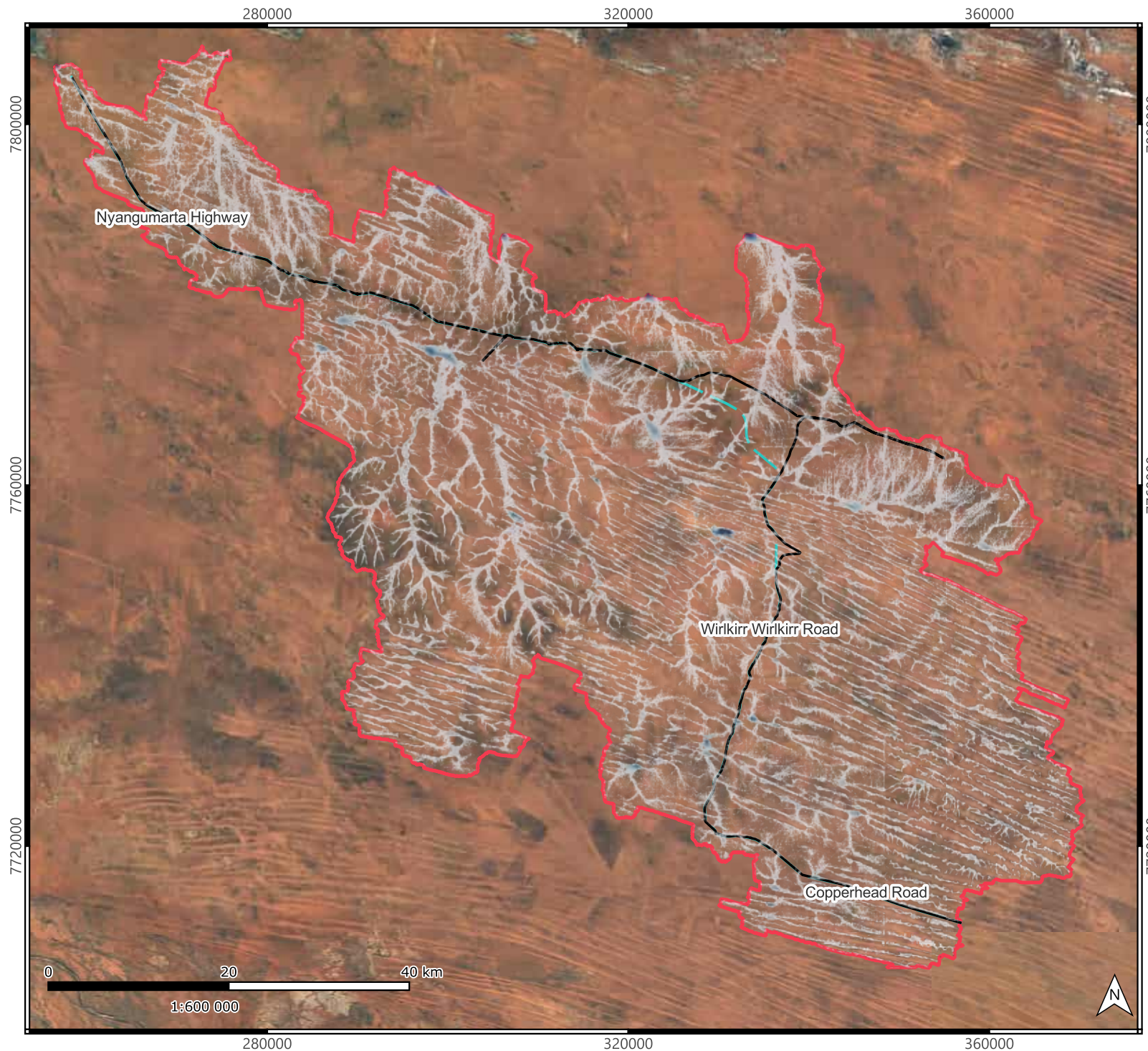
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - <= 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flood Depth

Project No.
311012-01475

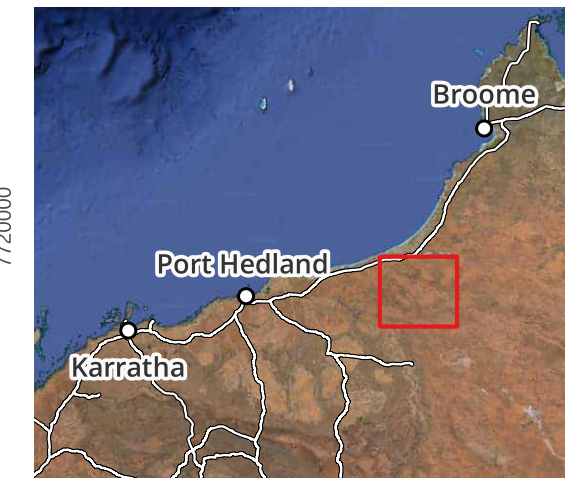
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project
Surface Water Management Plan
Post-Development
5% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flood Depth (m)

<= 0.05

0.05 - 0.50

0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

2.00 - 2.50

2.50 - 3.00

3.00 - 3.50

> 3.50

Nyangumarta Highway

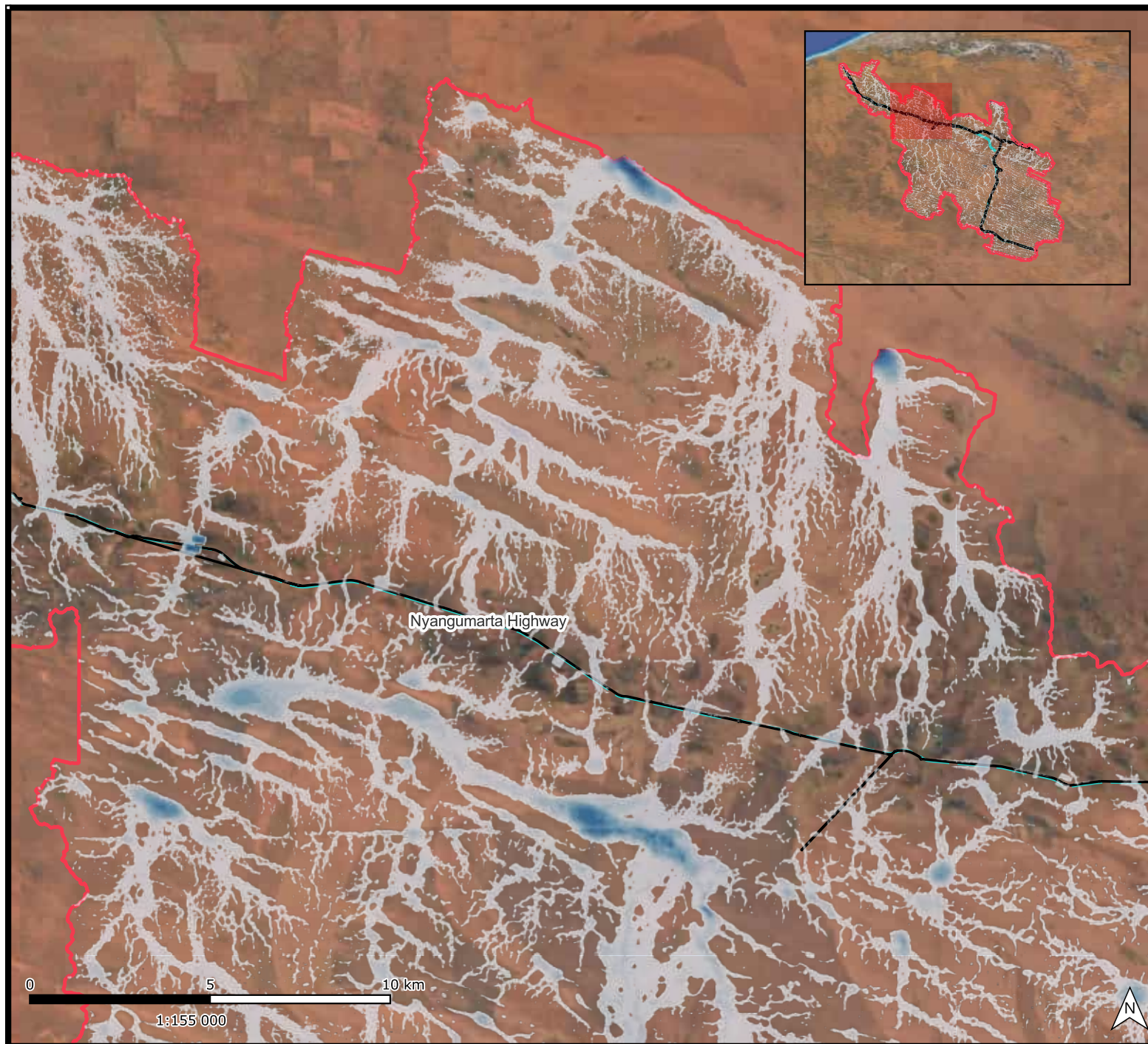
0 5 10 km

1:163 000



280000





Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

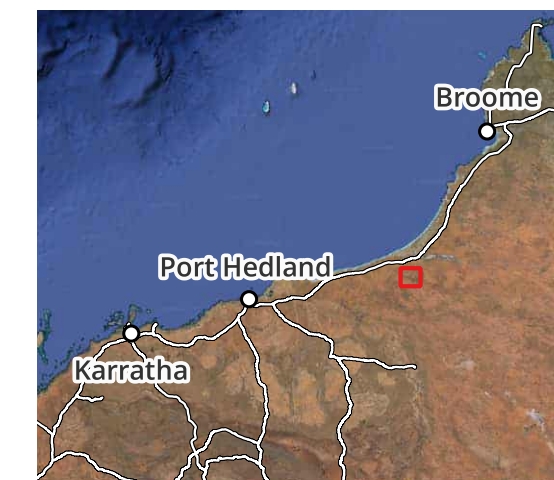
Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024

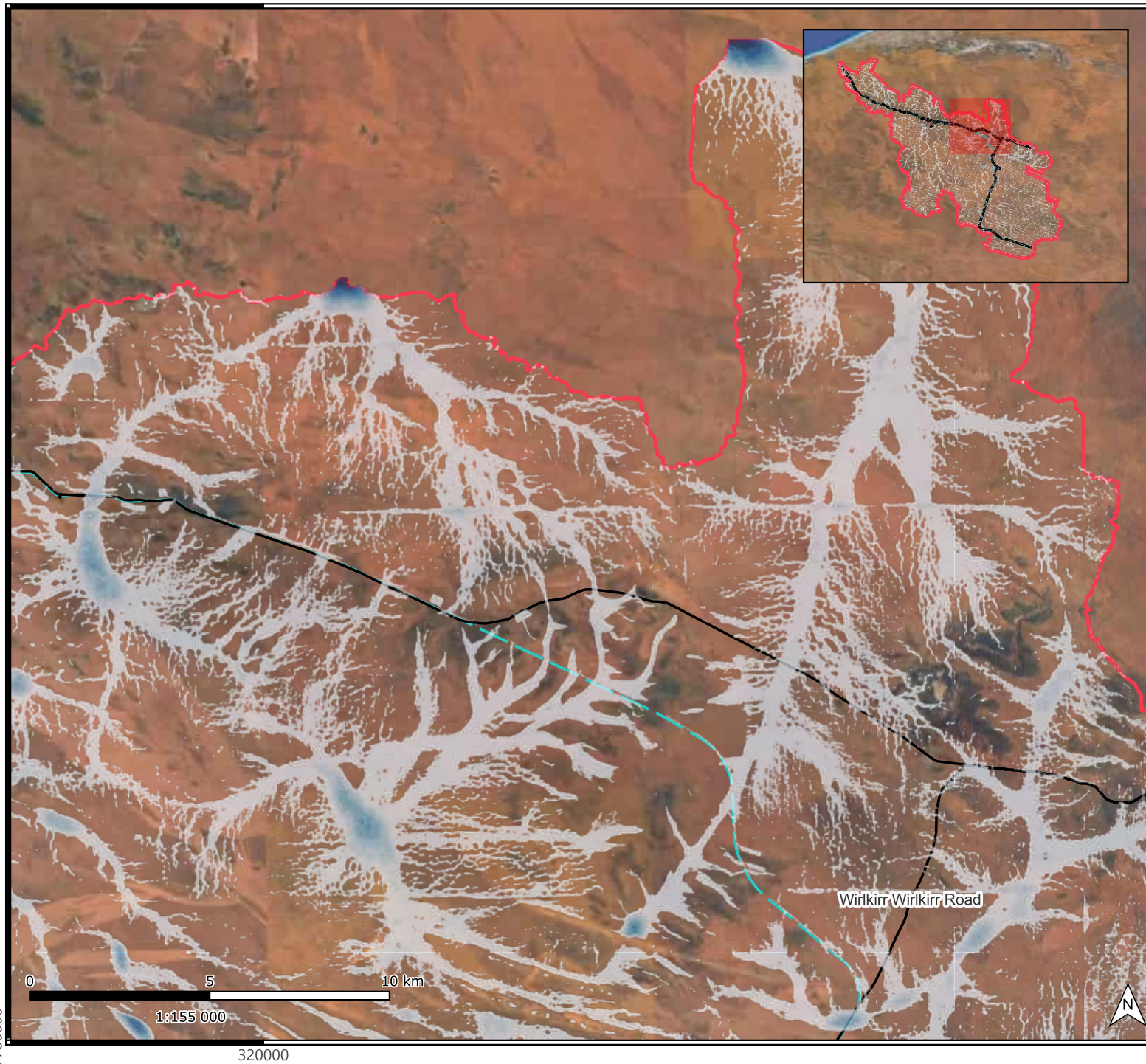


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flood Depth (m)

□ ≤ 0.05

□ 0.05 - 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 2.50

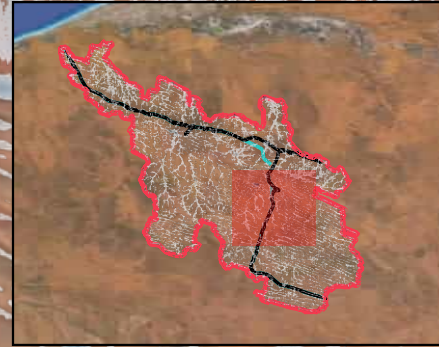
□ 2.50 - 3.00

□ 3.00 - 3.50

□ > 3.50



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Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

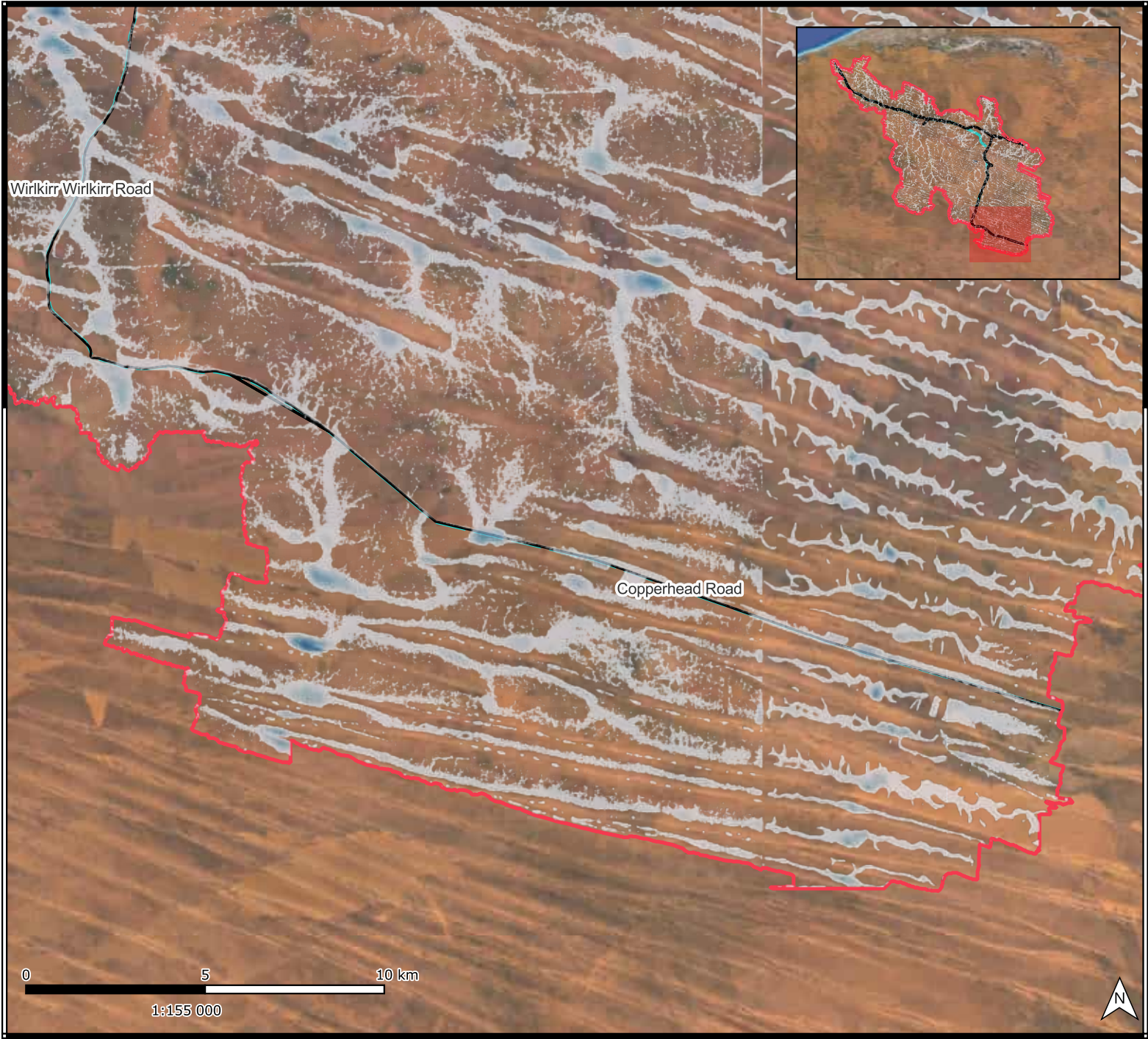
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50





Winu Copper Gold Project
Surface Water Management Plan
Post-Development
5% AEP Flood Depth (Location E)

Project No.
311012-01475

Client
Rio Tinto

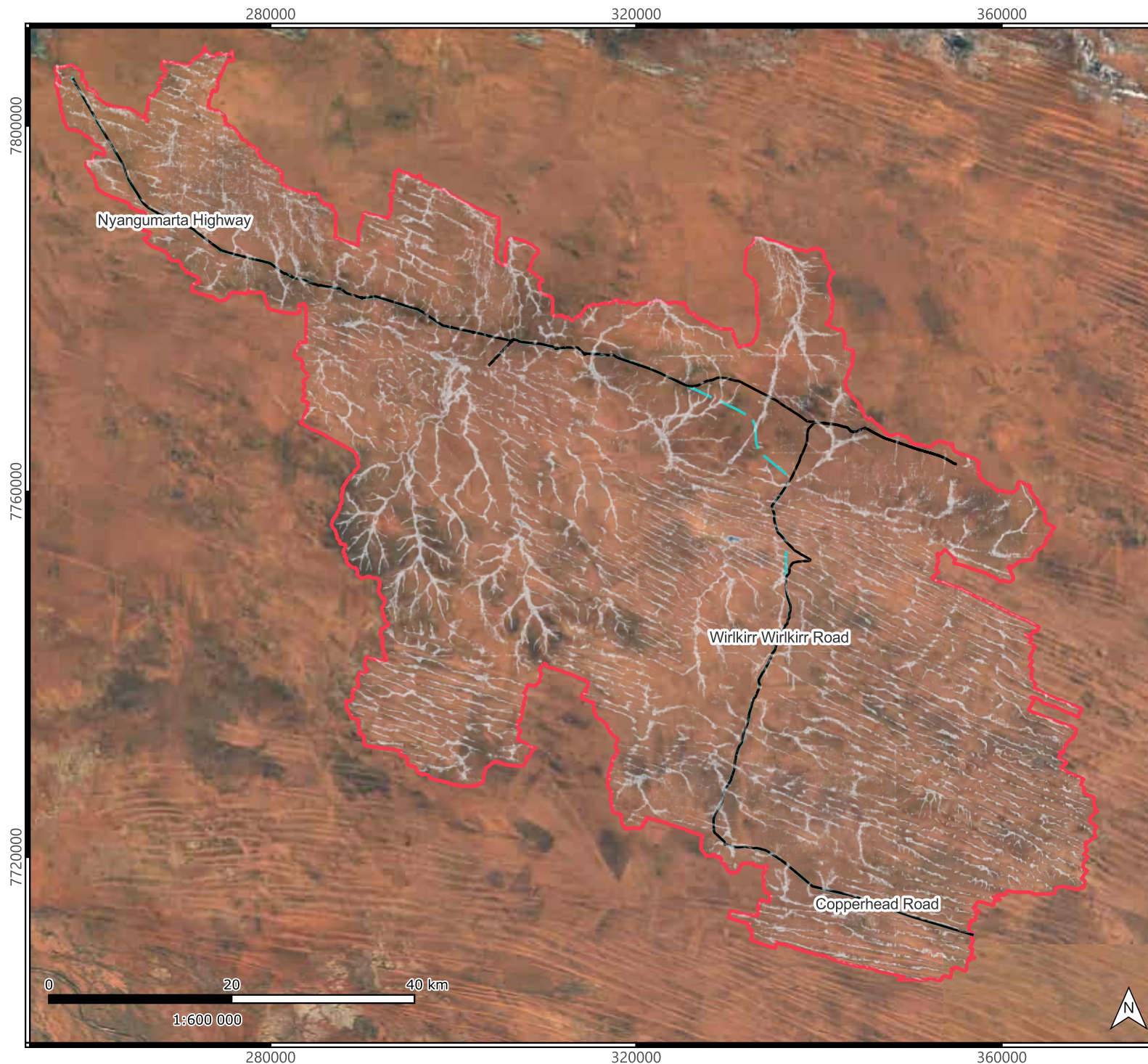
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flood Depth

Project No.
311012-01475

Client
Rio Tinto

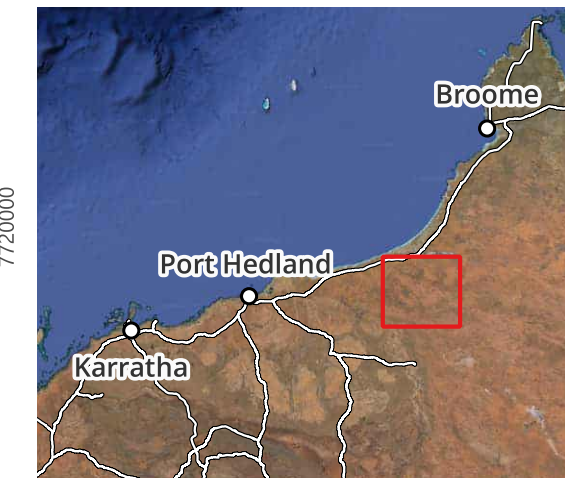
Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50



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Winu Copper Gold Project
Surface Water Management Plan
Post-Development
10% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flood Depth (m)

<= 0.05

0.05 - 0.50

0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

2.00 - 2.50

2.50 - 3.00

3.00 - 3.50

> 3.50

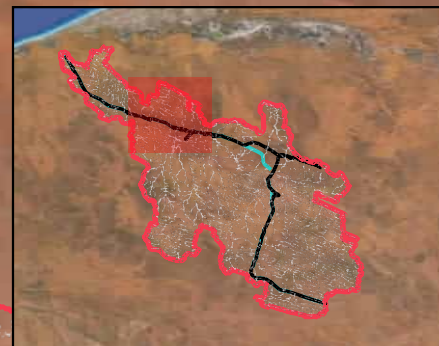
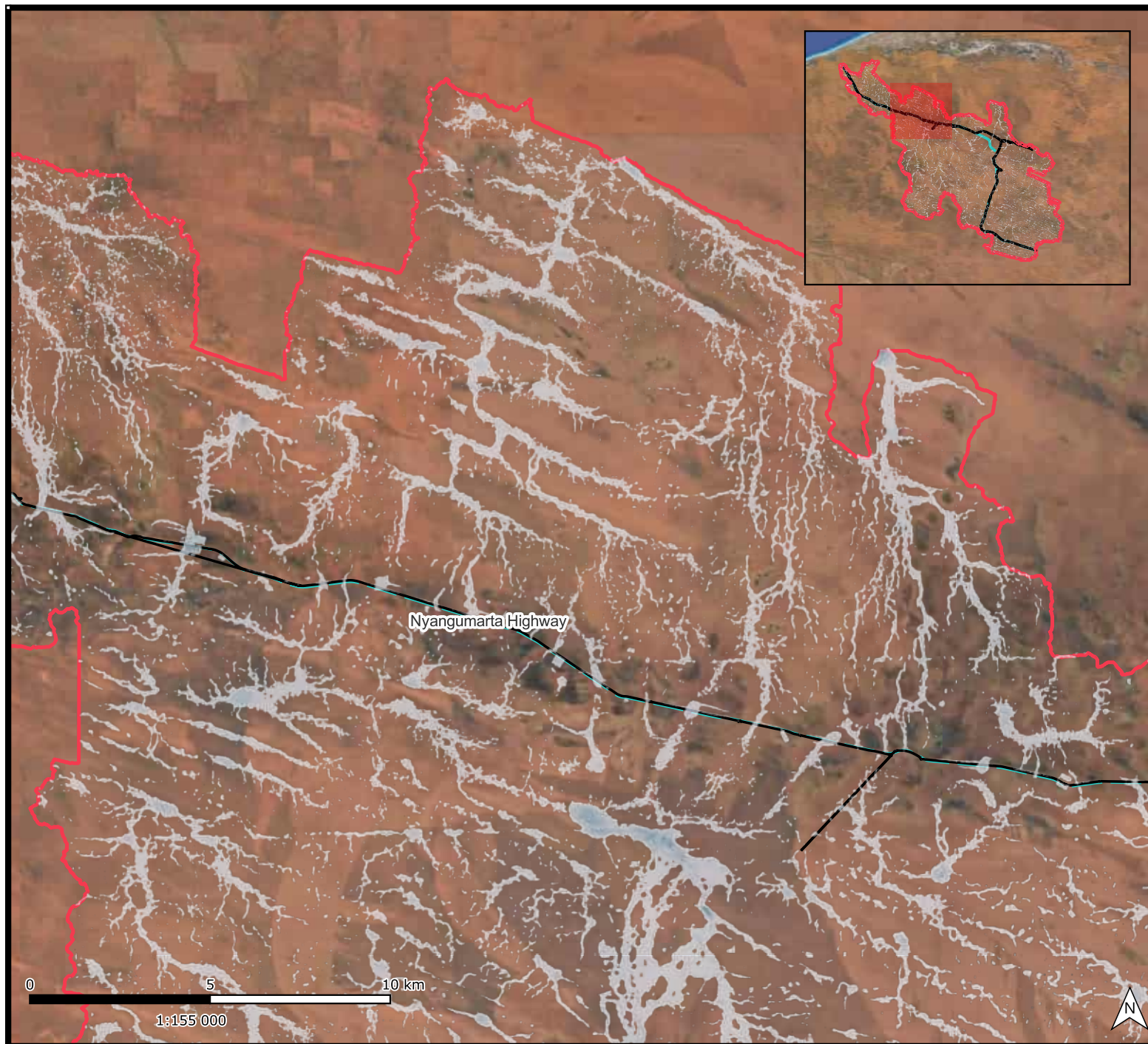
Nyangumarta Highway

0 5 10 km

1:163 000

280000





Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flood Depth (m)

□ ≤ 0.05

□ 0.05 - 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

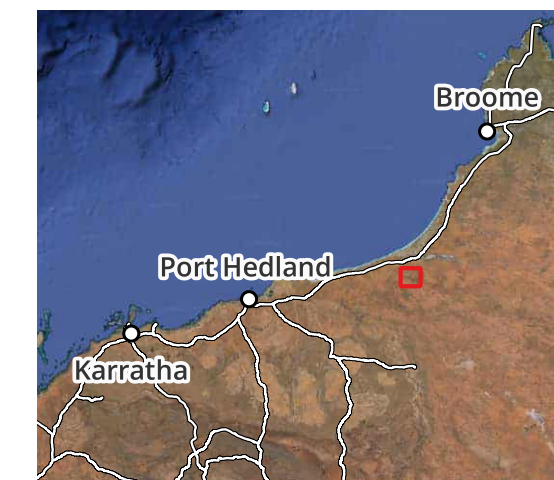
□ 1.50 - 2.00

□ 2.00 - 2.50

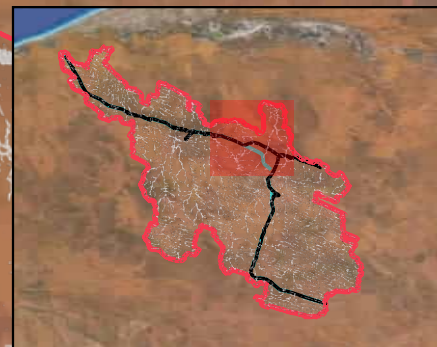
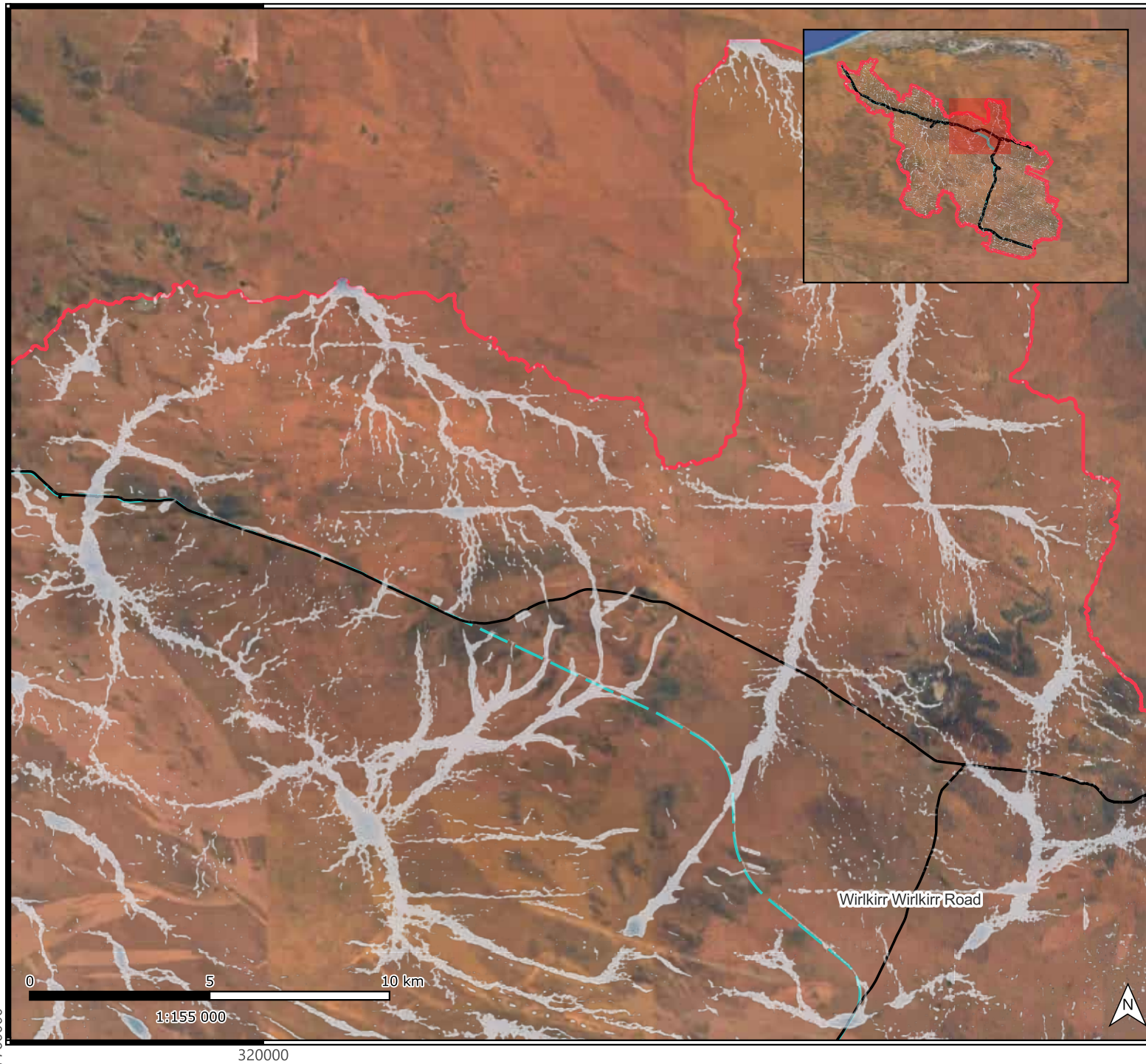
□ 2.50 - 3.00

□ 3.00 - 3.50

□ > 3.50



320000



Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flood Depth (m)

□ ≤ 0.05

□ 0.05 - 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 2.50

□ 2.50 - 3.00

□ 3.00 - 3.50

□ > 3.50

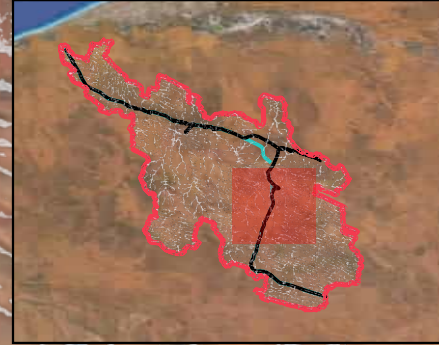
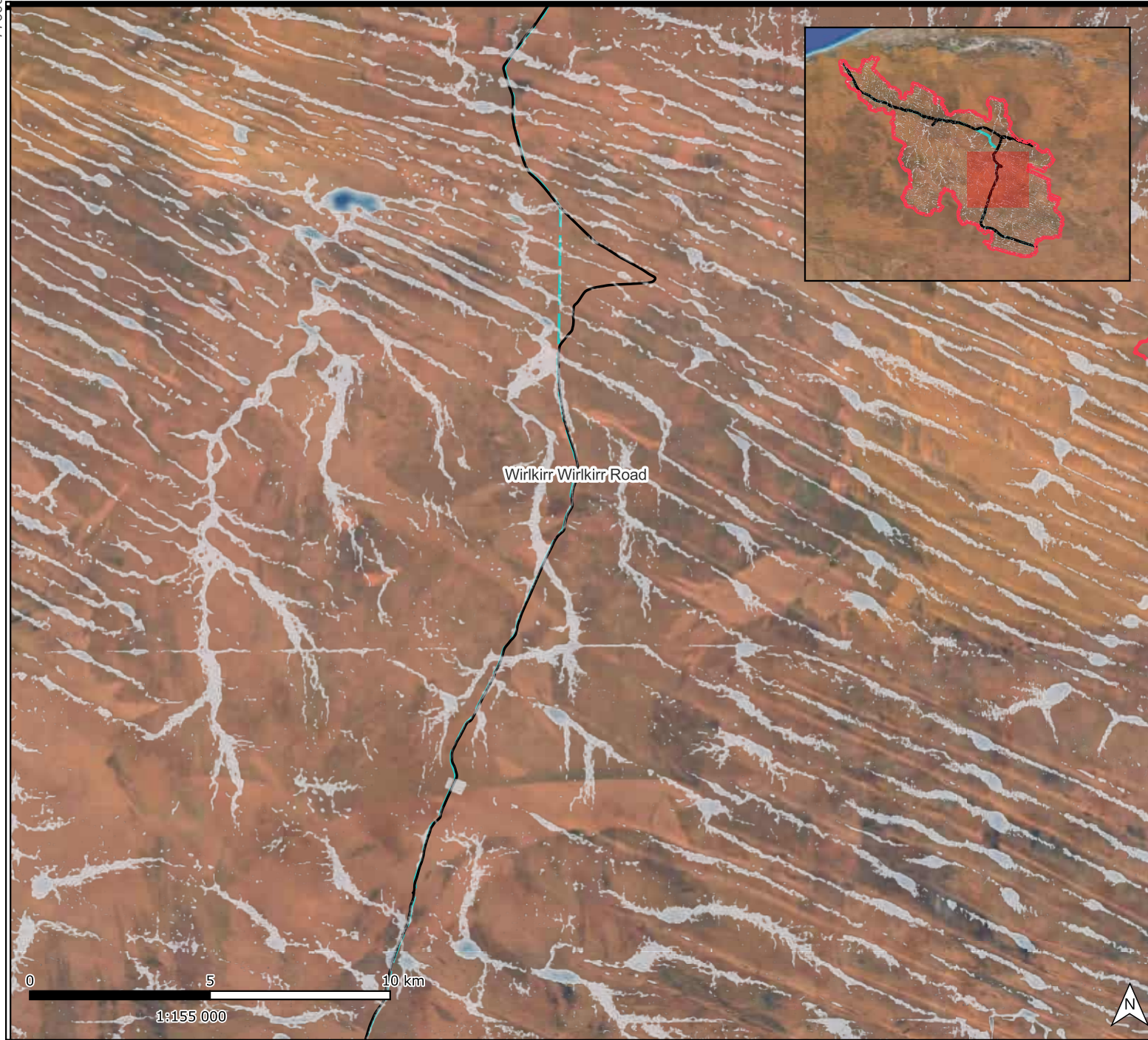


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Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

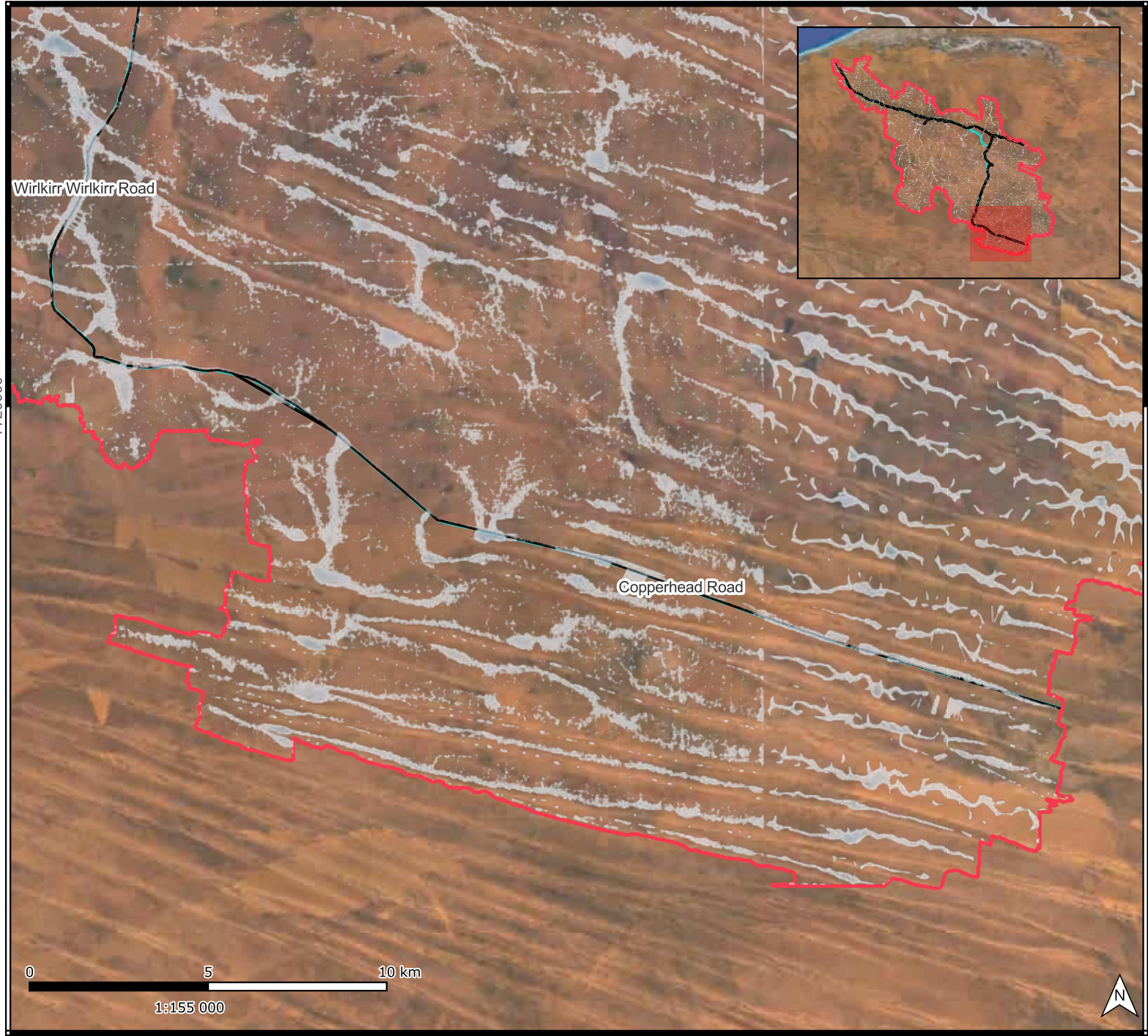
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= 0.05
- 0.05 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- 3.00 - 3.50
- > 3.50





Winu Copper Gold Project
Surface Water Management Plan
Post-Development
10% AEP Flood Depth (Location E)

Project No. 311012-01475 Client Rio Tinto

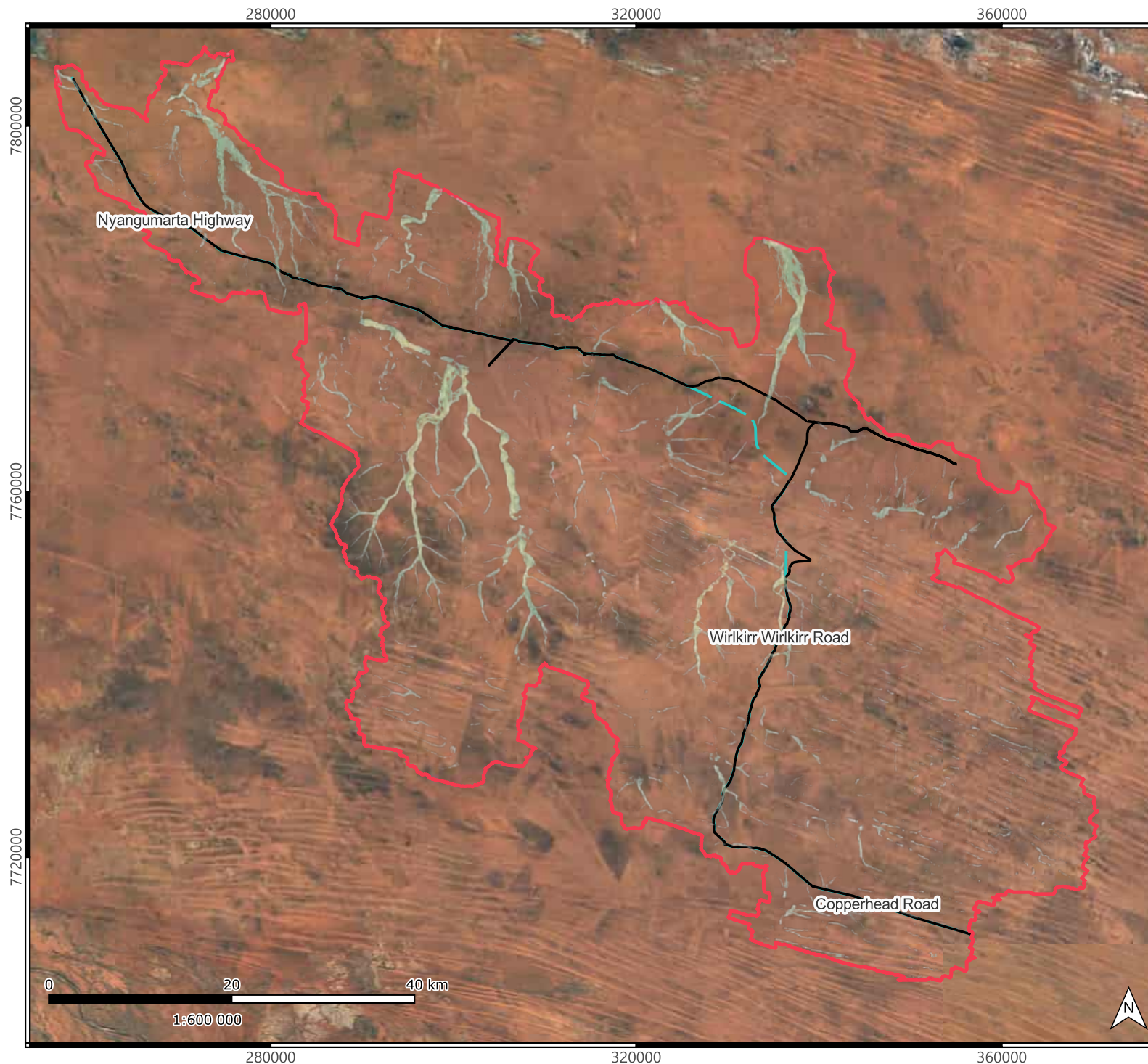
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ 0.05
 - 0.05 - 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 2.50
 - 2.50 - 3.00
 - 3.00 - 3.50
 - > 3.50





Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flow Velocity

Project No.
311012-01475

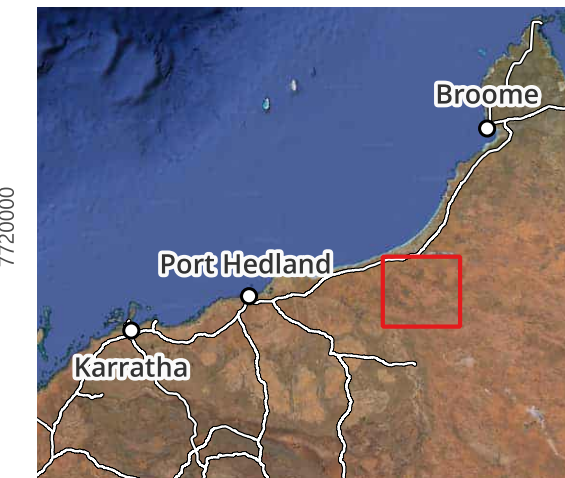
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00



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Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
1% AEP Flow Velocity (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flow Velocity (m/s)

≤ 0.50

0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

2.00 - 3.00

> 3.00

Nyangumarta Highway

0 5 10 km

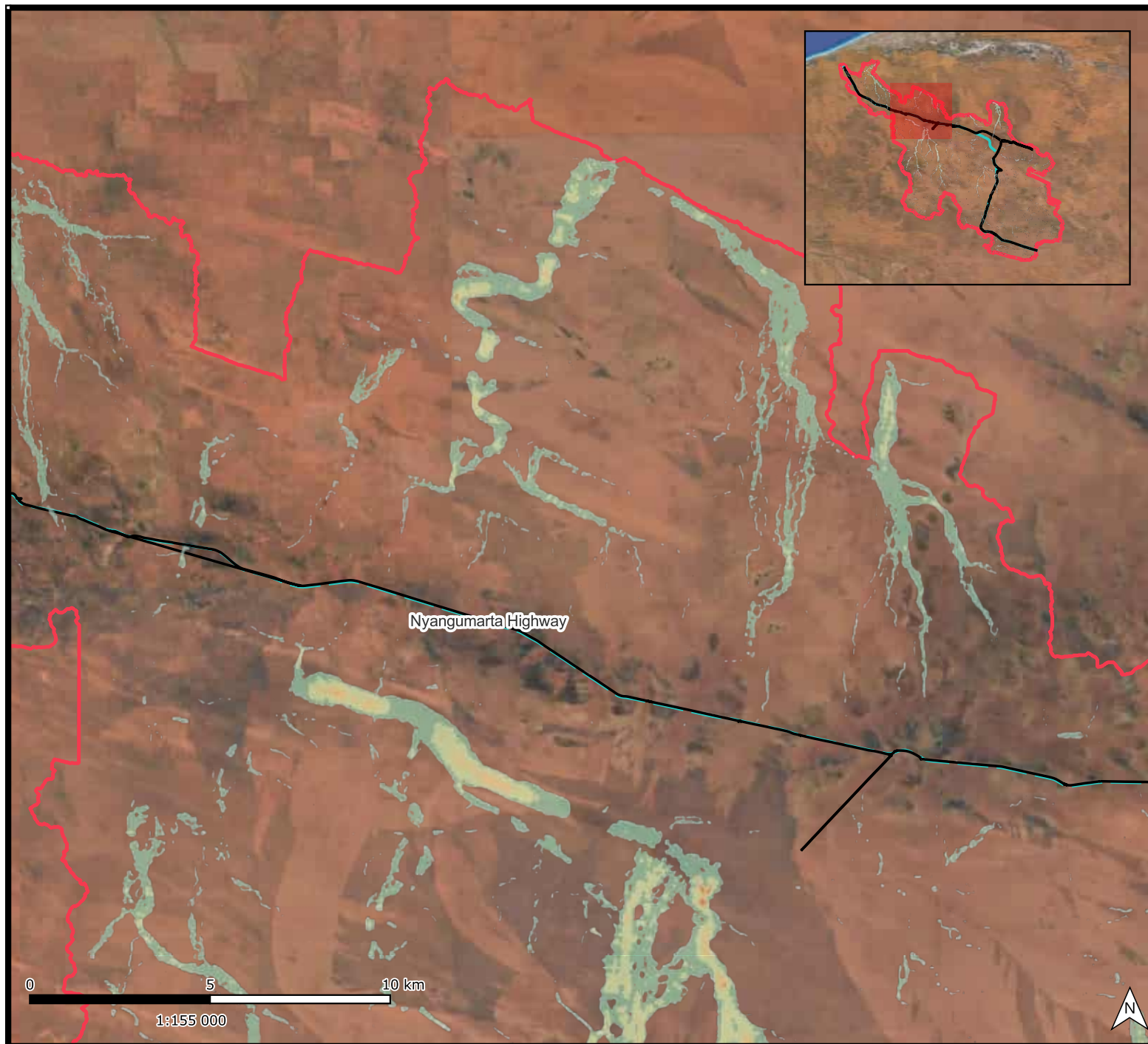
1:163 000



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Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flow Velocity (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

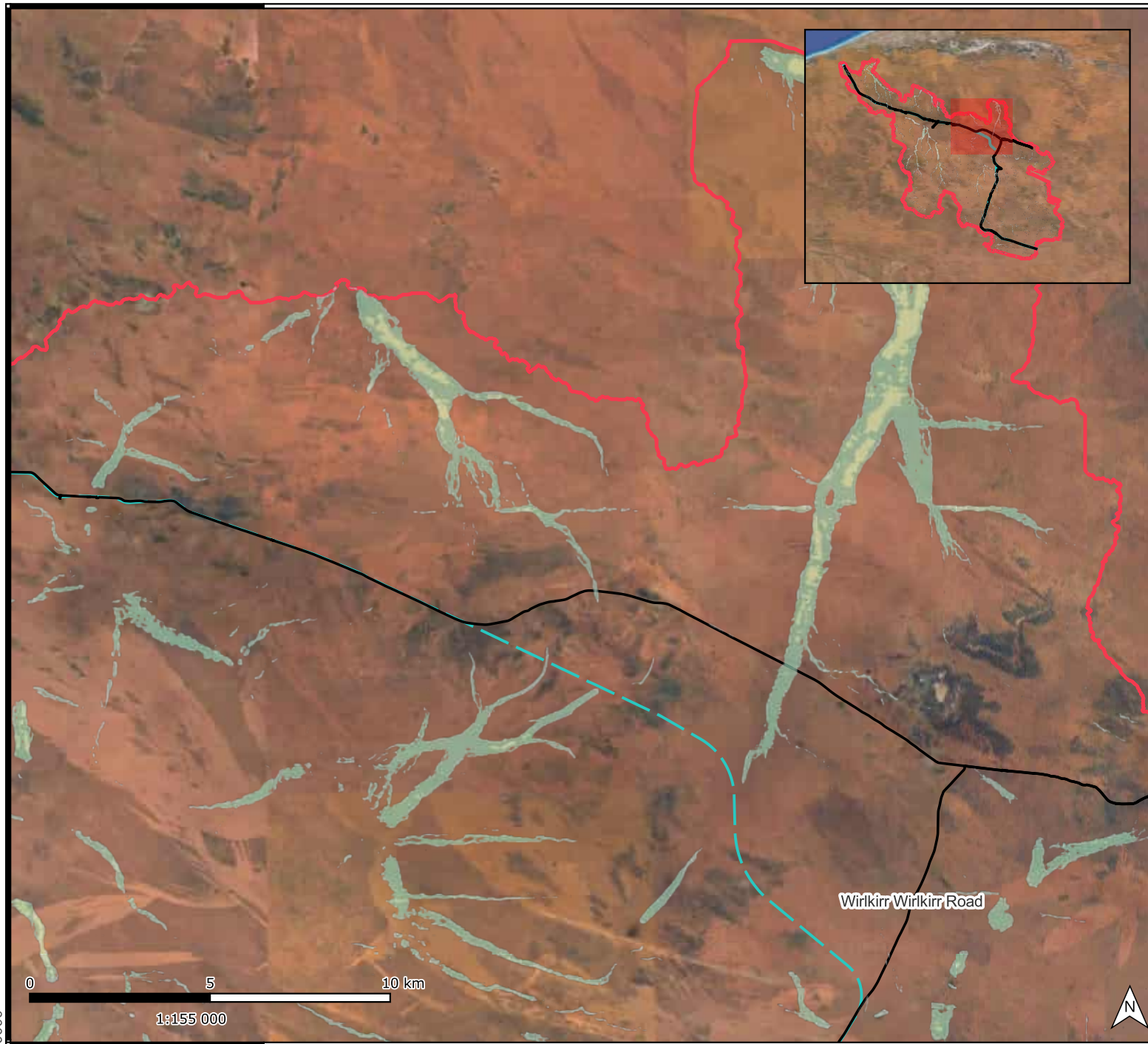
- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



320000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flow Velocity (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ ≤ 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

□ > 3.00



320000

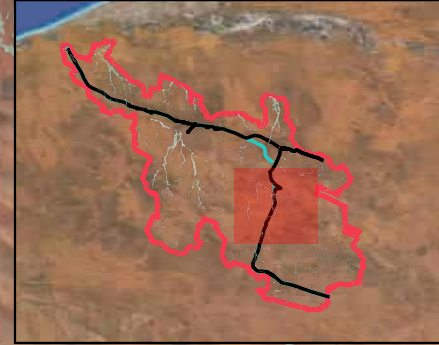
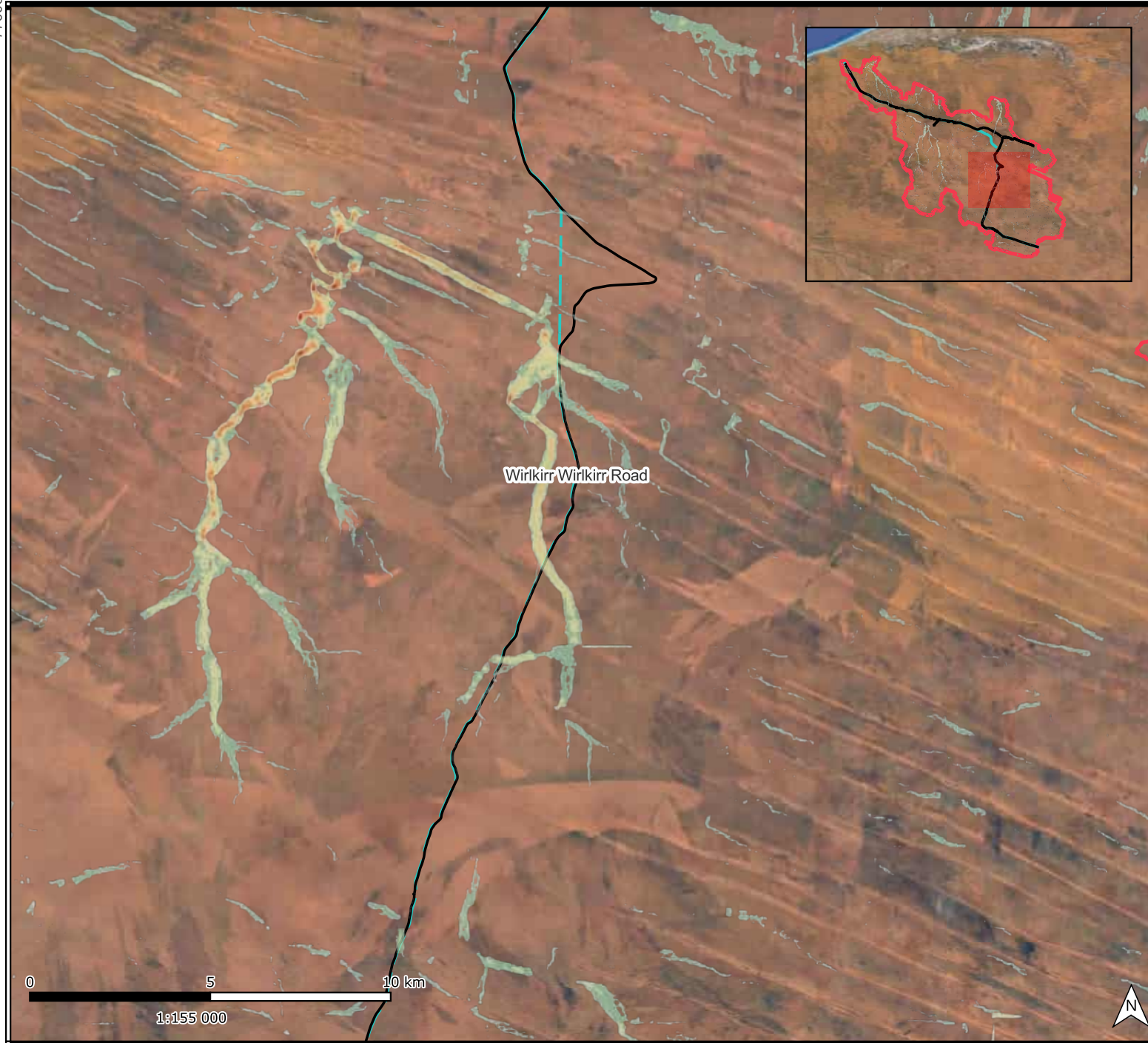
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Winu Copper Gold Project Surface Water Management Plan Pre-Development 1% AEP Flow Velocity (Location D)

Project No.
311012-01475

Client
Rio Tinto

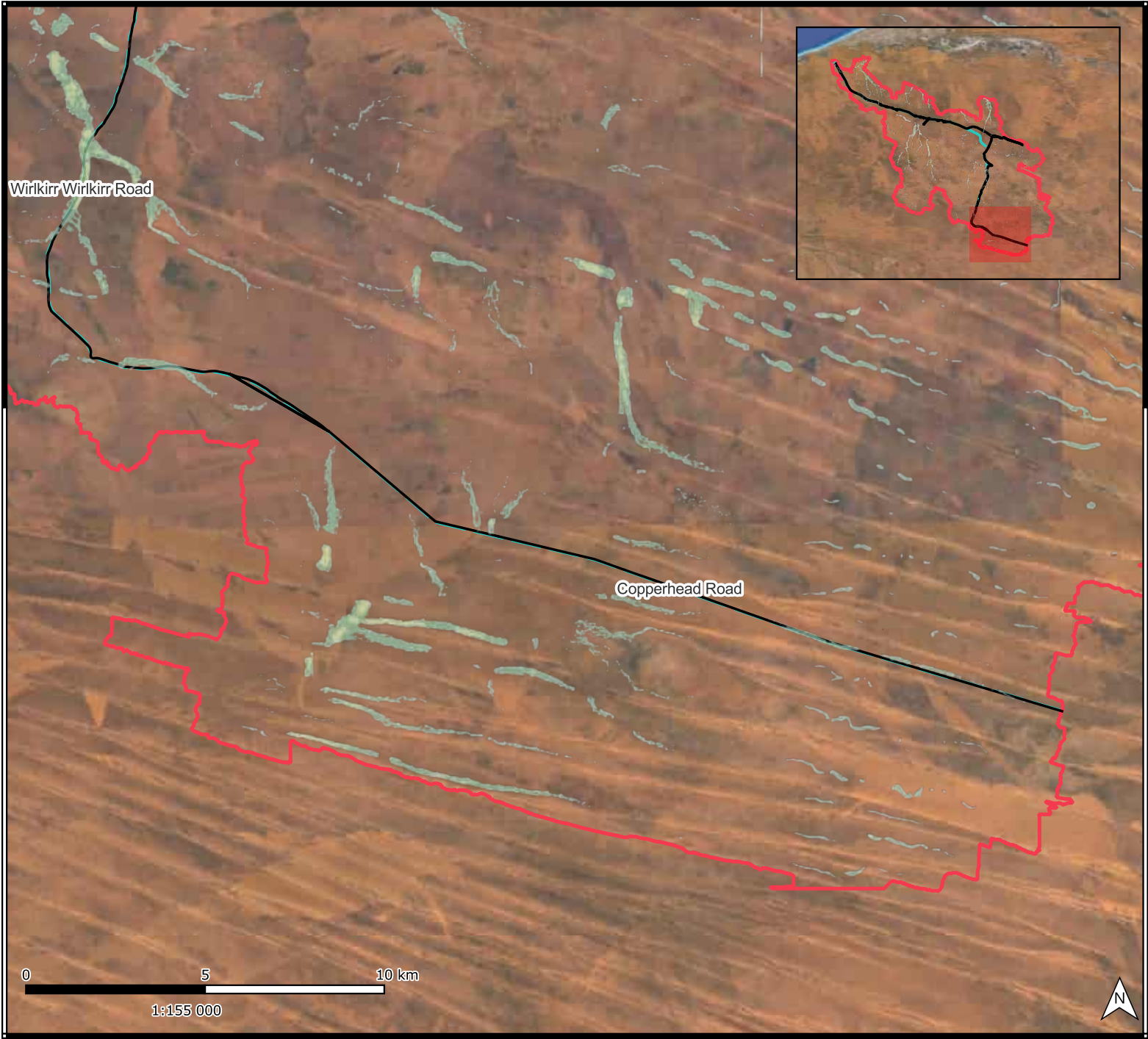
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
1% AEP Flow Velocity (Location E)

Project No. 311012-01475 Client Rio Tinto

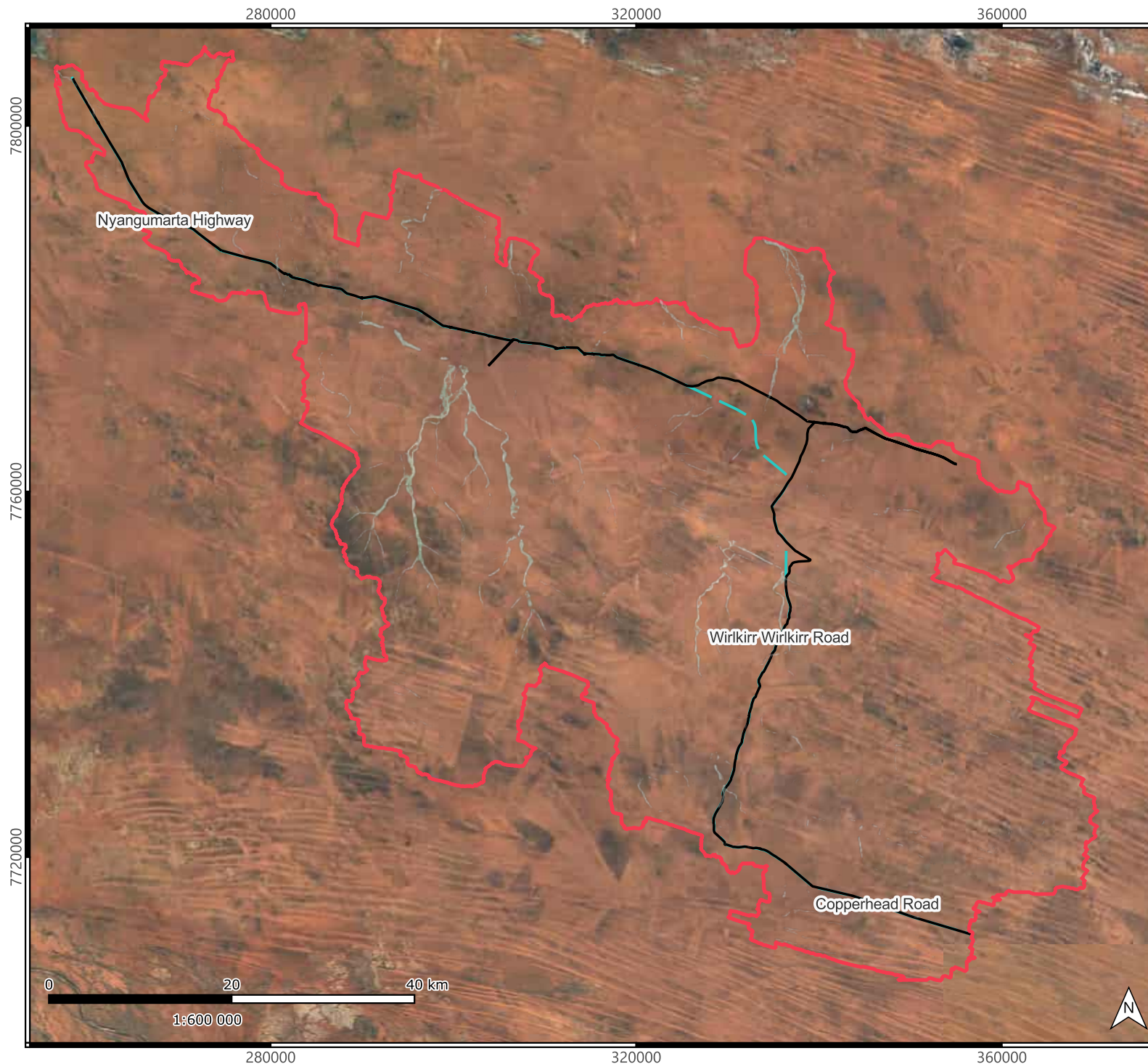
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flow Velocity

Project No.
311012-01475

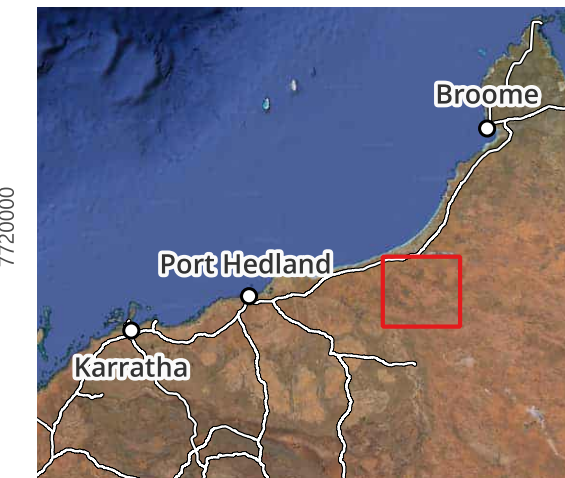
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00



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Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
5% AEP Flow Velocity (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

 Proposed Access Road

 Existing Access Road

 Model Extent

Flow Velocity (m/s)

 ≤ 0.50

 0.50 - 1.00

 1.00 - 1.50

 1.50 - 2.00

 2.00 - 3.00

 > 3.00

Nyangumarta Highway

0 5 10 km

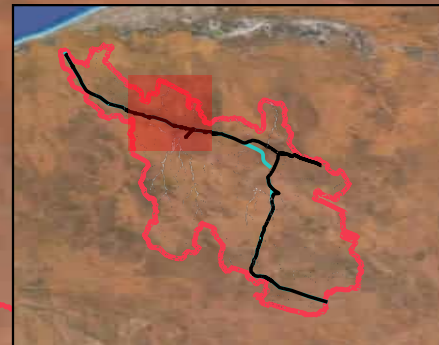
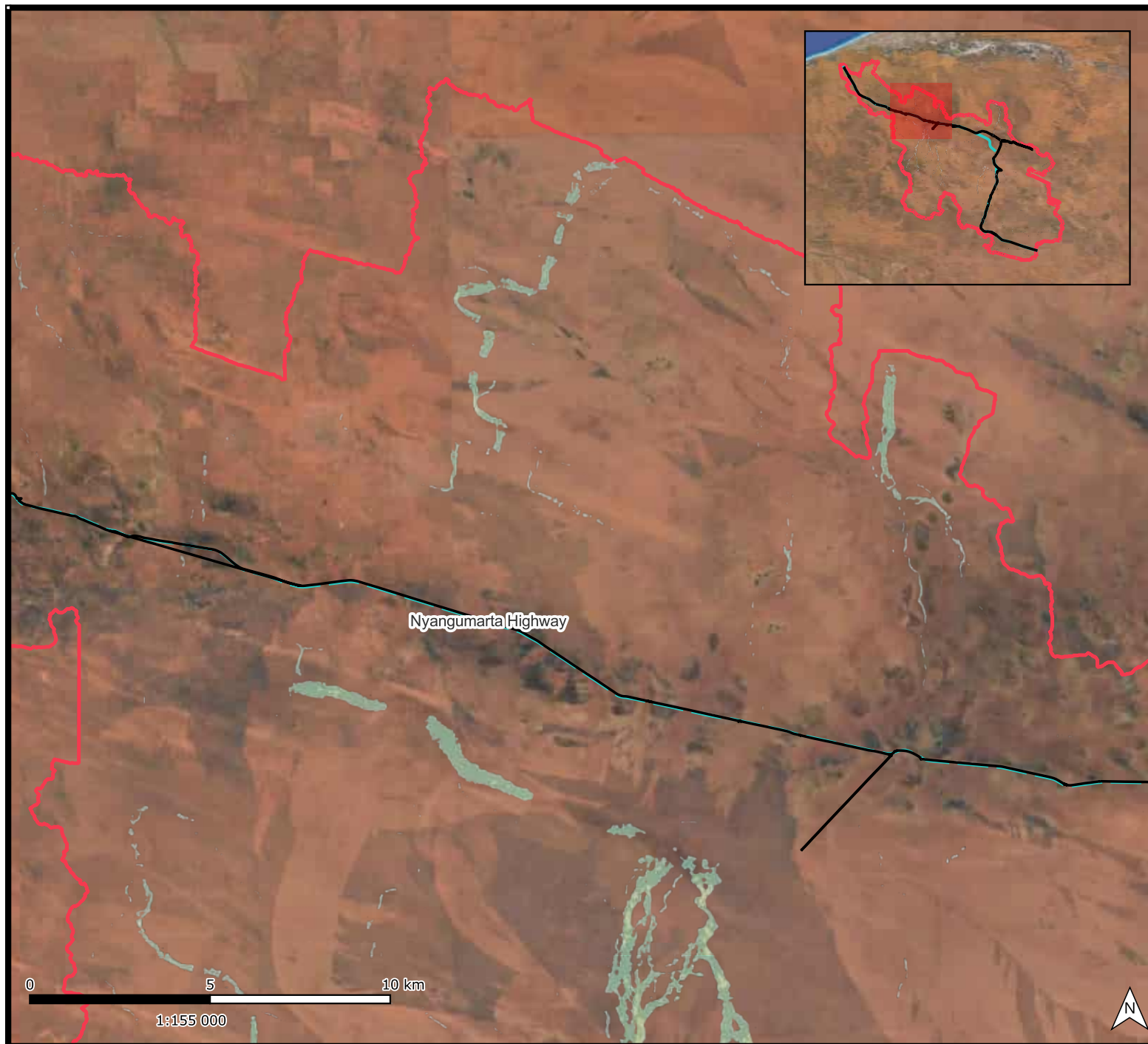
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Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flow Velocity (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

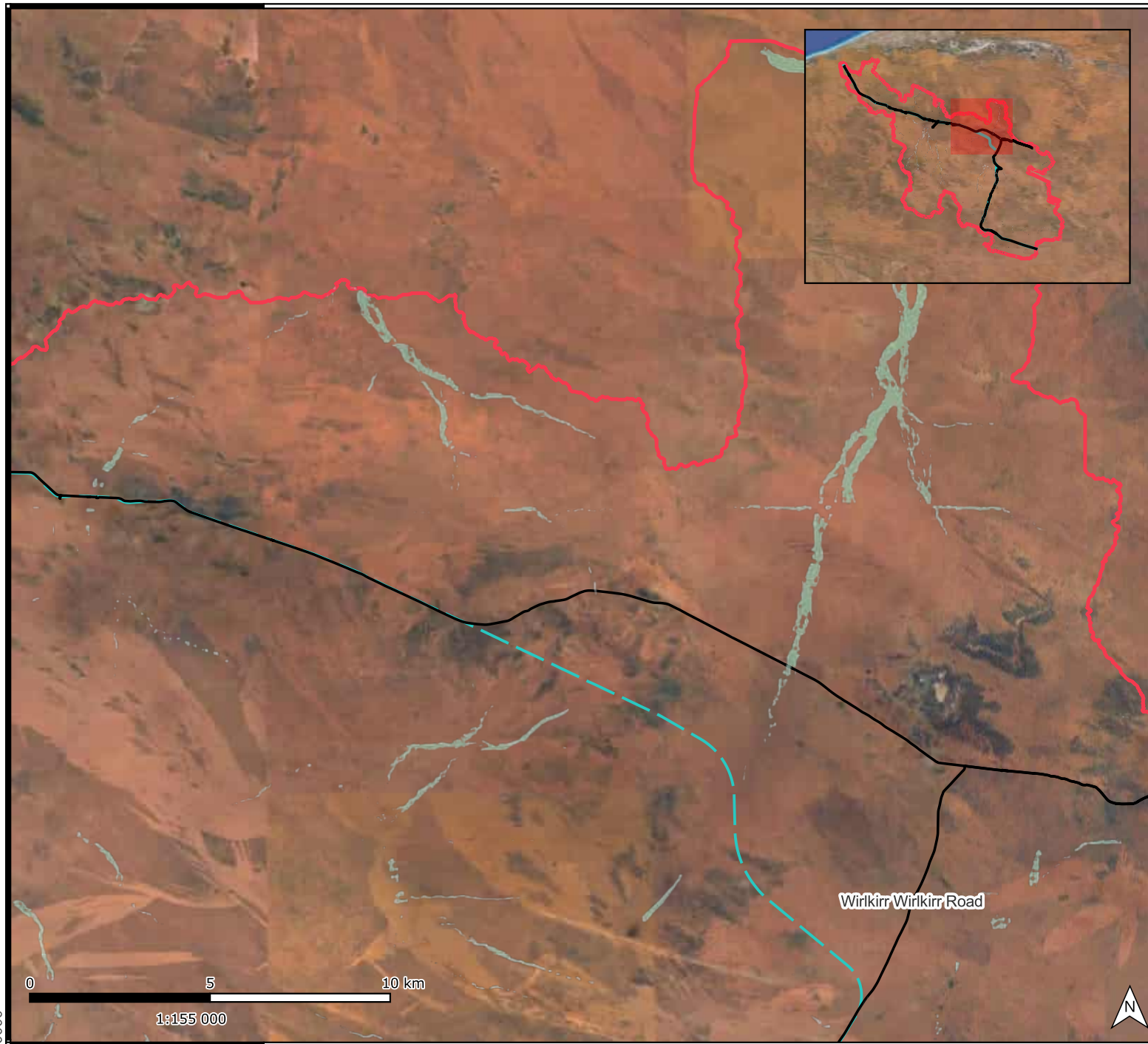
- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



320000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flow Velocity (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

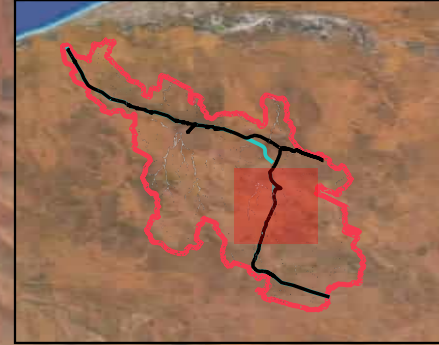
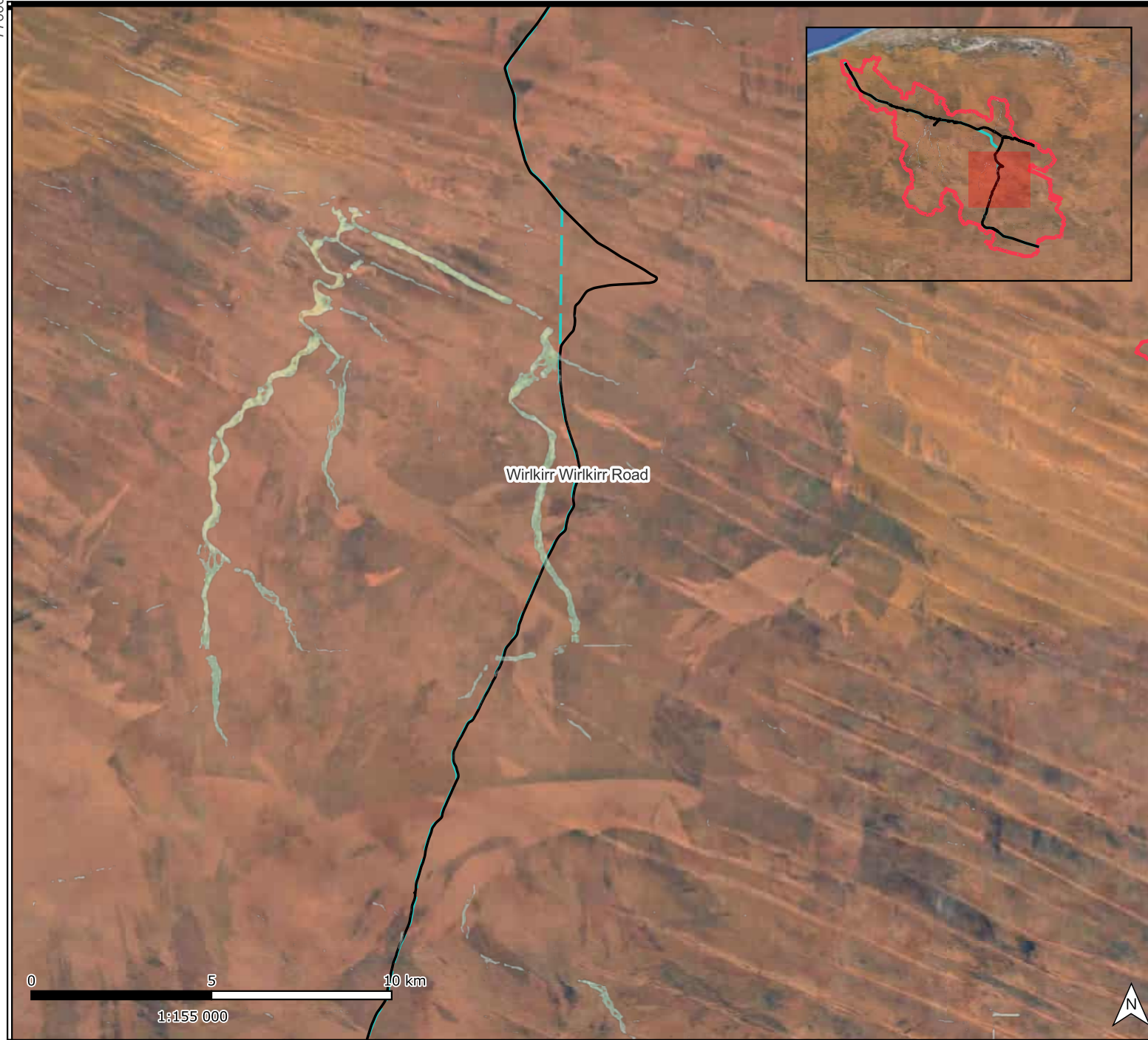
- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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Winu Copper Gold Project Surface Water Management Plan Pre-Development 5% AEP Flow Velocity (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ ≤ 0.50

□ 0.50 - 1.00

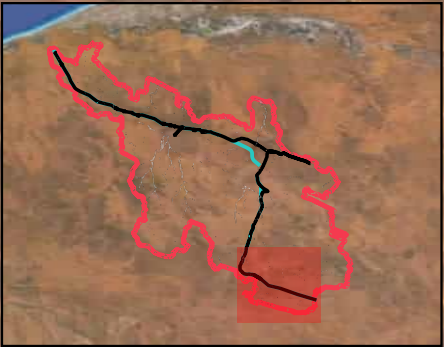
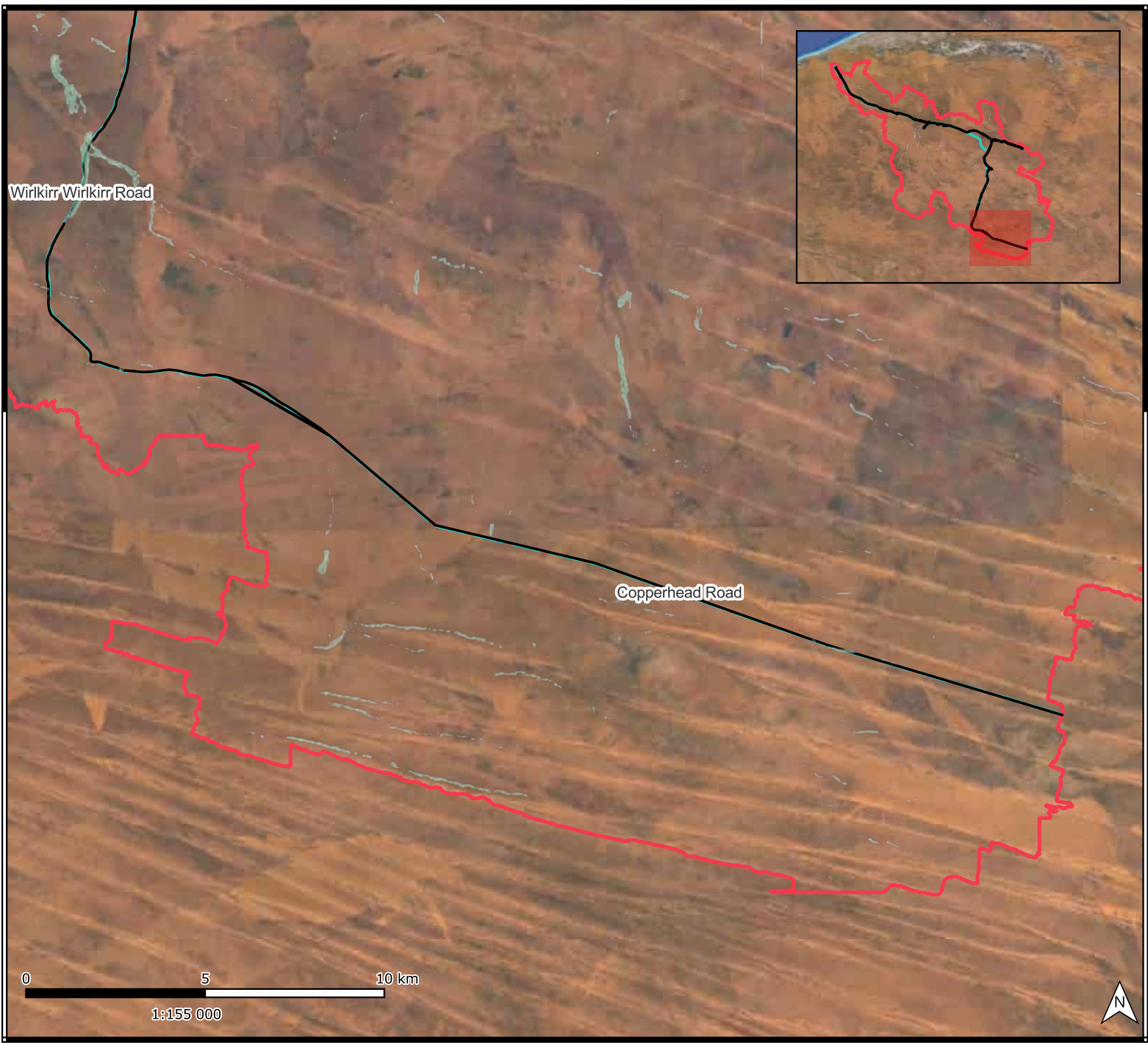
□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

□ > 3.00





Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
5% AEP Flow Velocity (Location E)

Project No. 311012-01475 Client Rio Tinto

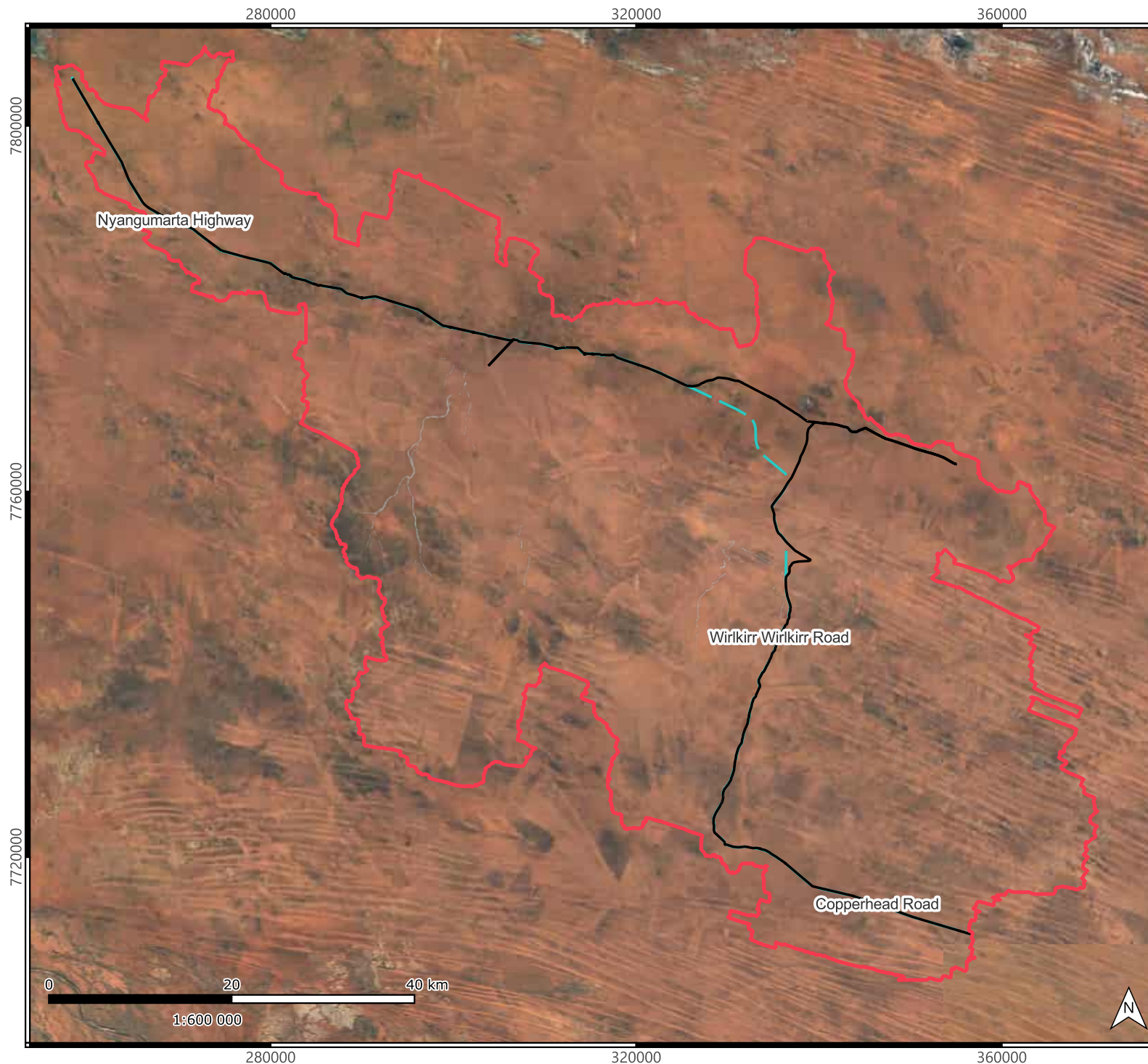
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flow Velocity

Project No.
311012-01475

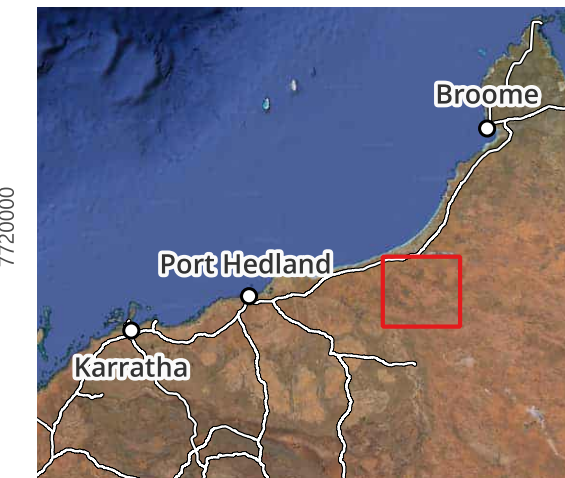
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00



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Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
10% AEP Flow Velocity (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flow Velocity (m/s)

≤ 0.50

0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

2.00 - 3.00

> 3.00

Nyangumarta Highway

0 5 10 km

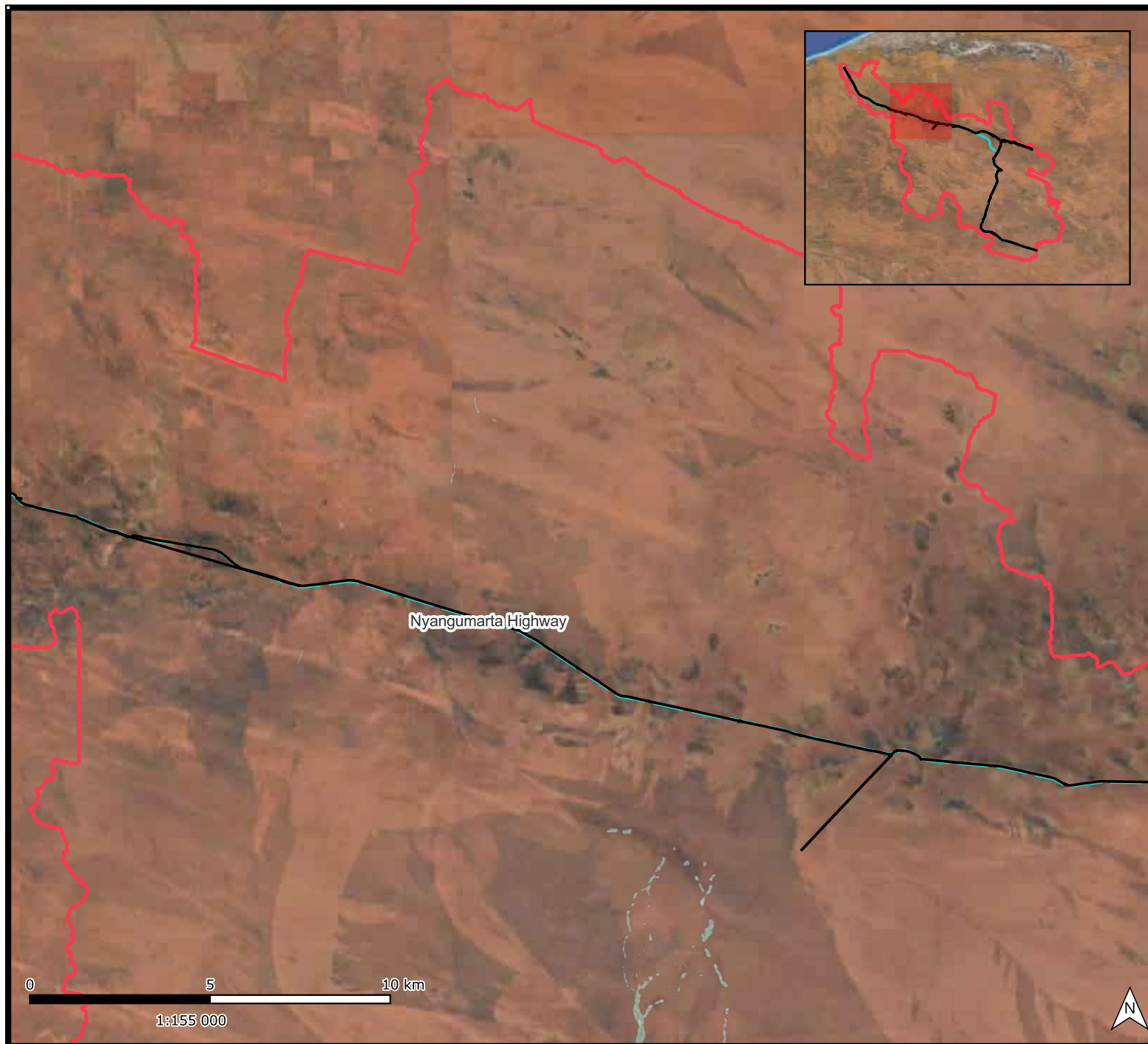
1:163 000



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Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flow Velocity (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

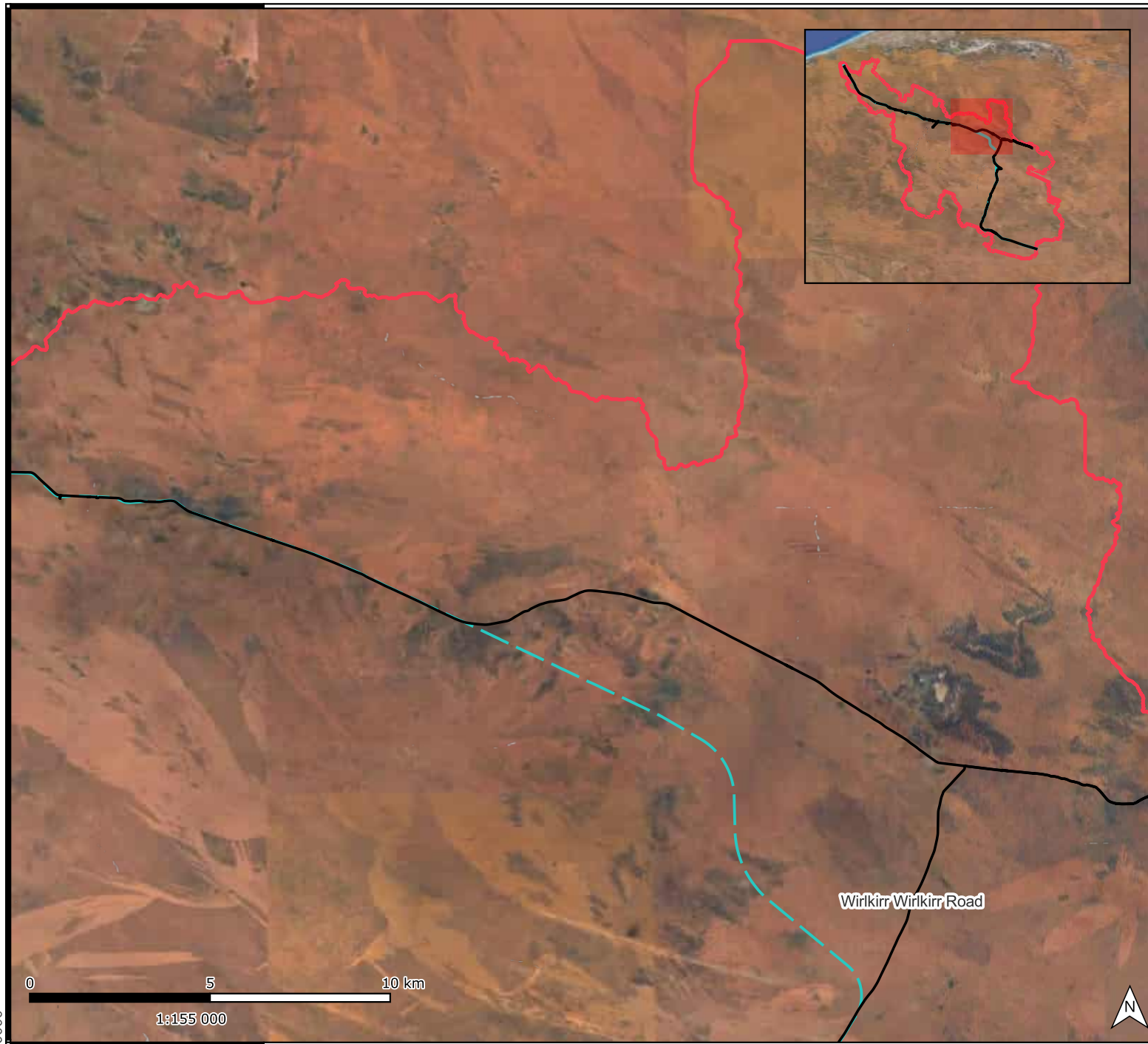
- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flow Velocity (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

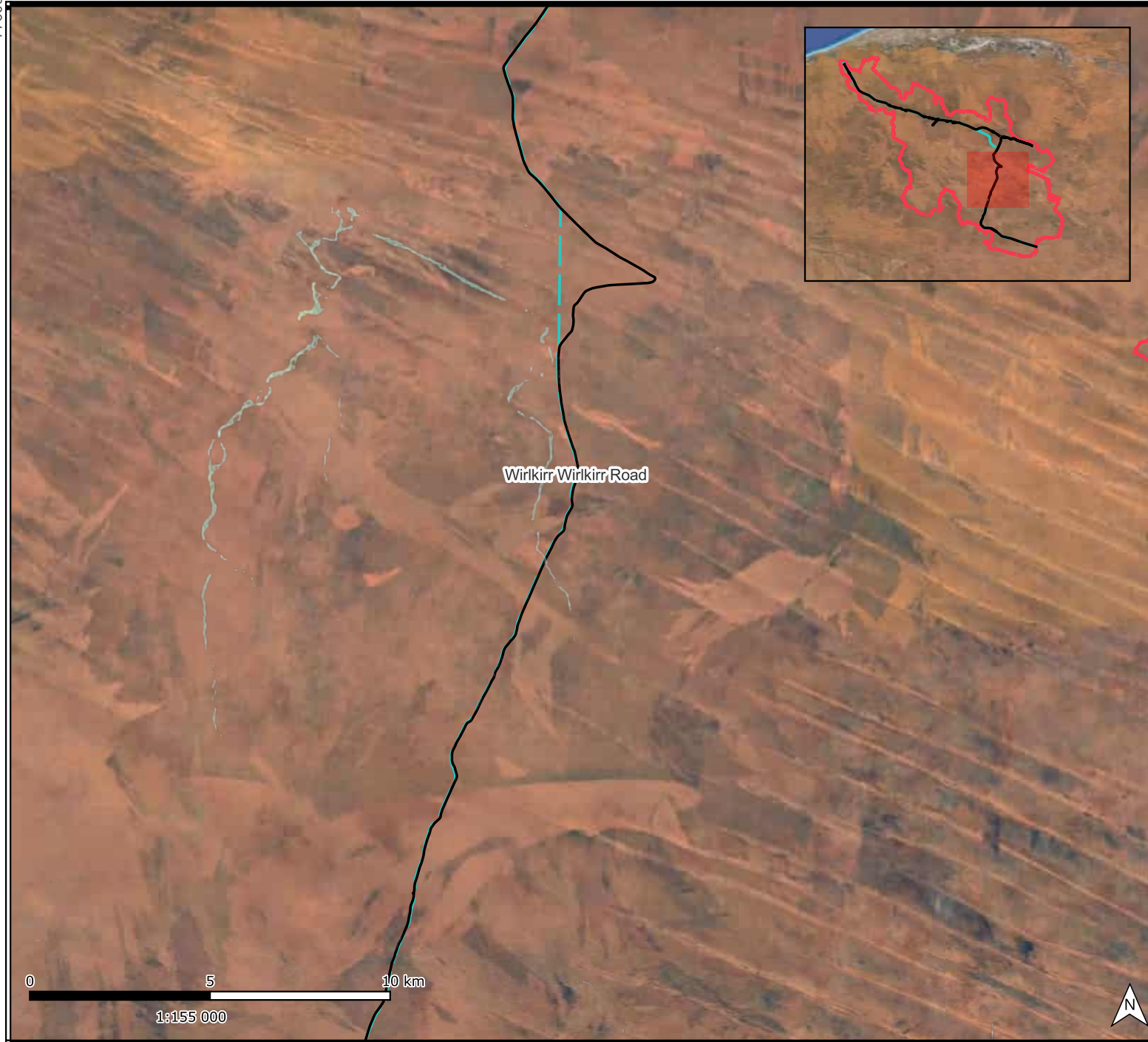
- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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1:155 000

7760000



Winu Copper Gold Project Surface Water Management Plan Pre-Development 10% AEP Flow Velocity (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ ≤ 0.50

□ 0.50 - 1.00

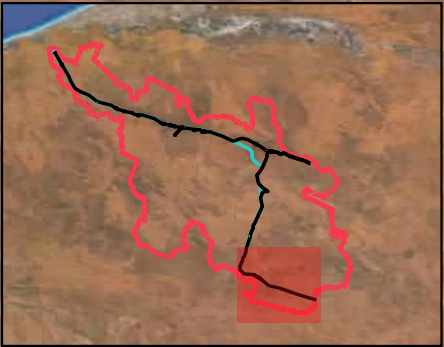
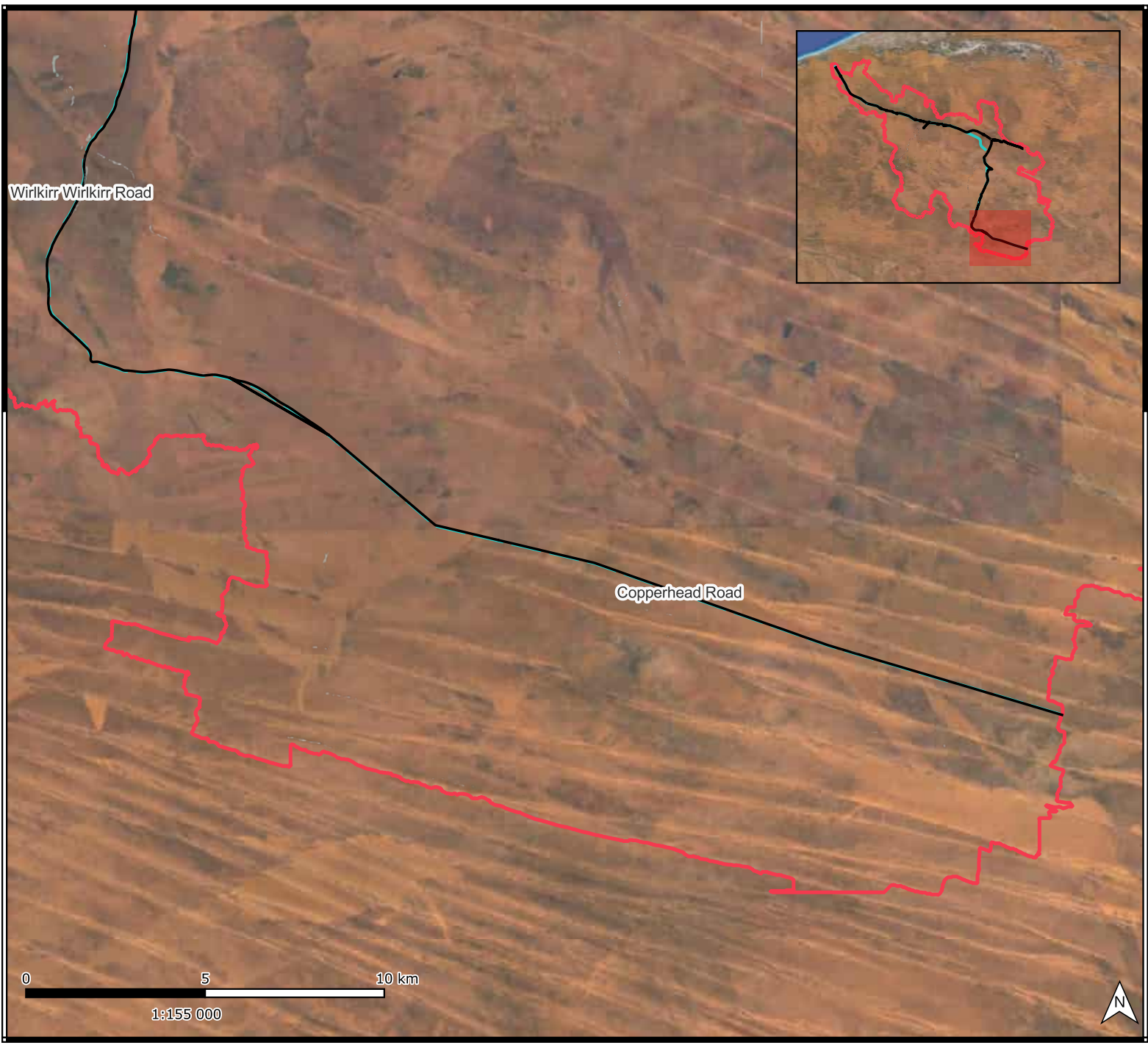
□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

□ > 3.00





Winu Copper Gold Project
Surface Water Management Plan
Pre-Development
10% AEP Flow Velocity (Location E)

Project No. 311012-01475 Client Rio Tinto

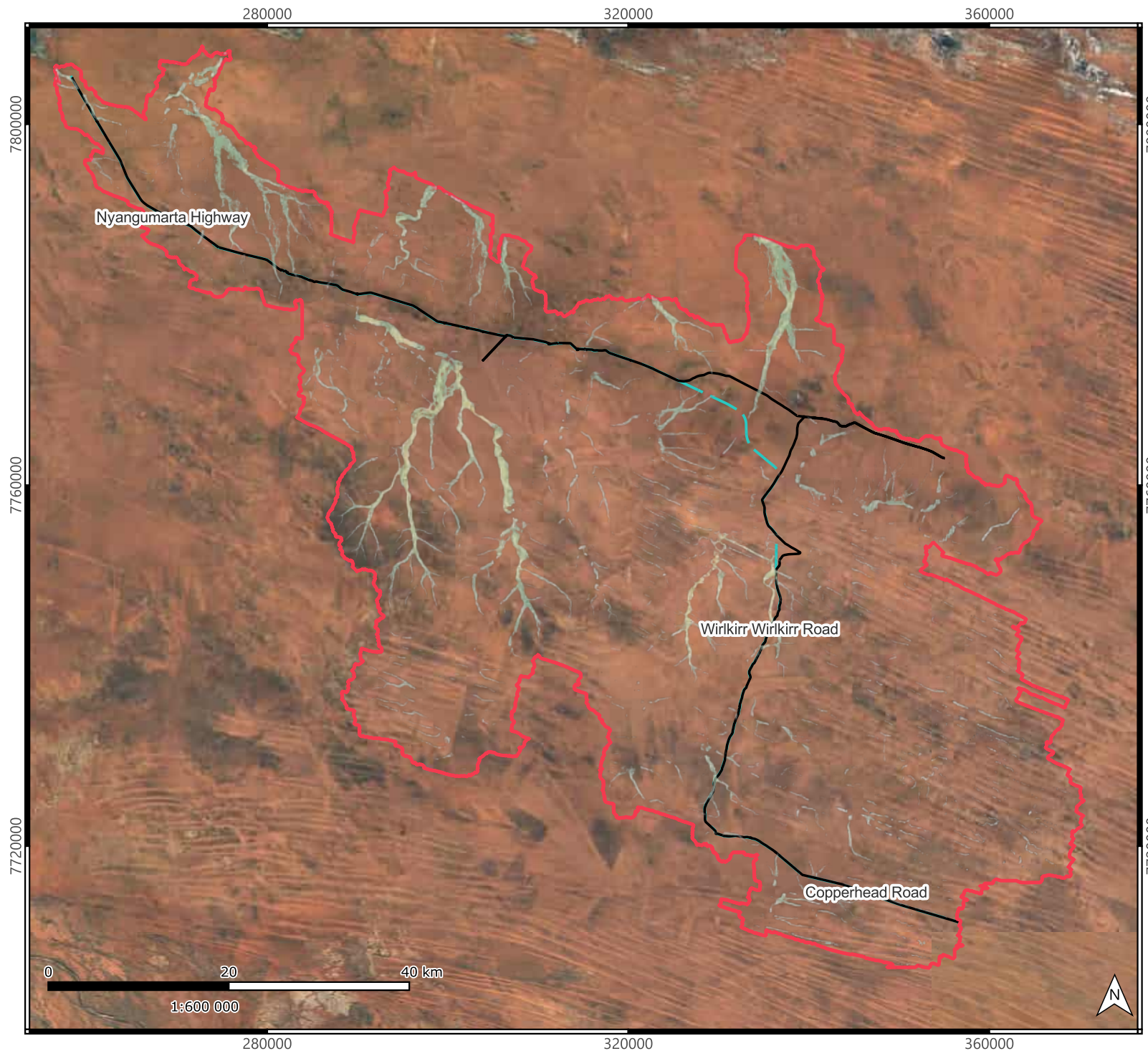
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flow Velocity

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

Proposed Access Road

Existing Access Road

Model Extent

Flow Velocity (m/s)

≤ 0.50

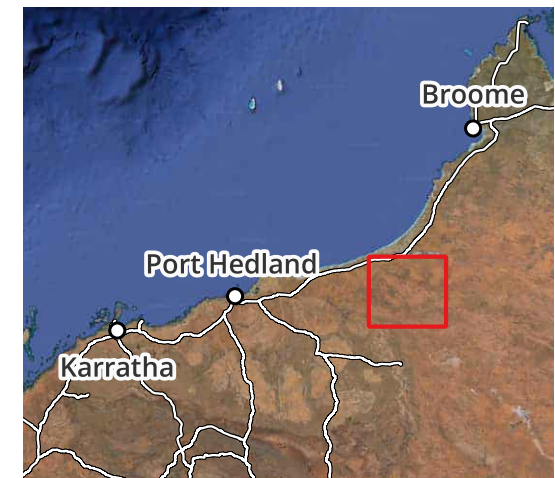
0.50 - 1.00

1.00 - 1.50

1.50 - 2.00

2.00 - 3.00

> 3.00



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Winu Copper Gold Project
Surface Water Management Plan
Post-Development
1% AEP Flow Velocity (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024

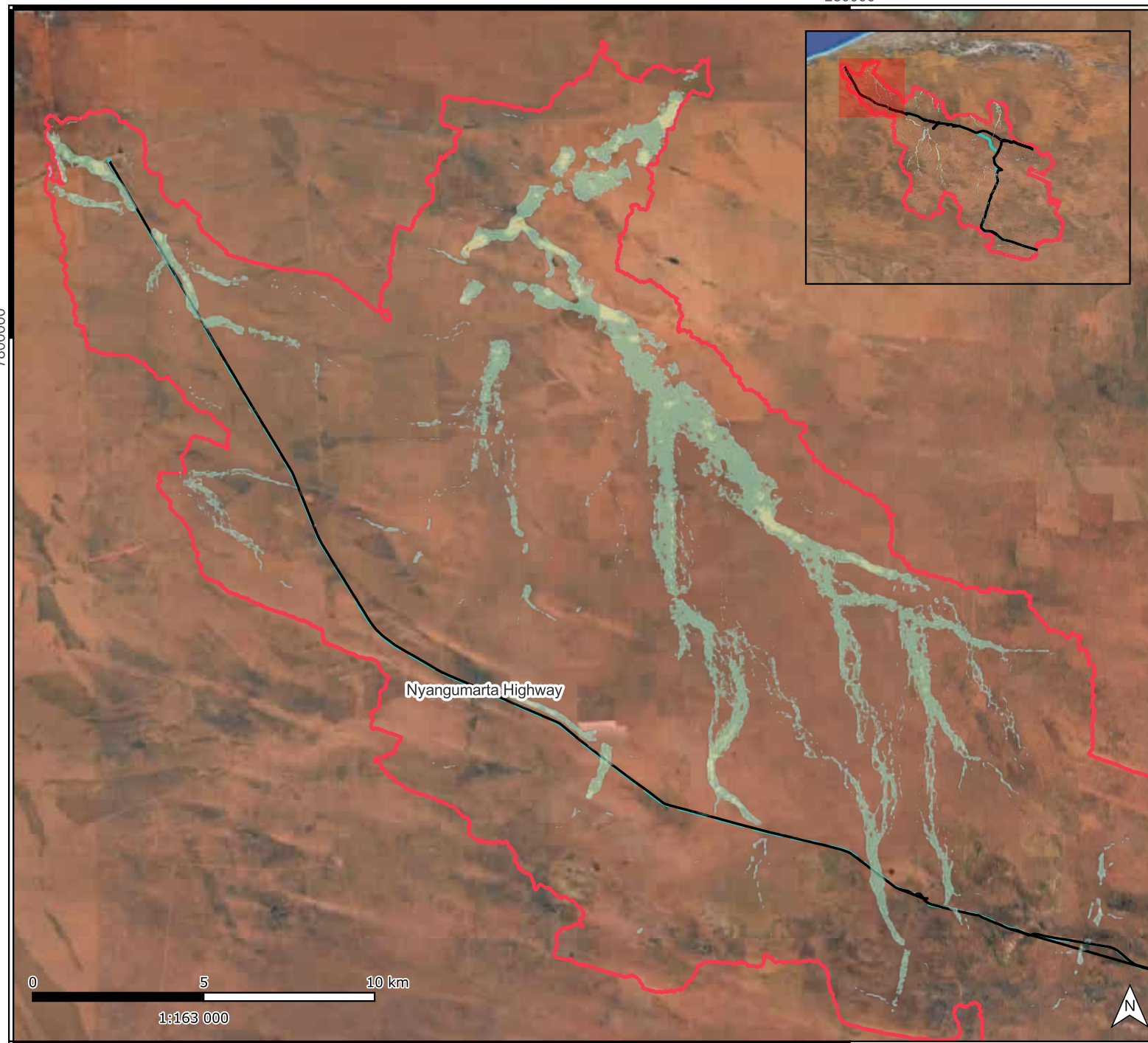


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

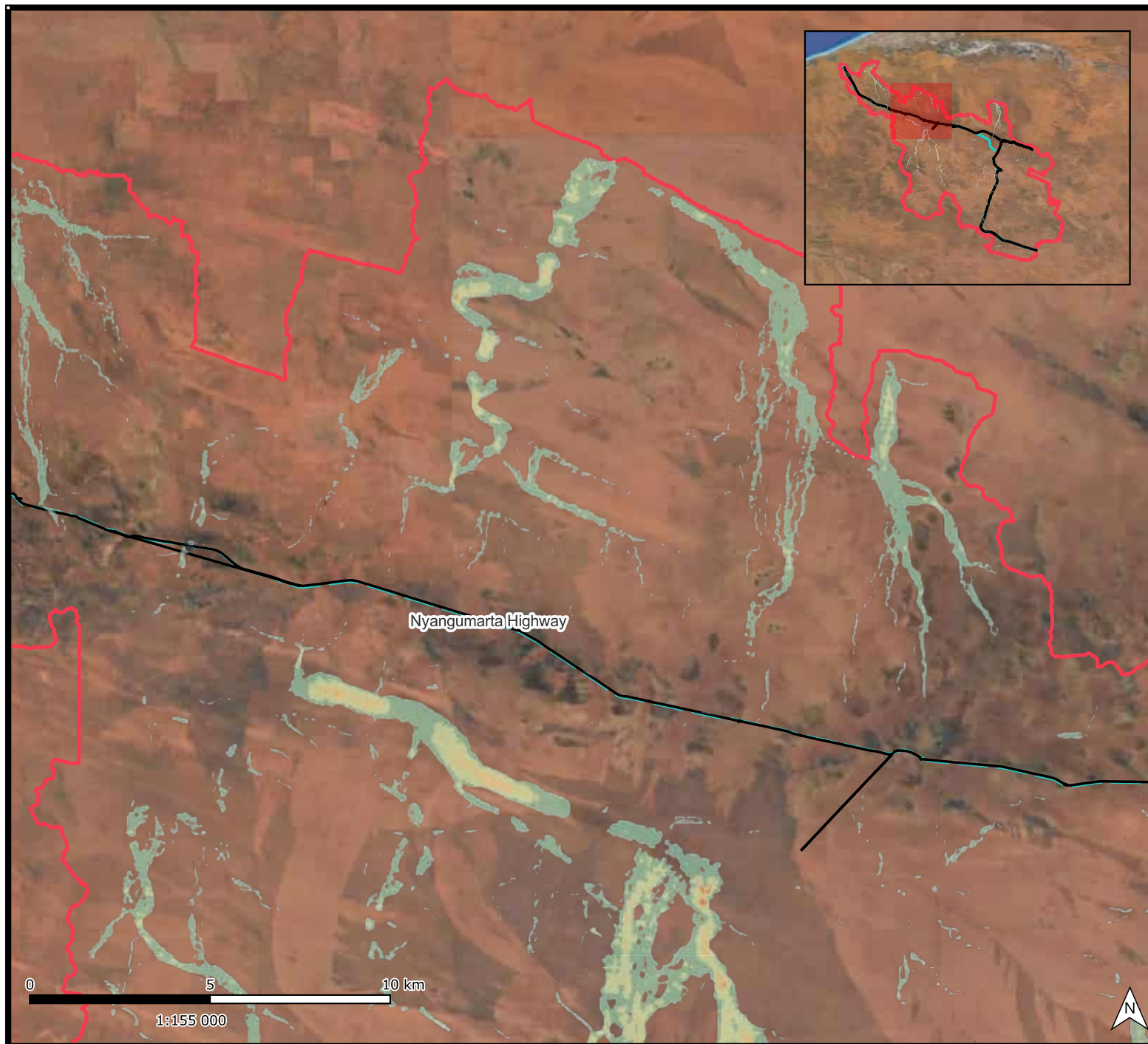
- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flow Velocity (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

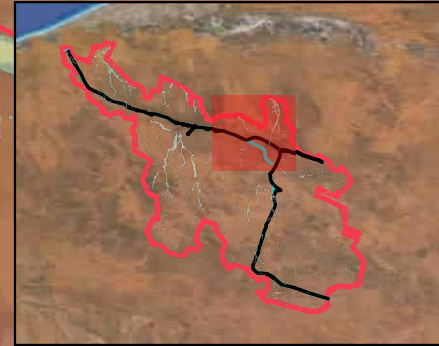
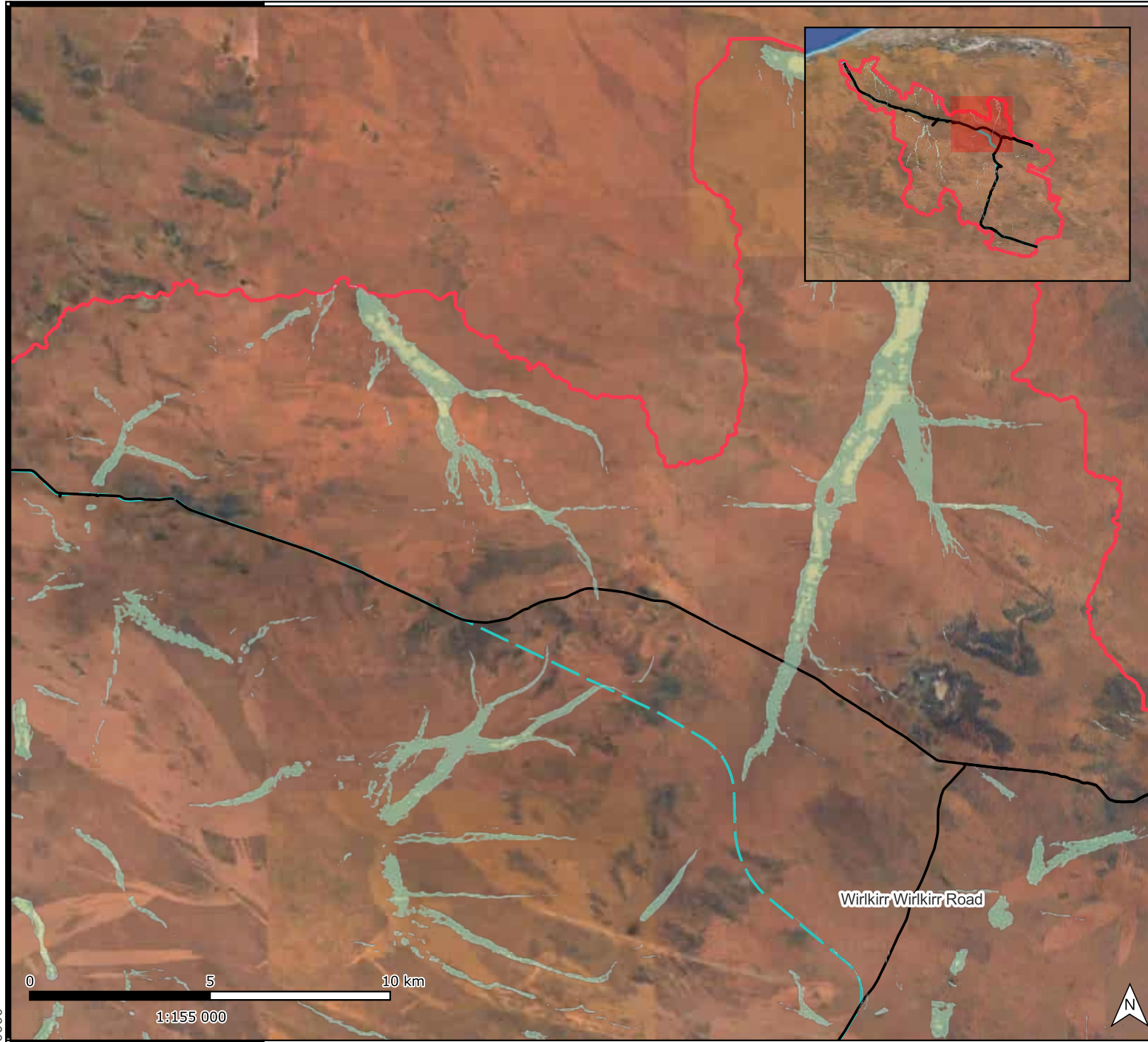
- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



320000



Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flow Velocity (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ <= 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

□ > 3.00



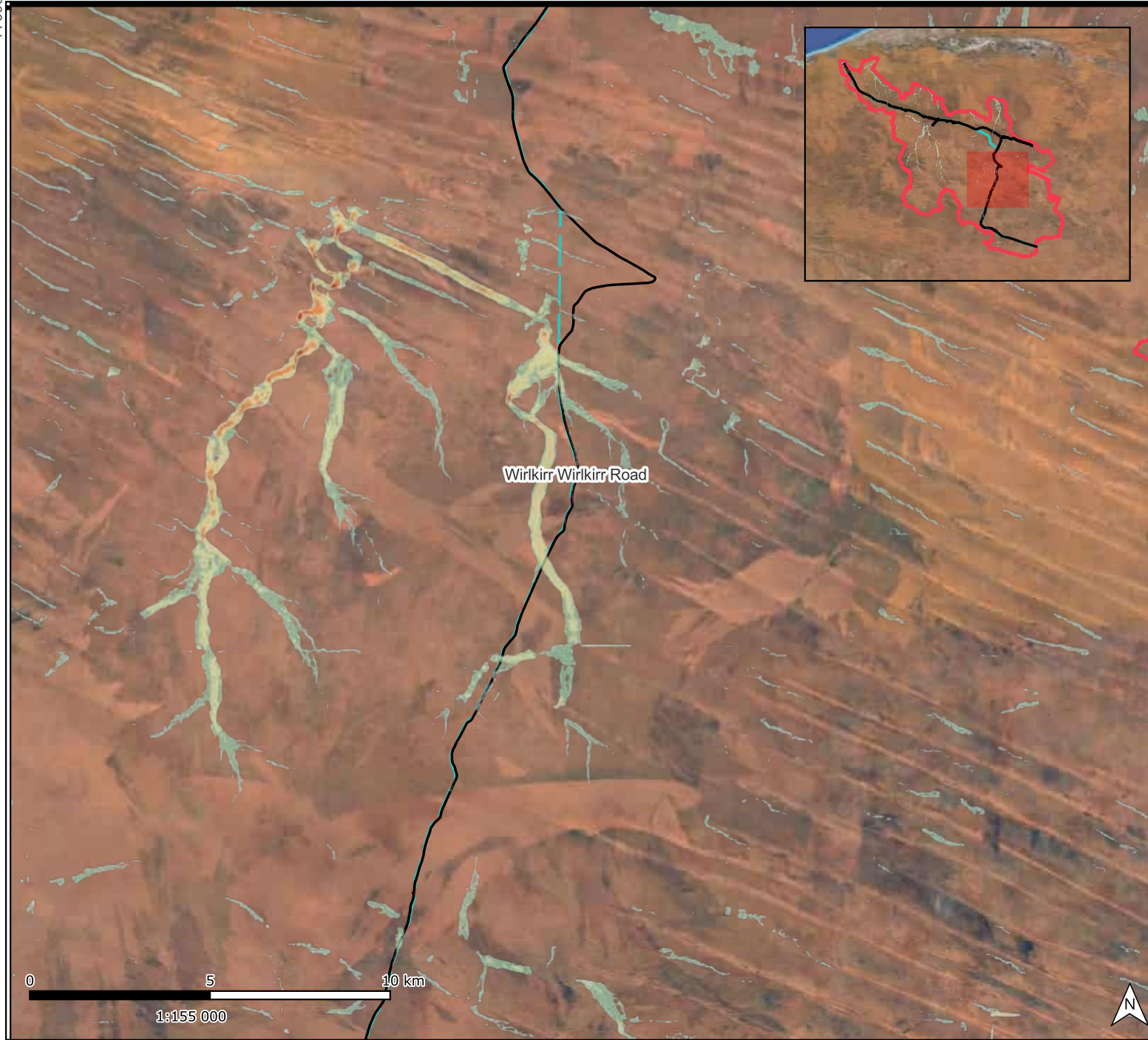
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1:155 000

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Winu Copper Gold Project Surface Water Management Plan Post-Development 1% AEP Flow Velocity (Location D)

Project No.
311012-01475

Client
Rio Tinto

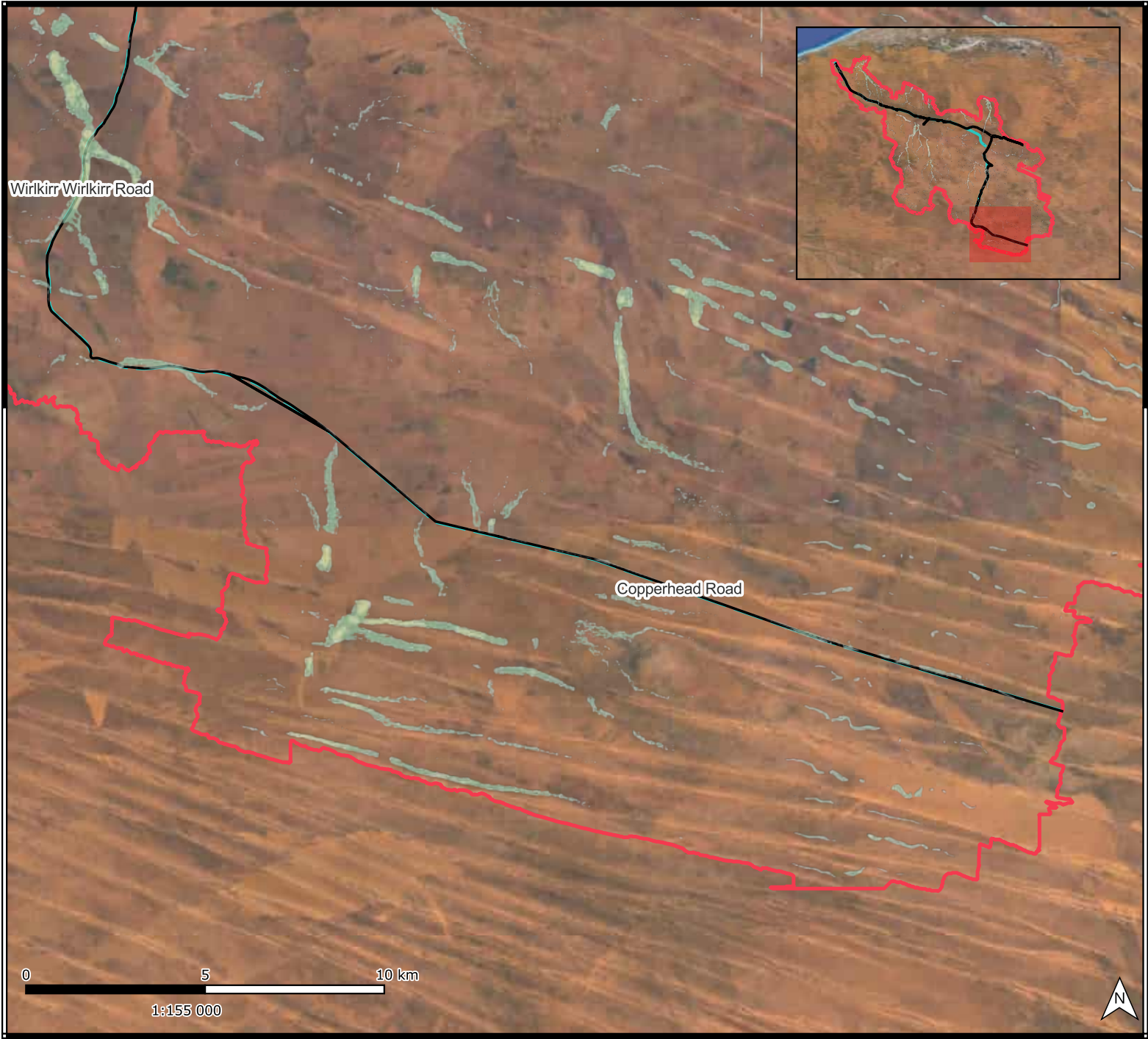
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project
Surface Water Management Plan
Post-Development
1% AEP Flow Velocity (Location E)

Project No.
311012-01475

Client
Rio Tinto

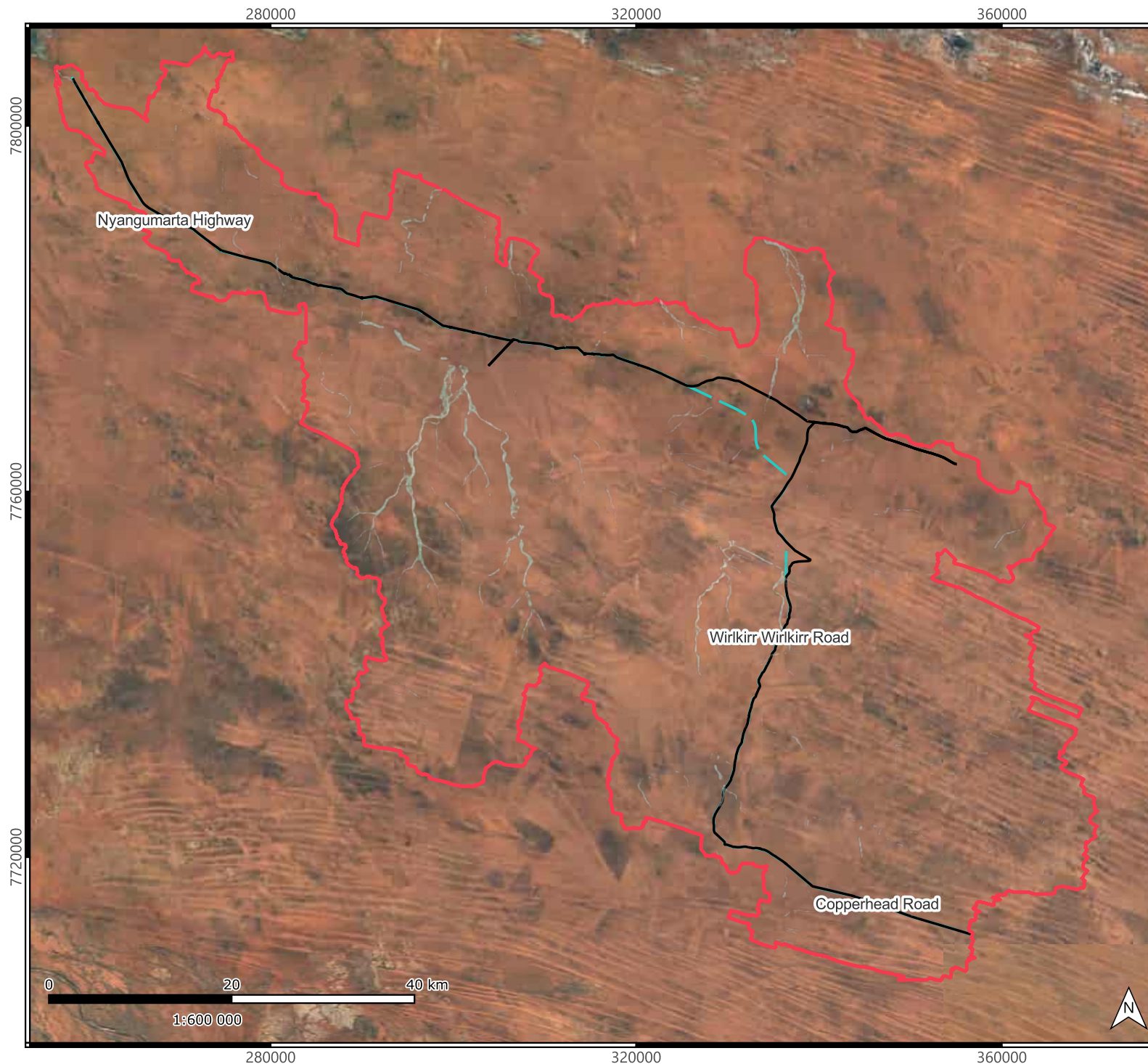
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flow Velocity

Project No.
311012-01475

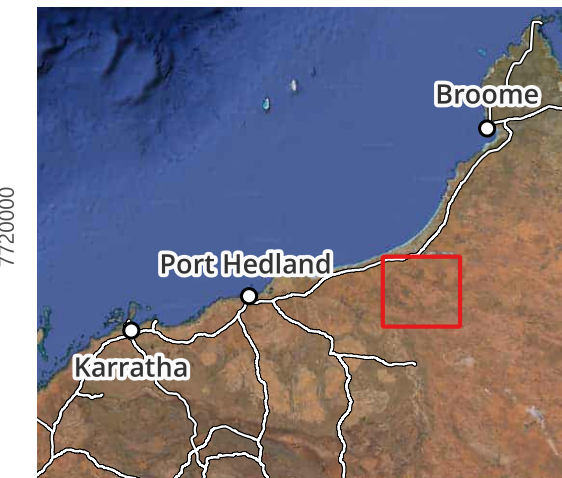
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00



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Winu Copper Gold Project
Surface Water Management Plan
Post-Development
5% AEP Flow Velocity (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024

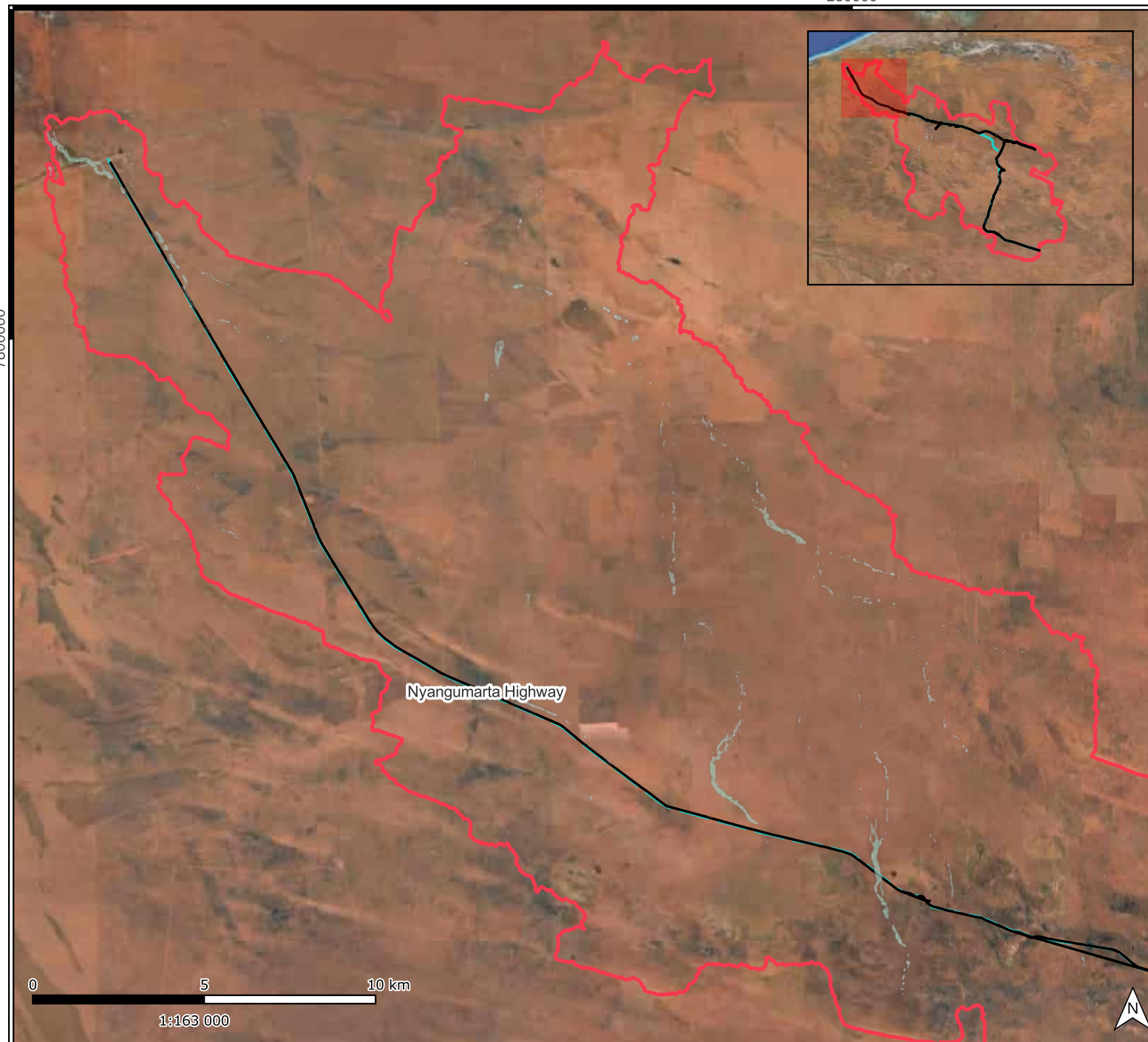


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

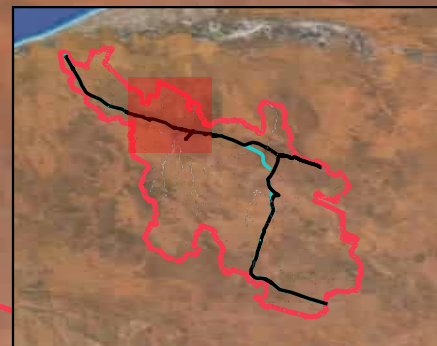
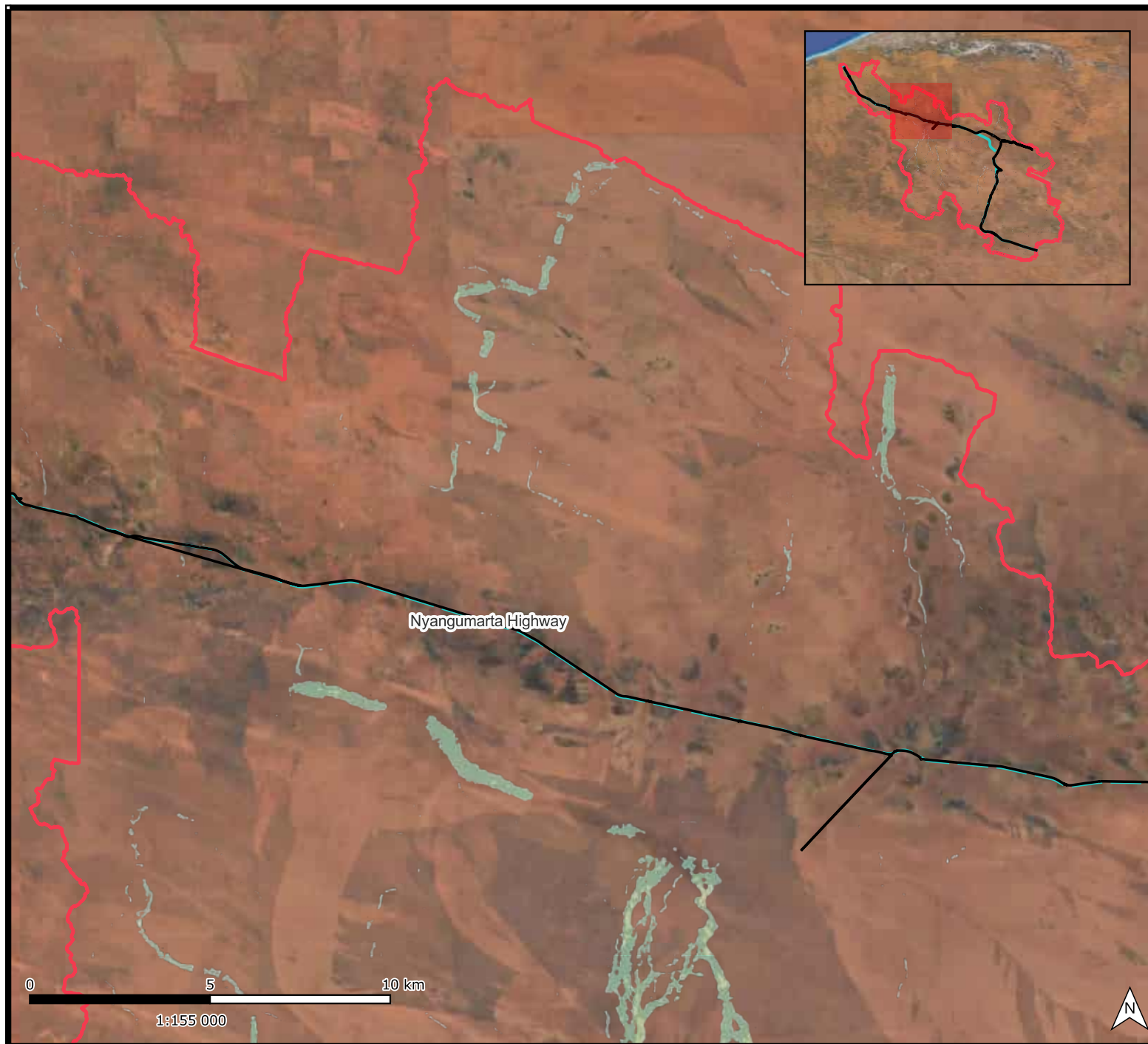
- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flow Velocity (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

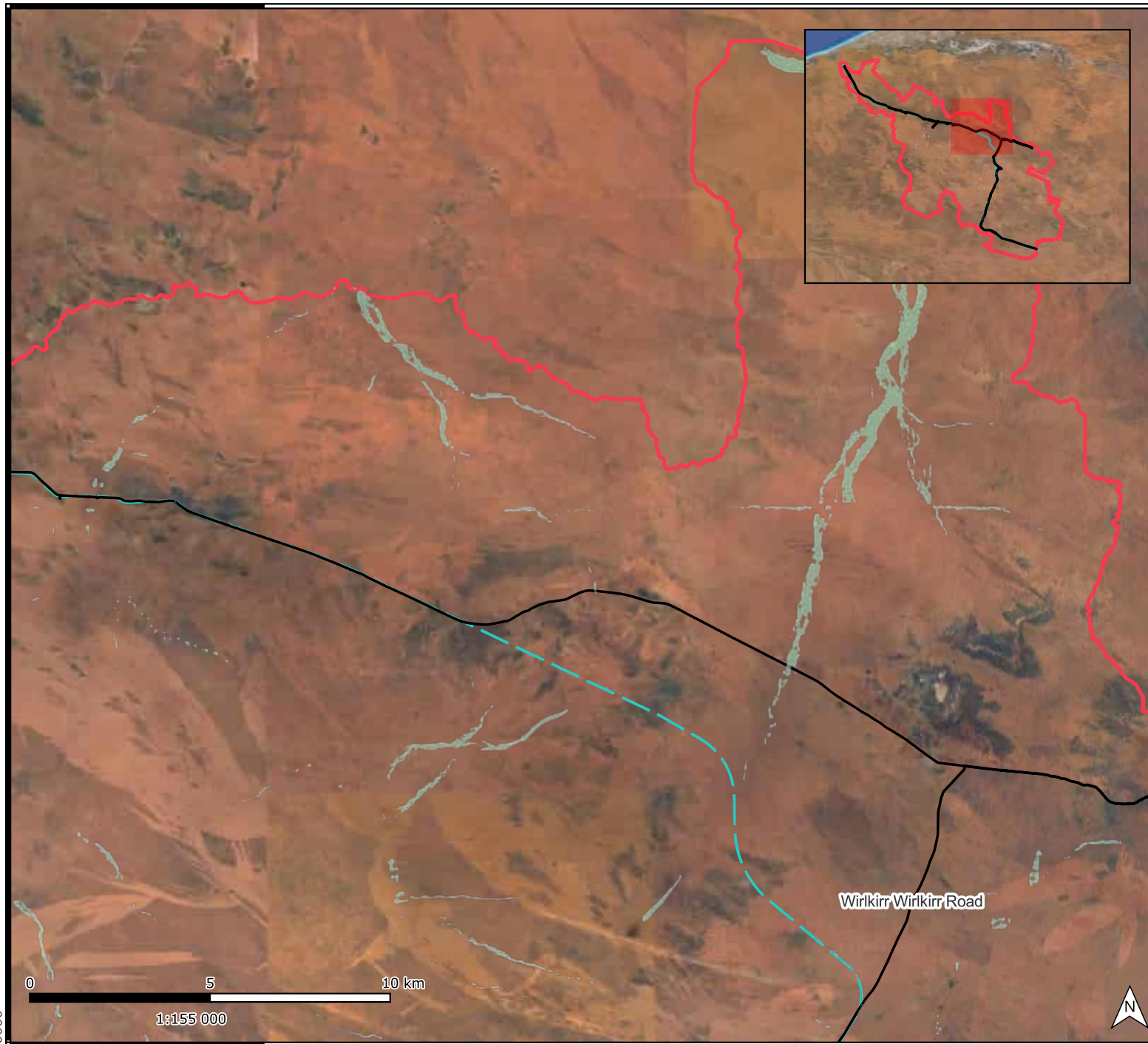
- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



320000



Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flow Velocity (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

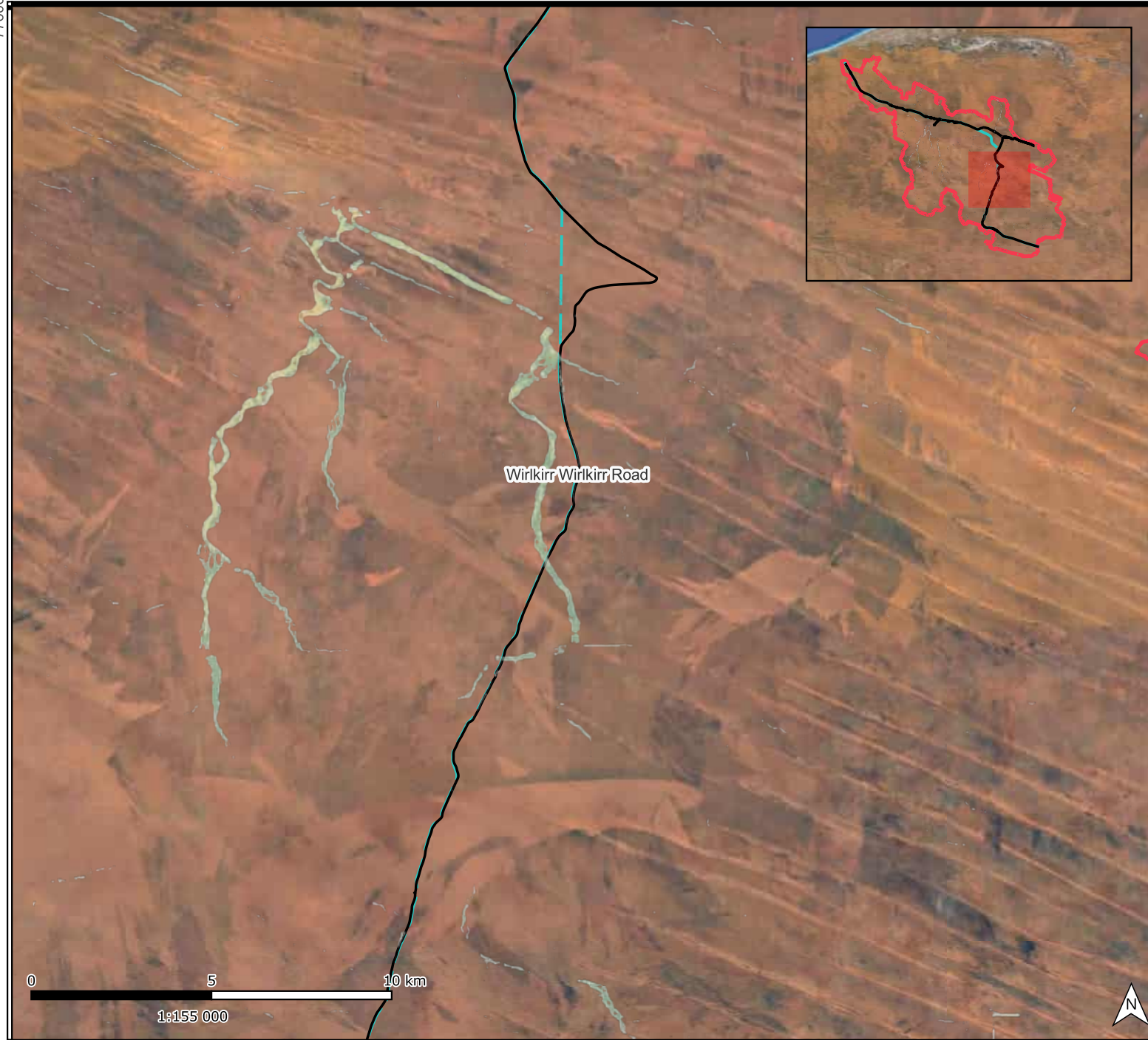
- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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Winu Copper Gold Project Surface Water Management Plan Post-Development 5% AEP Flow Velocity (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ ≤ 0.50

□ 0.50 - 1.00

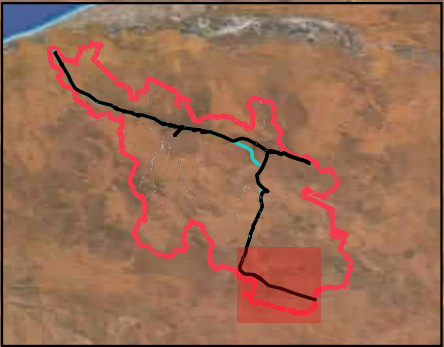
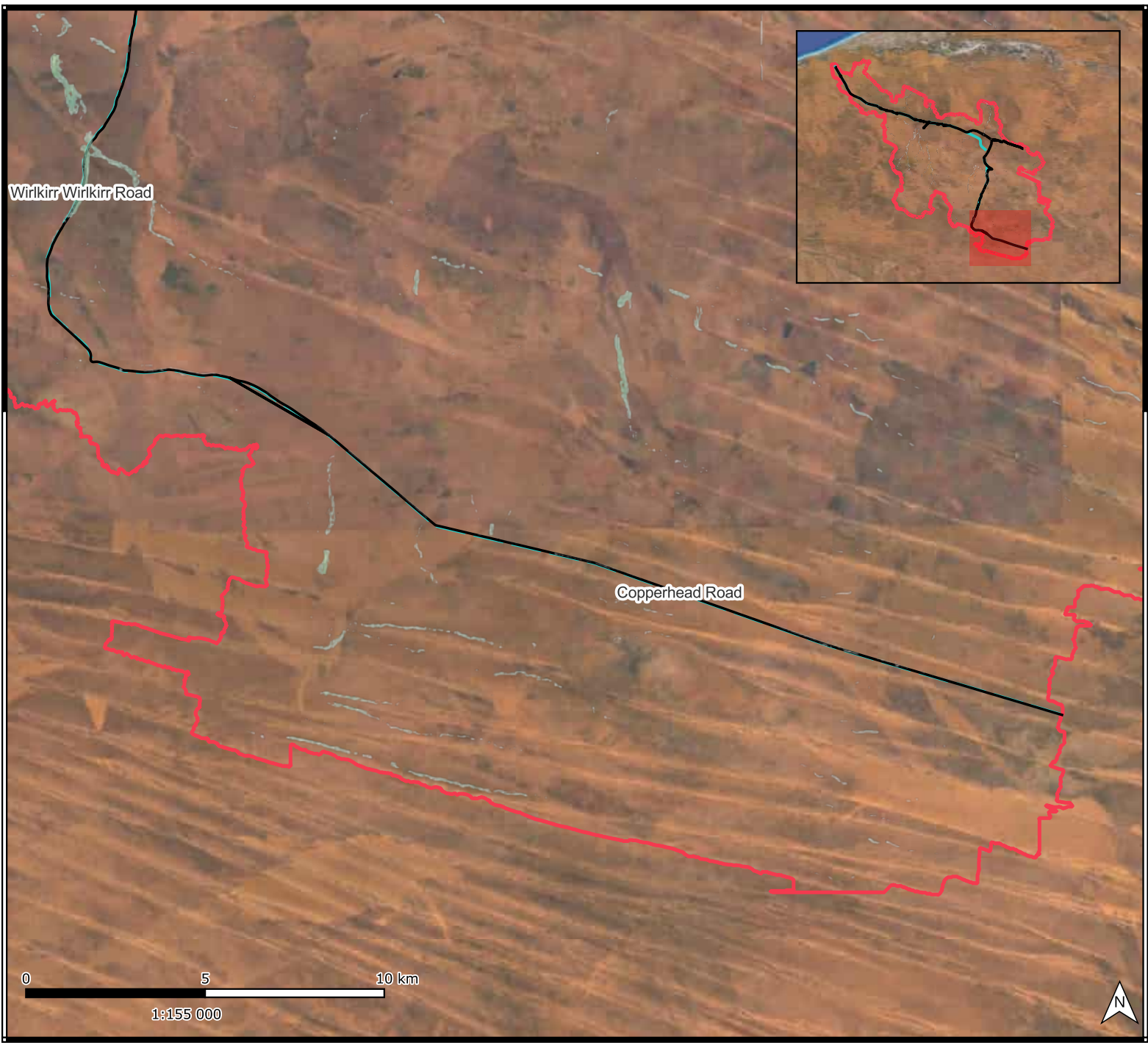
□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

□ > 3.00





Winu Copper Gold Project
Surface Water Management Plan
Post-Development
5% AEP Flow Velocity (Location E)

Project No. 311012-01475 Client Rio Tinto

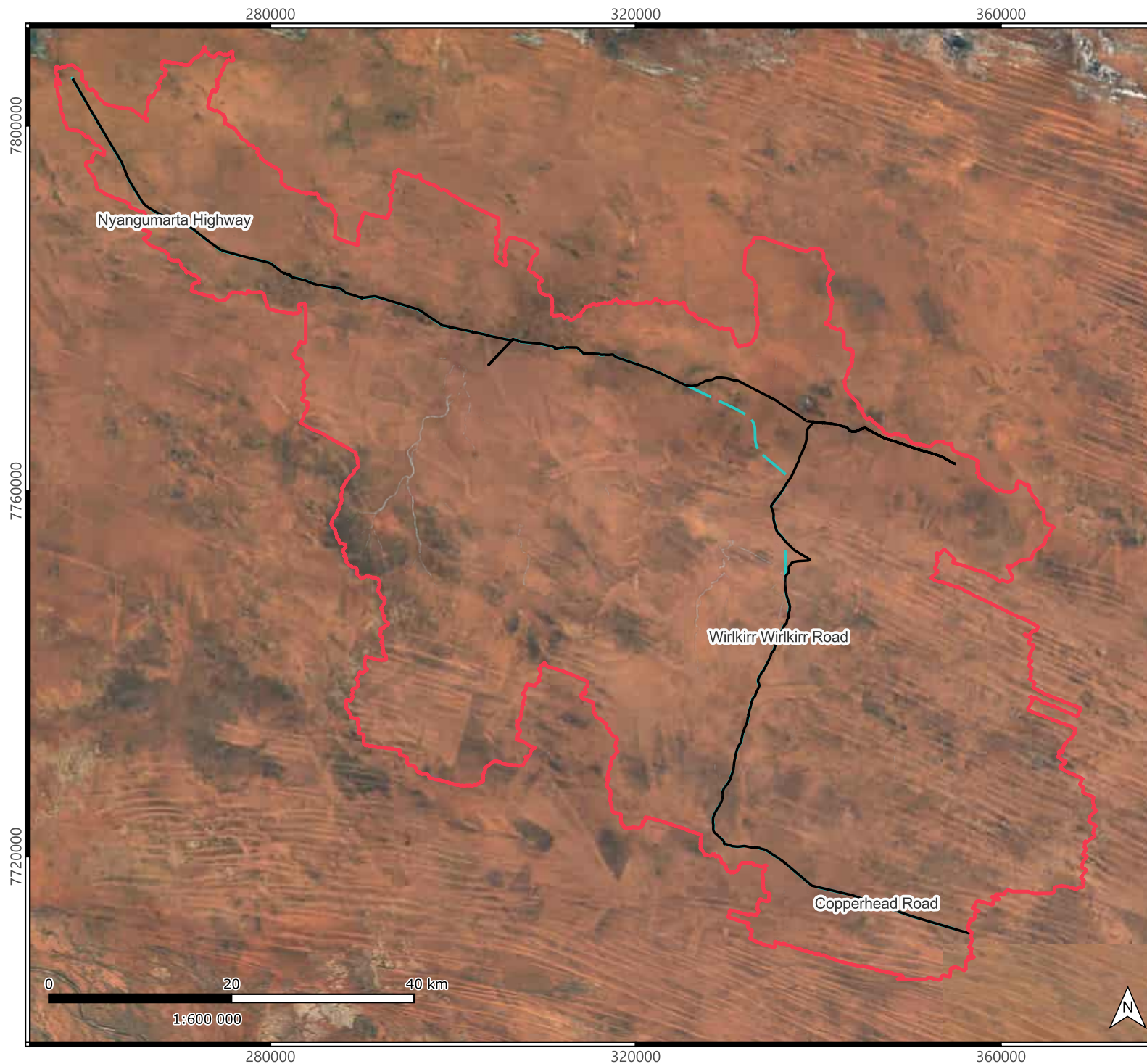
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flow Velocity

Project No.
311012-01475

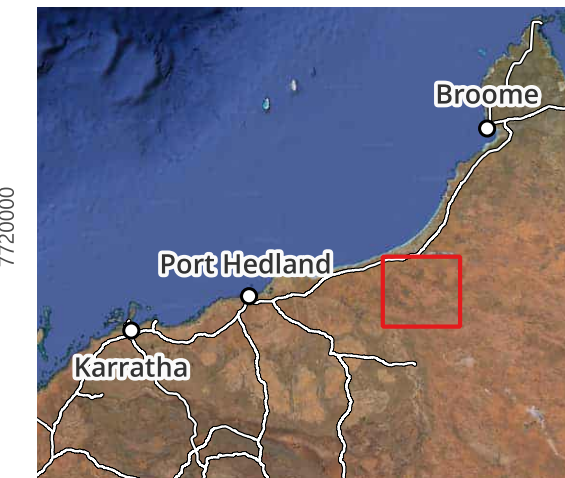
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



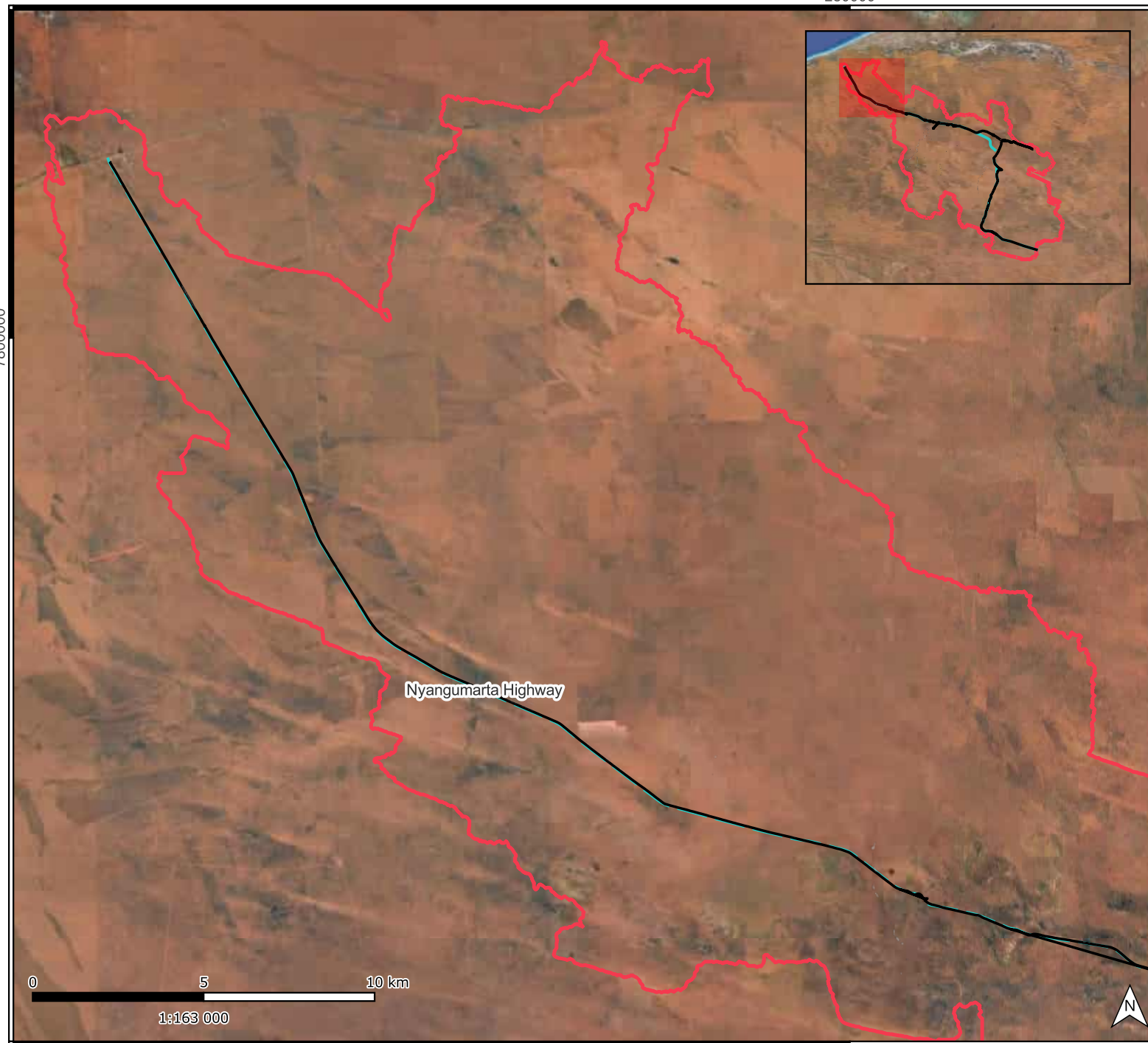
Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- <= 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00



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Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flow Velocity (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



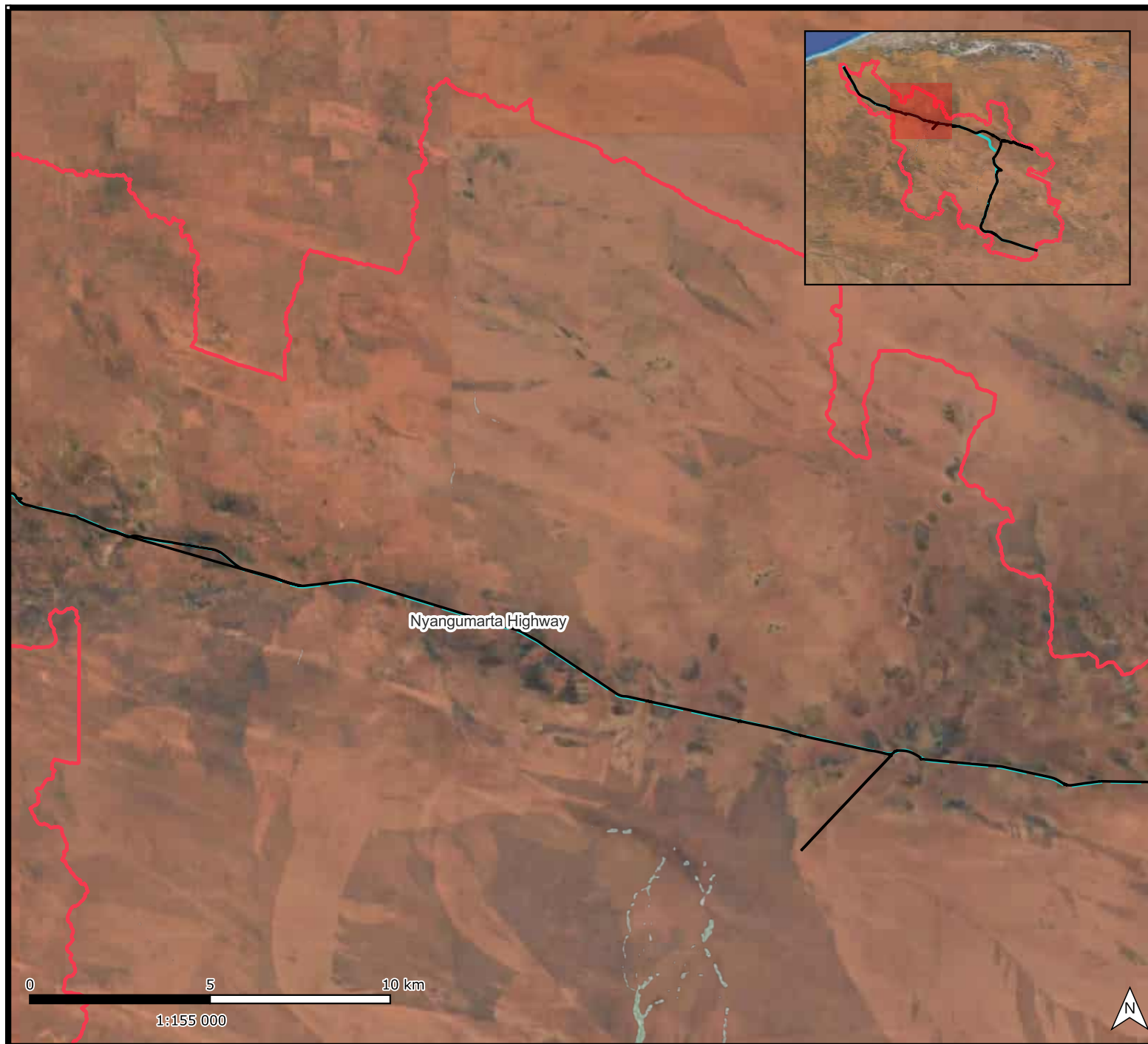
Legend

- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00





Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flow Velocity (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

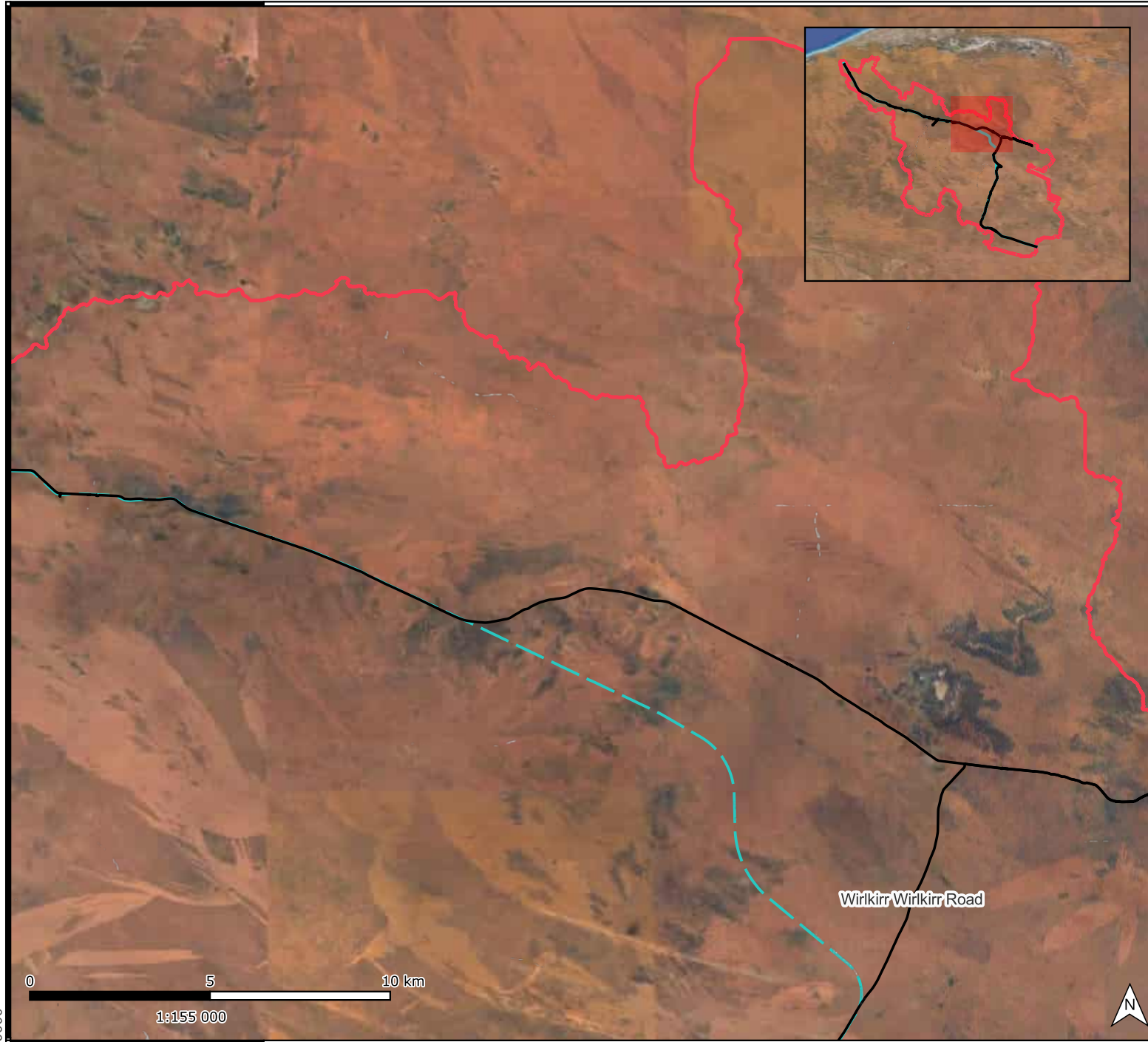
- Proposed Access Road
- Existing Access Road
- Model Extent

Flow Velocity (m/s)

- ≤ 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 3.00
- > 3.00



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Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flow Velocity (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ ≤ 0.50

□ 0.50 - 1.00

□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

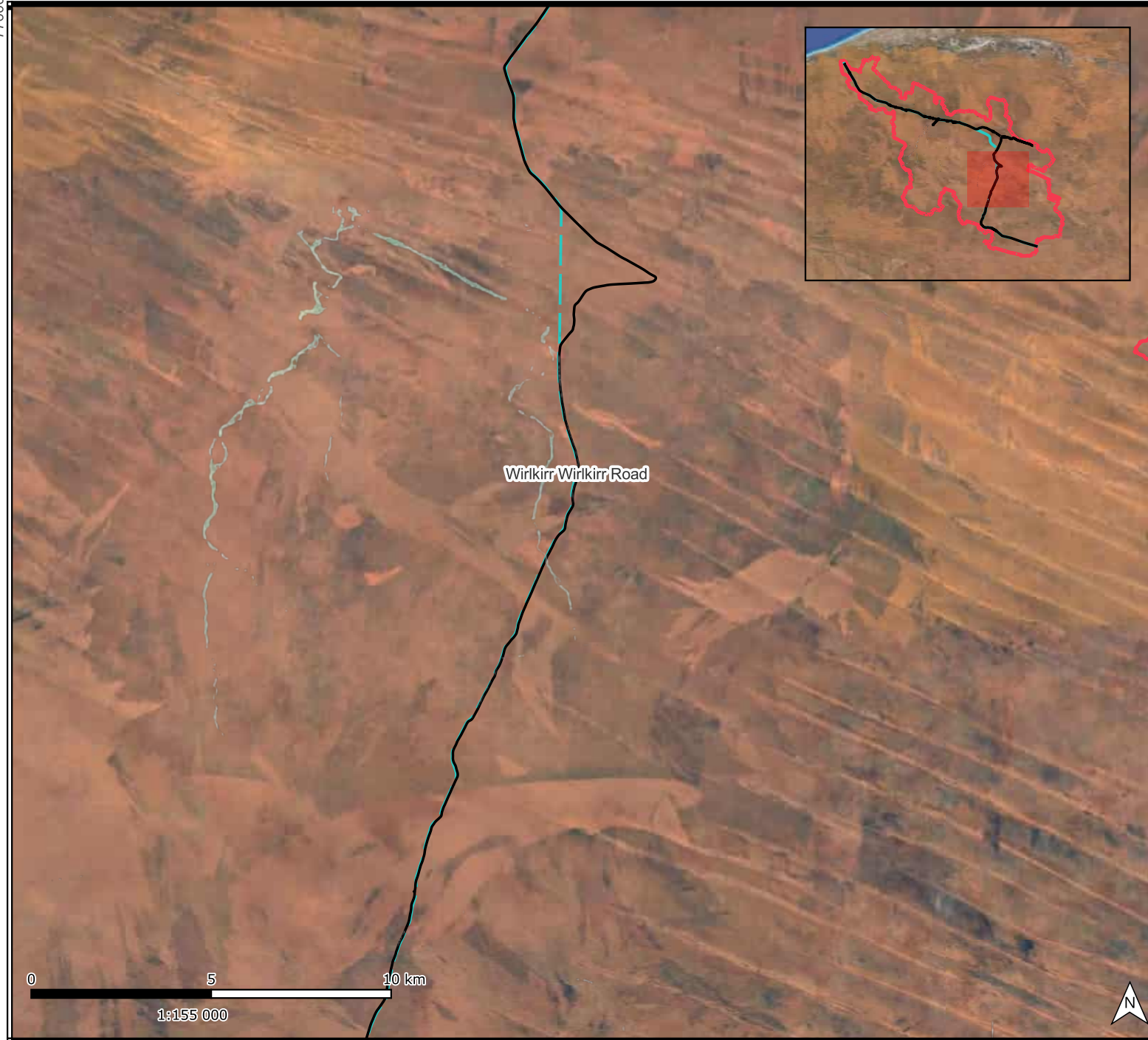
□ > 3.00



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Winu Copper Gold Project Surface Water Management Plan Post-Development 10% AEP Flow Velocity (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

— Proposed Access Road

— Existing Access Road

□ Model Extent

Flow Velocity (m/s)

□ ≤ 0.50

□ 0.50 - 1.00

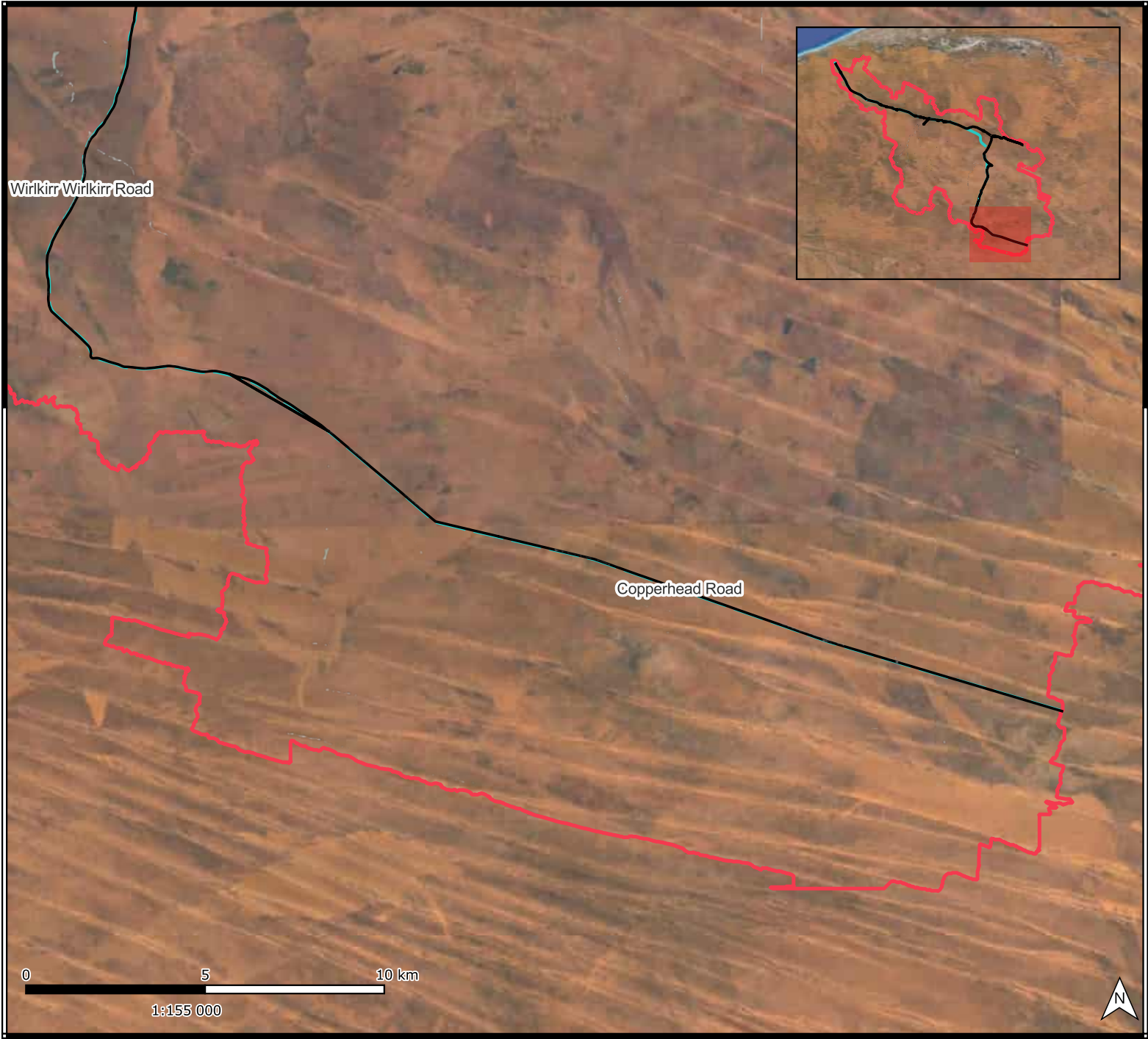
□ 1.00 - 1.50

□ 1.50 - 2.00

□ 2.00 - 3.00

□ > 3.00





Winu Copper Gold Project
Surface Water Management Plan
Post-Development
10% AEP Flow Velocity (Location E)

Project No.
311012-01475

Client
Rio Tinto

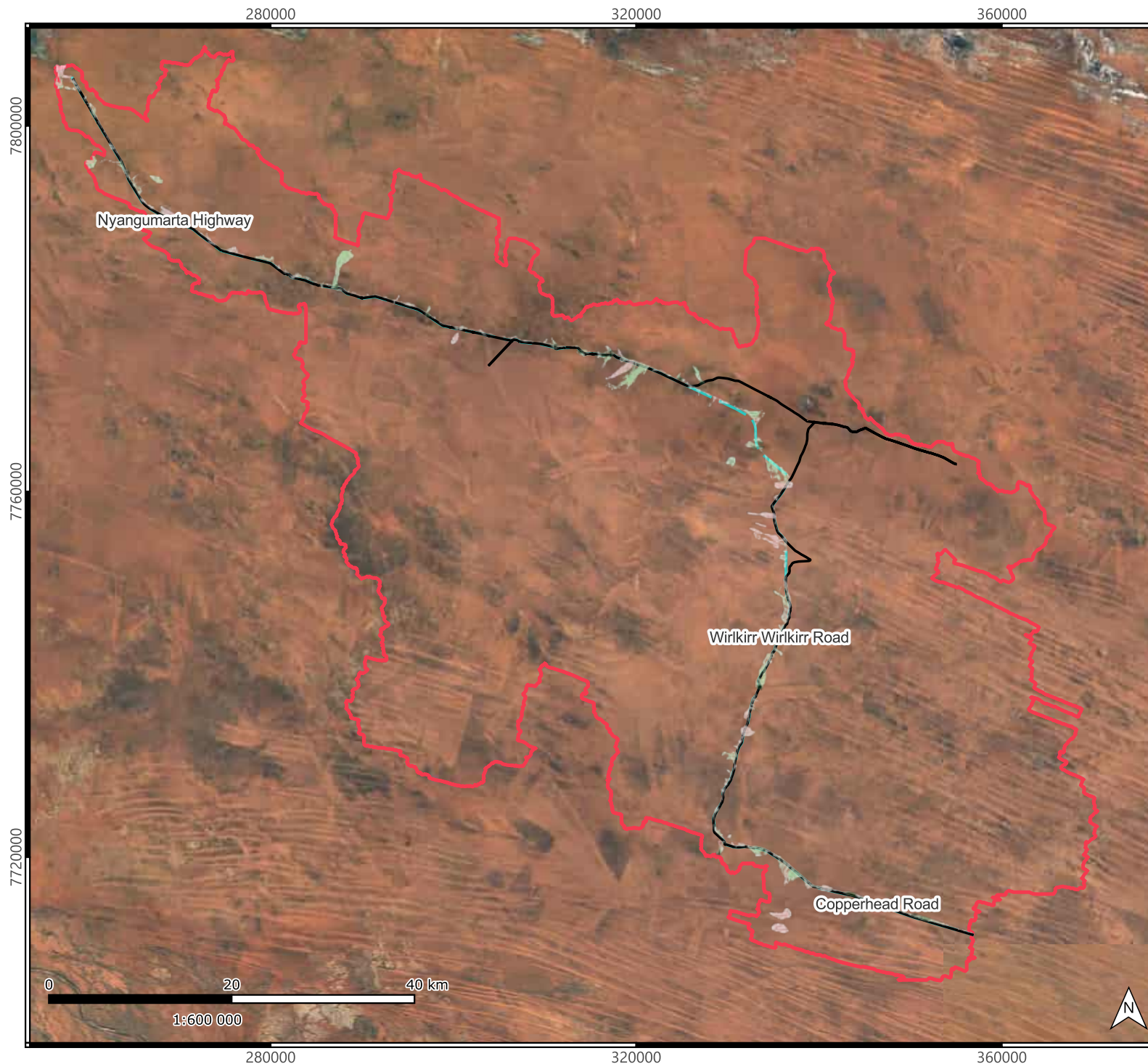
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
 - Existing Access Road
 - Model Extent
- Flow Velocity (m/s)
- ≤ 0.50
 - 0.50 - 1.00
 - 1.00 - 1.50
 - 1.50 - 2.00
 - 2.00 - 3.00
 - > 3.00





Winu Copper Gold Project Surface Water Management Plan Depth Difference 1% AEP Flood Depth

Project No.
311012-01475

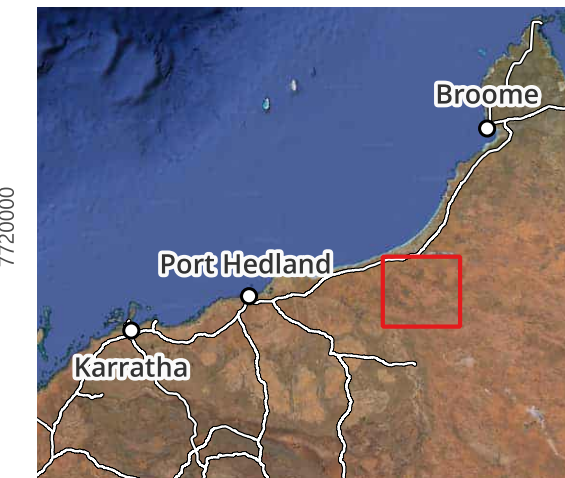
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ -1 (decrease)
 - $-1 - -0.5$
 - $-0.5 - -0.25$
 - $-0.25 - -0.01$
 - $-0.01 - 0.01$
 - $0.01 - 0.25$
 - $0.25 - 0.5$
 - $0.5 - 1.0$
 - > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 1% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

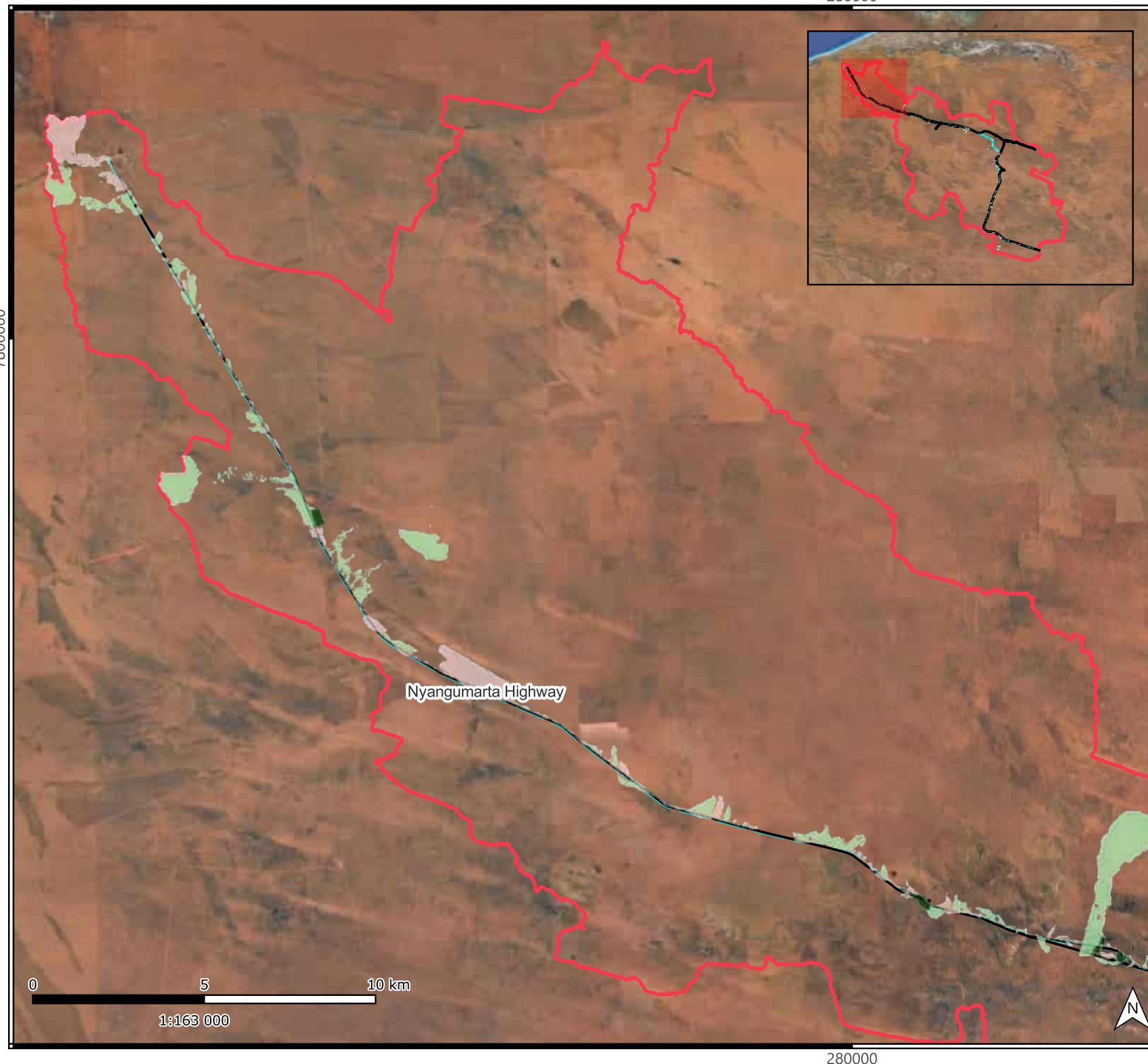
Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

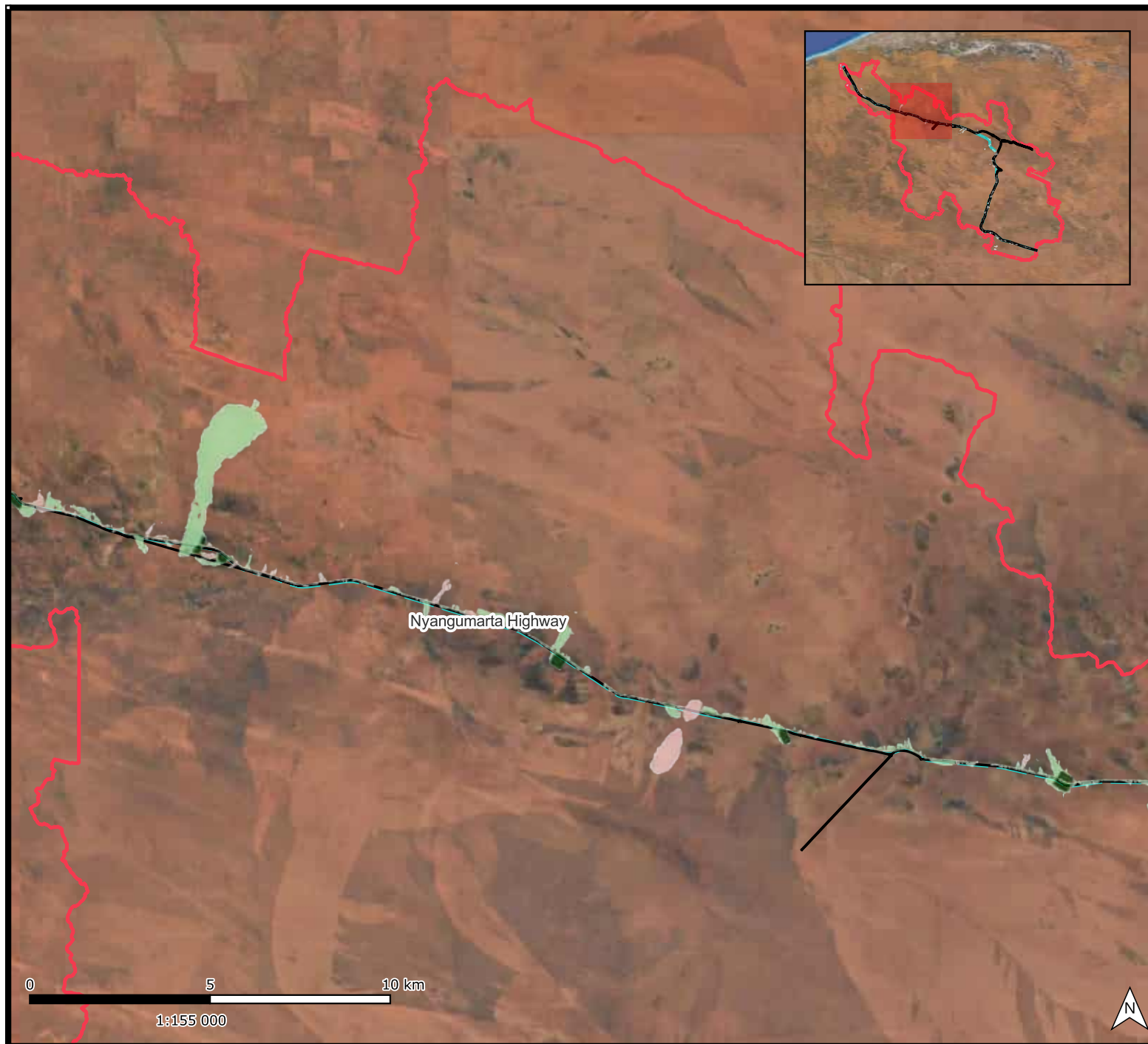
- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 1% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024

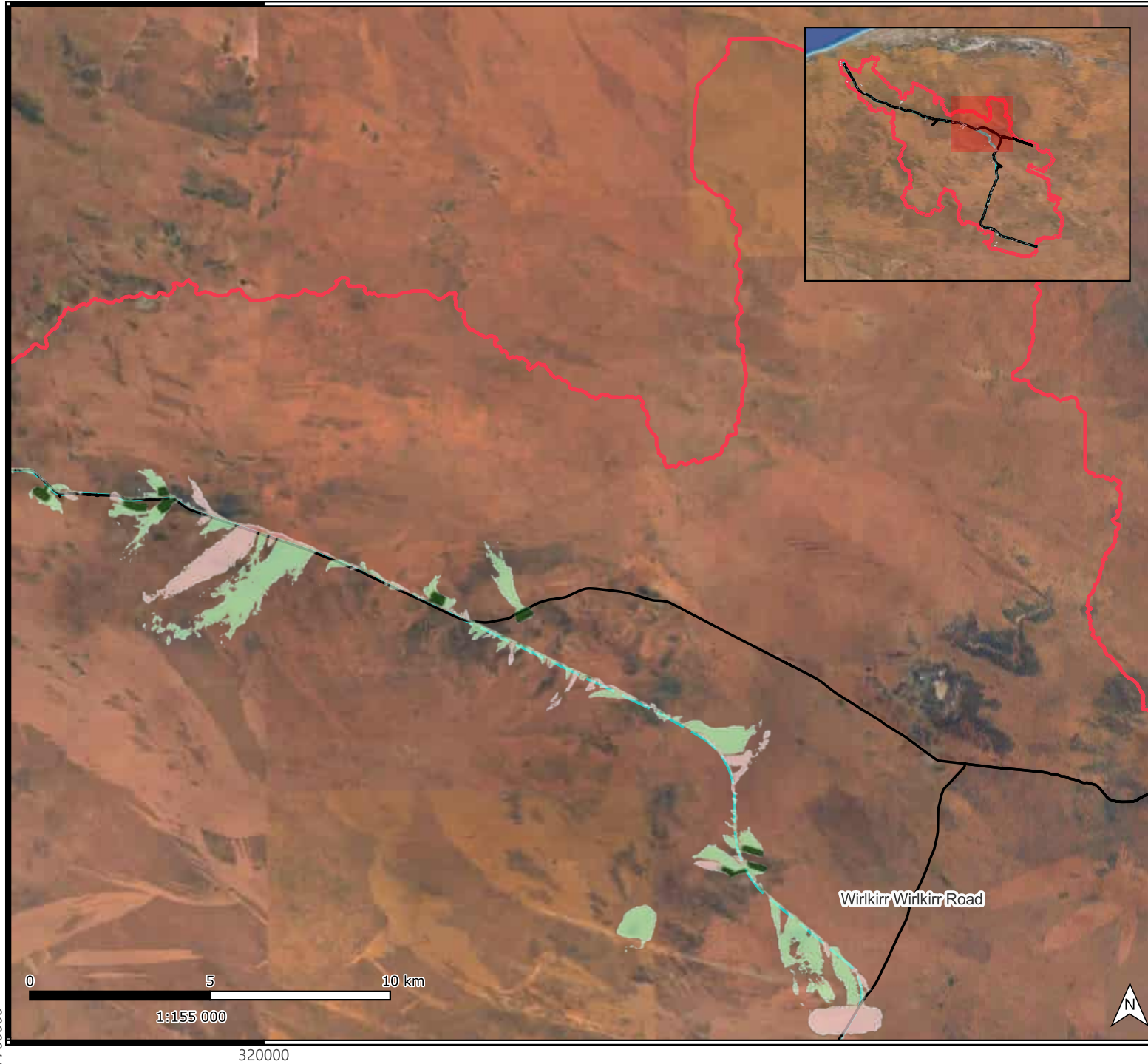


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 1% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- <= -1 (decrease)
- 1 - -0.5
- 0.5 - -0.25
- 0.25 - -0.01
- 0.01 - 0.01
- 0.01 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 1% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)

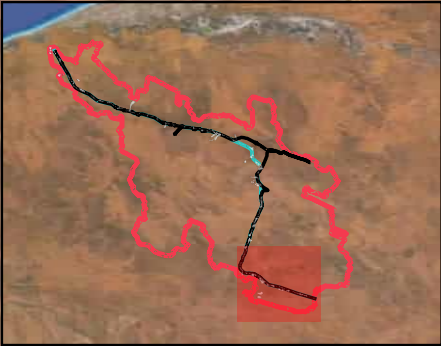
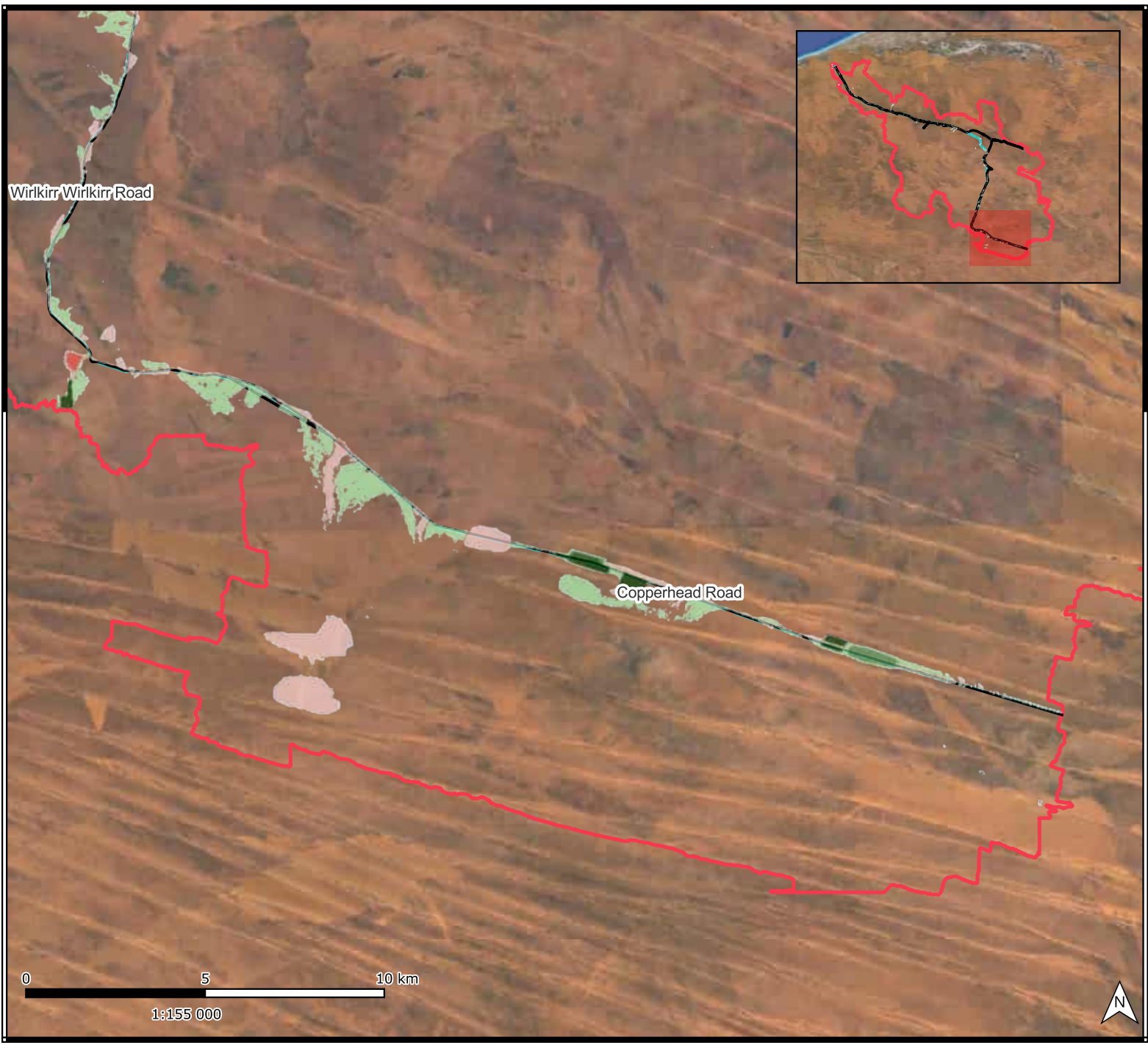


Wirikirr Wirikirr Road

0 5 10 km

1:155 000





Winu Copper Gold Project
Surface Water Management Plan
Depth Difference
1% AEP Flood Depth (Location E)

Project No. 311012-01475 Client Rio Tinto

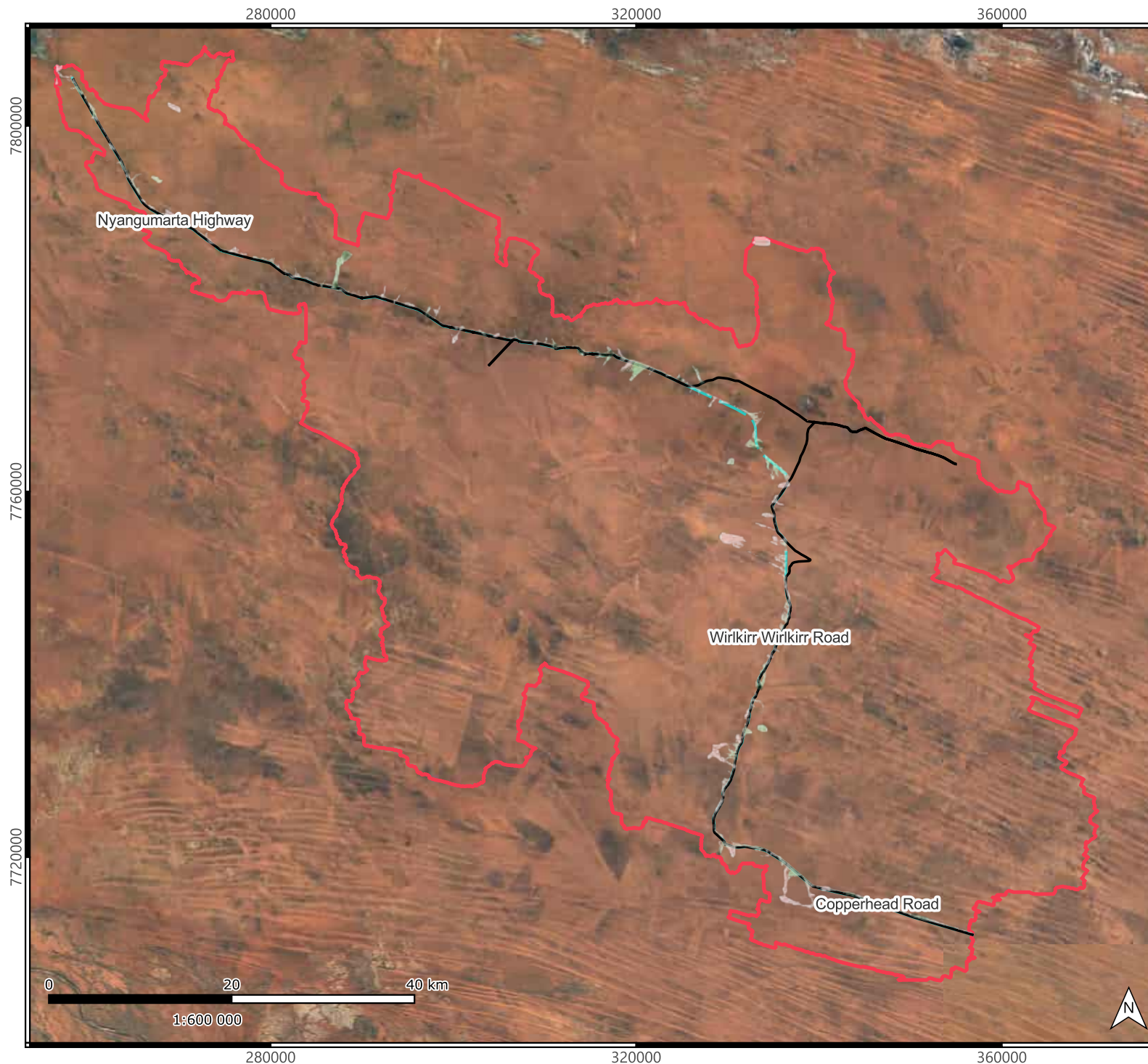
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ -1 (decrease)
 - 1 - -0.5
 - 0.5 - -0.25
 - 0.25 - -0.01
 - 0.01 - 0.01
 - 0.01 - 0.25
 - 0.25 - 0.5
 - 0.5 - 1.0
 - > 1.0 (increase)





Winu Copper Gold Project Surface Water Management Plan Depth Difference 5% AEP Flood Depth

Project No.
311012-01475

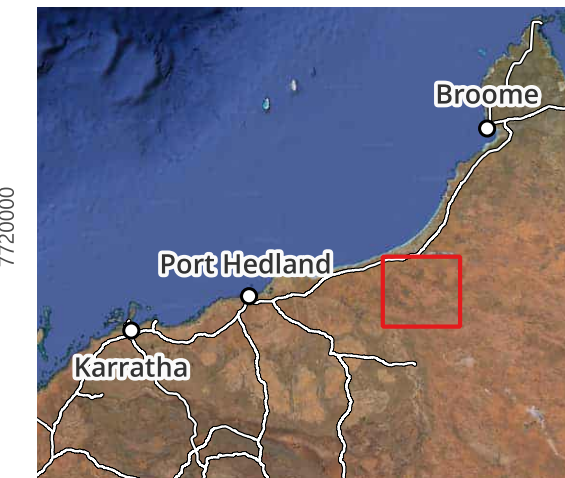
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



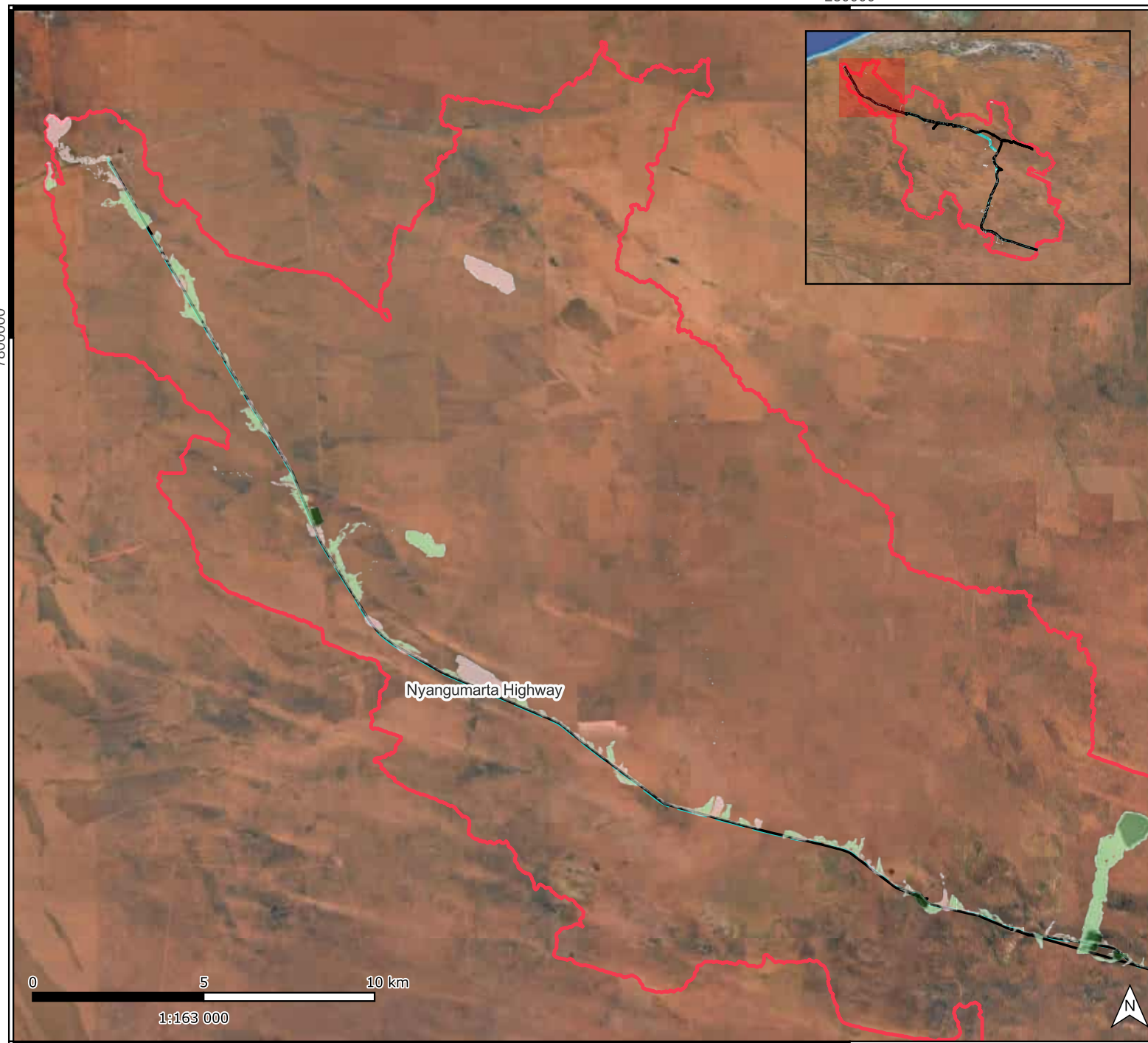
Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 5% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

Notes:

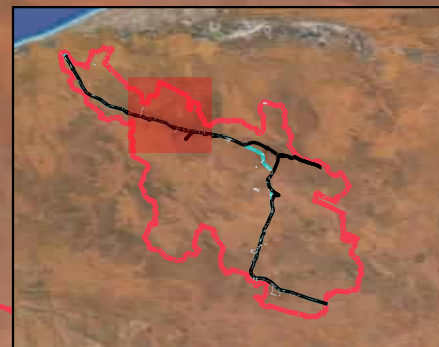
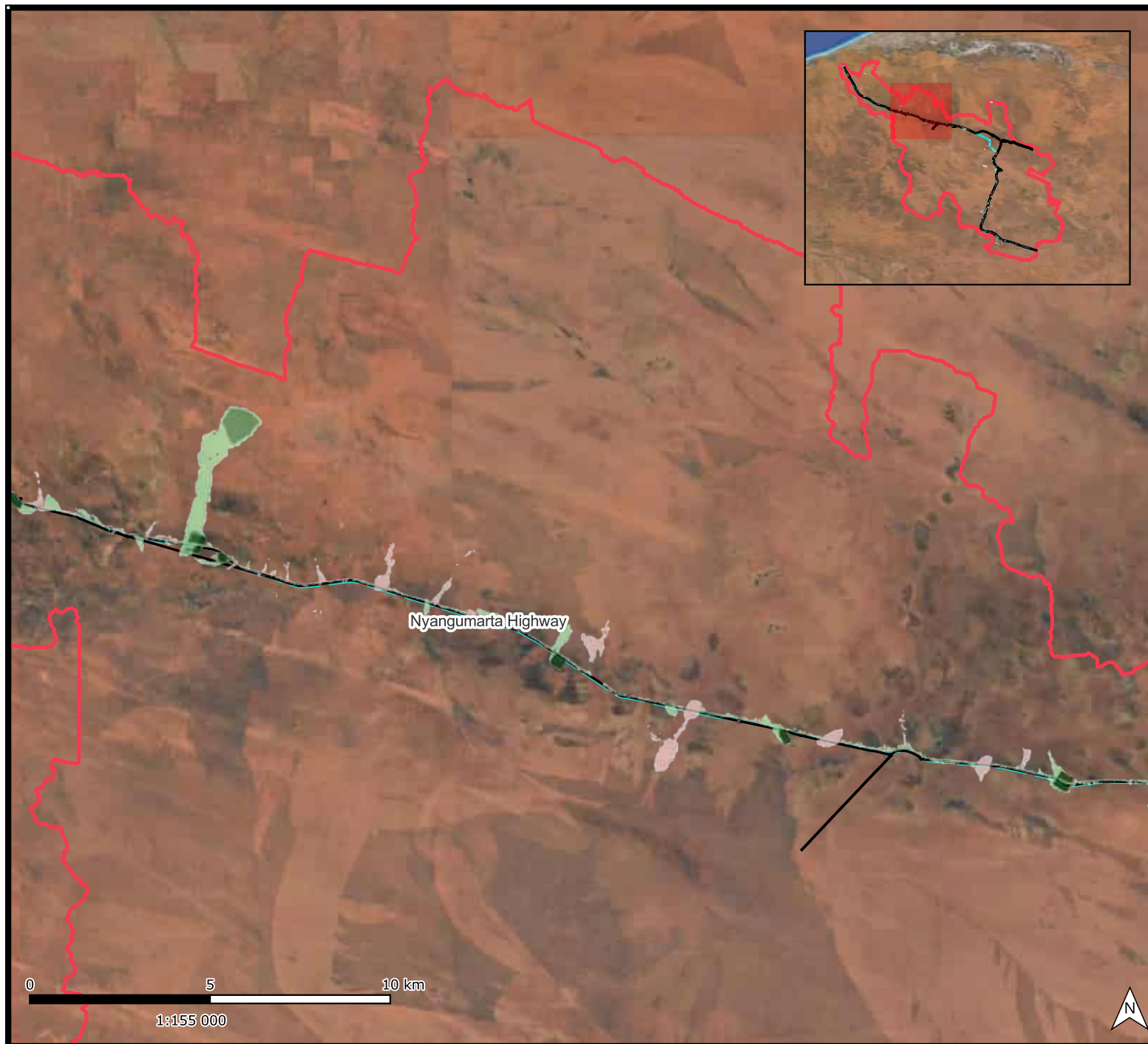
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ -1 (decrease)
 - 1 - -0.5
 - 0.5 - -0.25
 - 0.25 - -0.01
 - 0.01 - 0.01
 - 0.01 - 0.25
 - 0.25 - 0.5
 - 0.5 - 1.0
 - > 1.0 (increase)





Winu Copper Gold Project Surface Water Management Plan Depth Difference 5% AEP Flood Depth (Location B)

Project No.
311012-01475

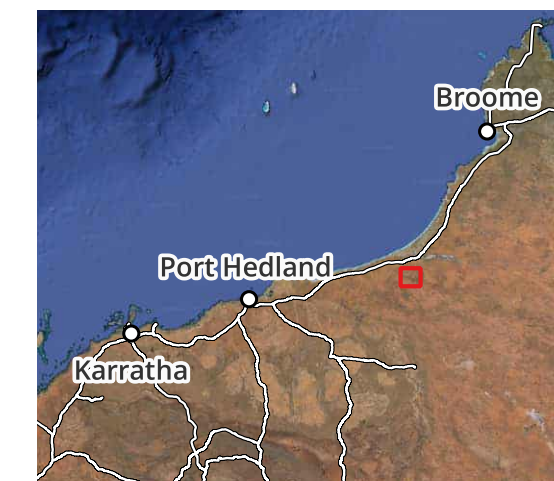
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024

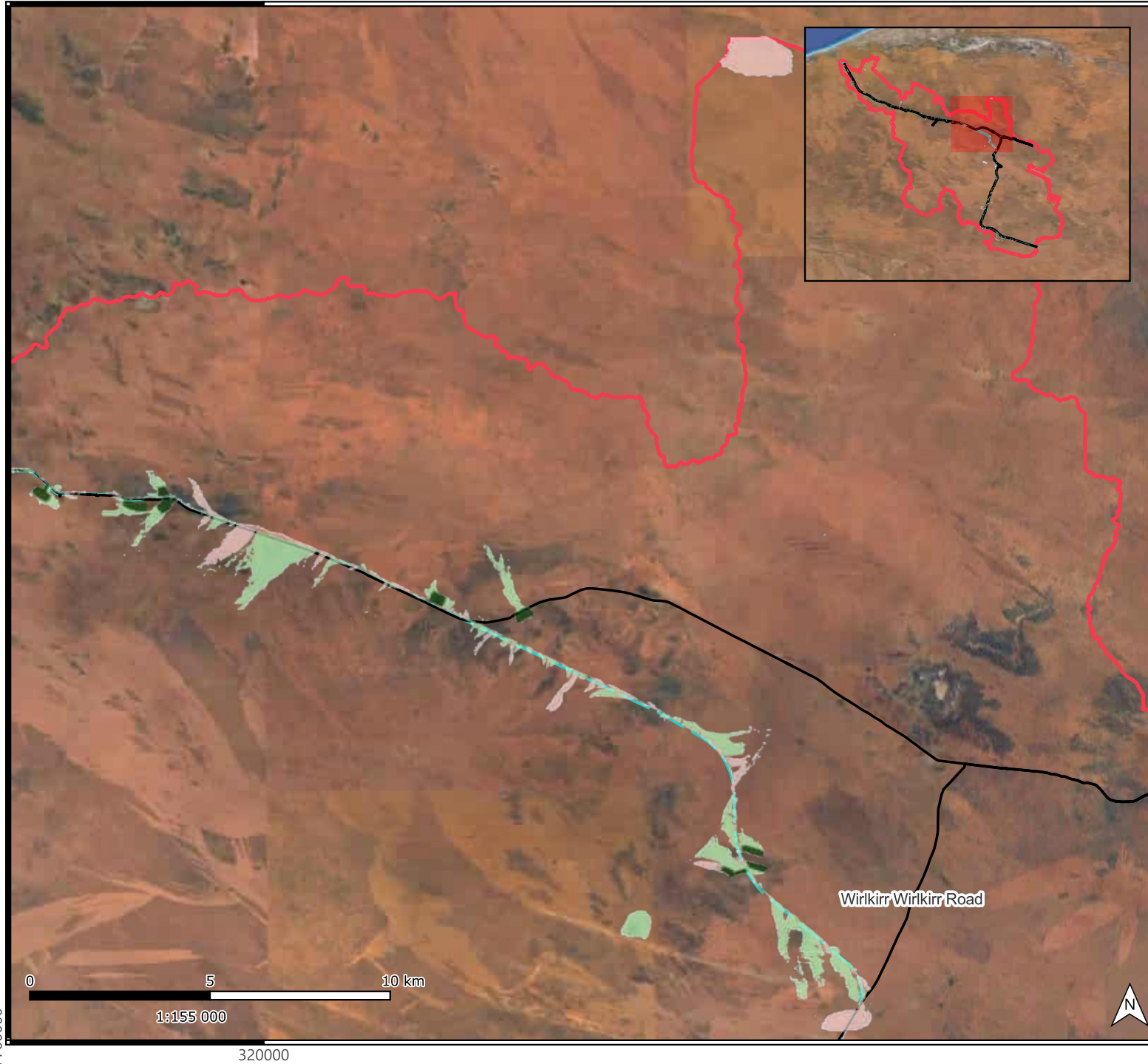


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ -1 (decrease)
 - 1 - -0.5
 - 0.5 - -0.25
 - 0.25 - -0.01
 - 0.01 - 0.01
 - 0.01 - 0.25
 - 0.25 - 0.5
 - 0.5 - 1.0
 - > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 5% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 5% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)

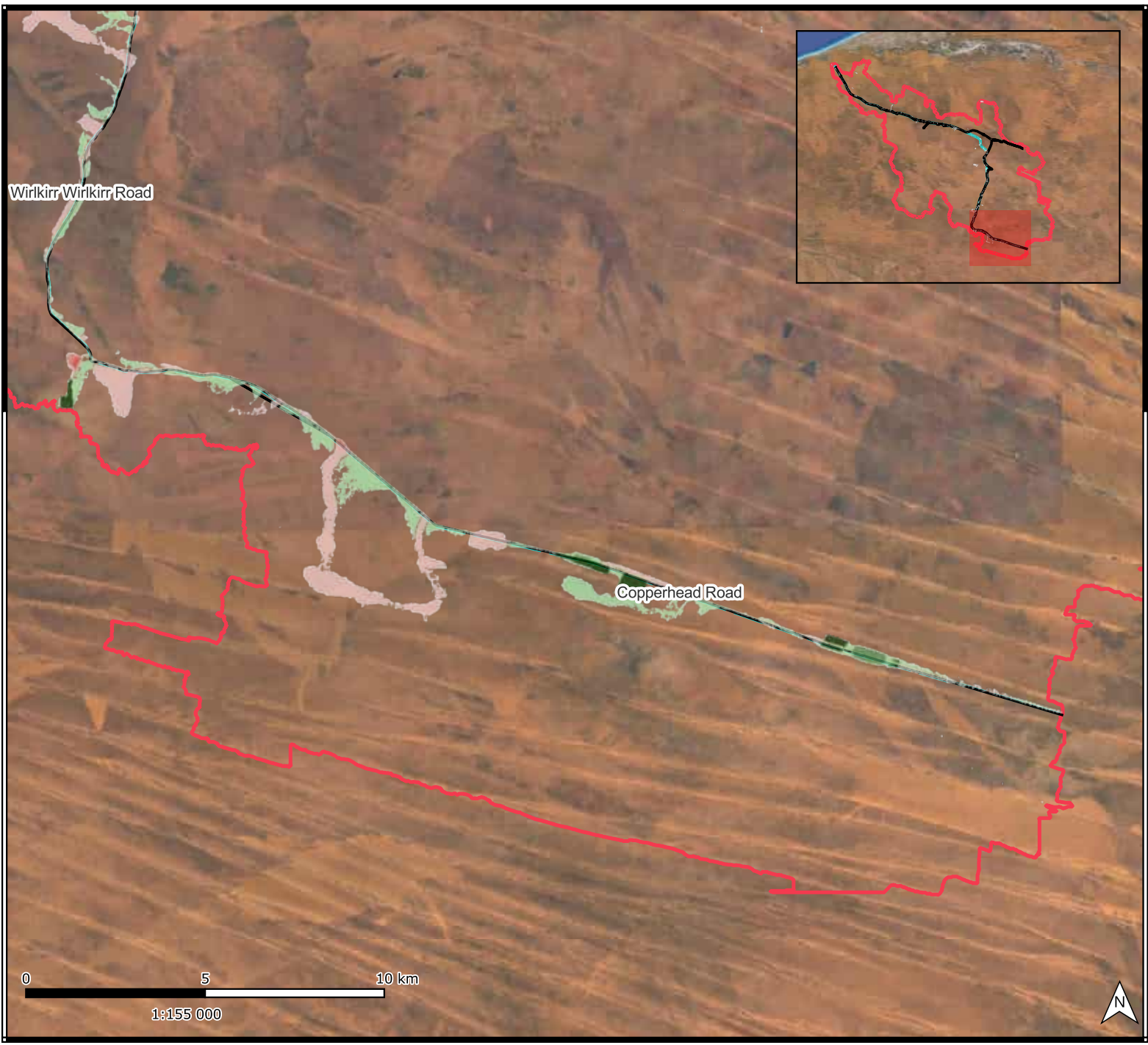


Wirikirr, Wirikirr, Road

0 5 10 km

1:155 000





Winu Copper Gold Project
Surface Water Management Plan
Depth Difference
5% AEP Flood Depth (Location E)

Project No.
311012-01475

Client
Rio Tinto

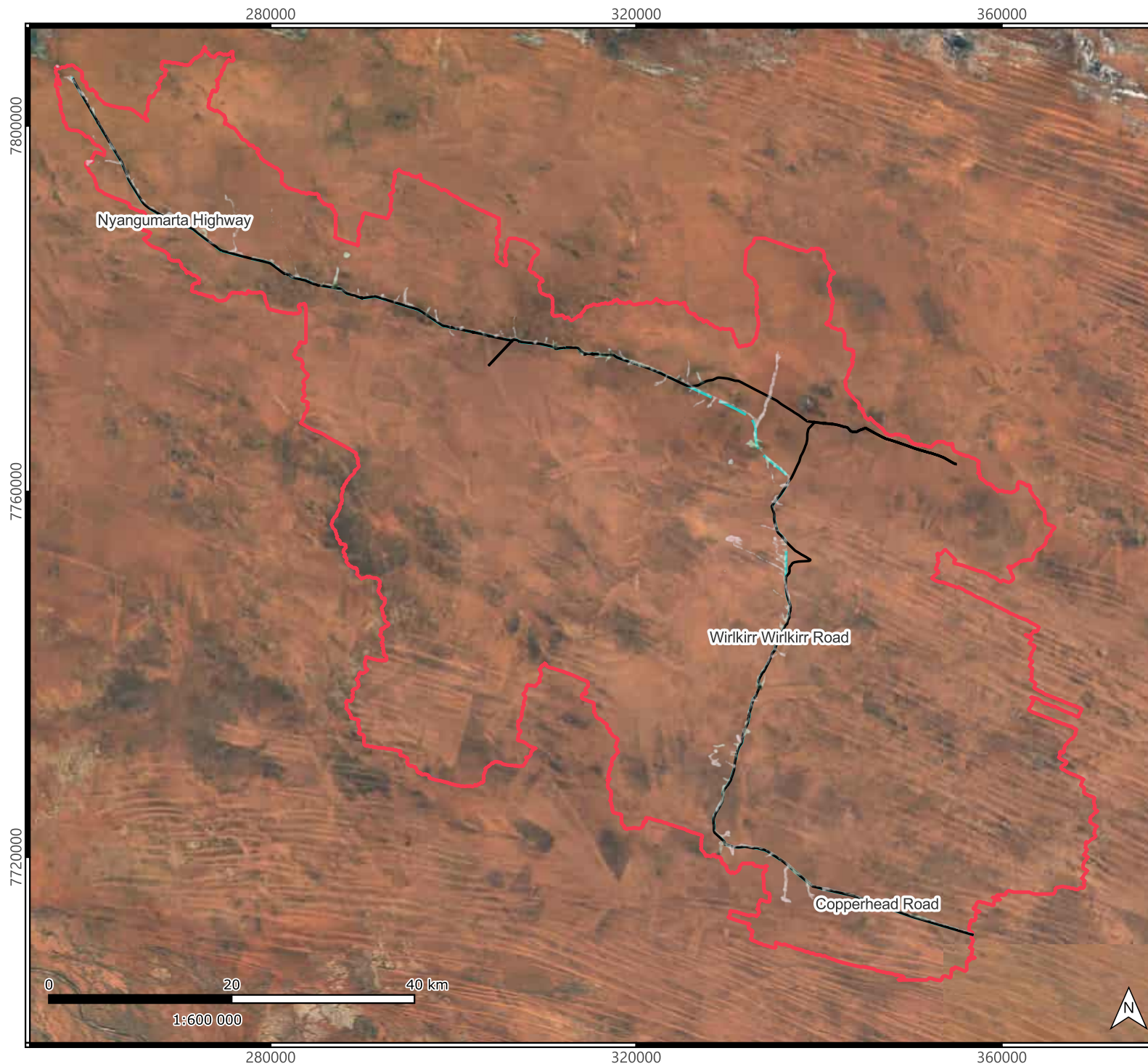
Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ -1 (decrease)
 - 1 - -0.5
 - 0.5 - -0.25
 - 0.25 - -0.01
 - 0.01 - 0.01
 - 0.01 - 0.25
 - 0.25 - 0.5
 - 0.5 - 1.0
 - > 1.0 (increase)





Winu Copper Gold Project Surface Water Management Plan Depth Difference 10% AEP Flood Depth

Project No.
311012-01475

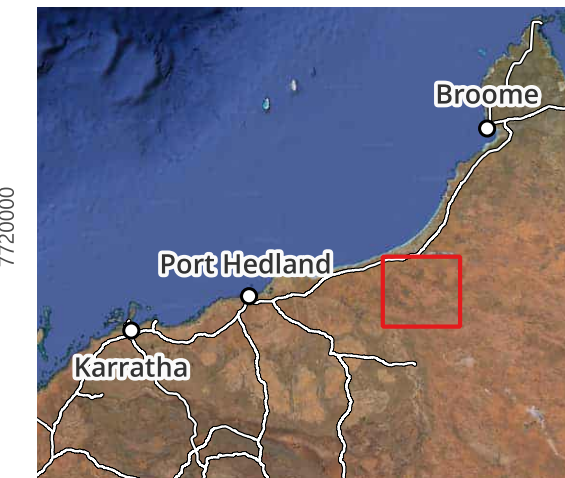
Client
Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 10% AEP Flood Depth (Location A)

Project No.
311012-01475

Client
Rio Tinto

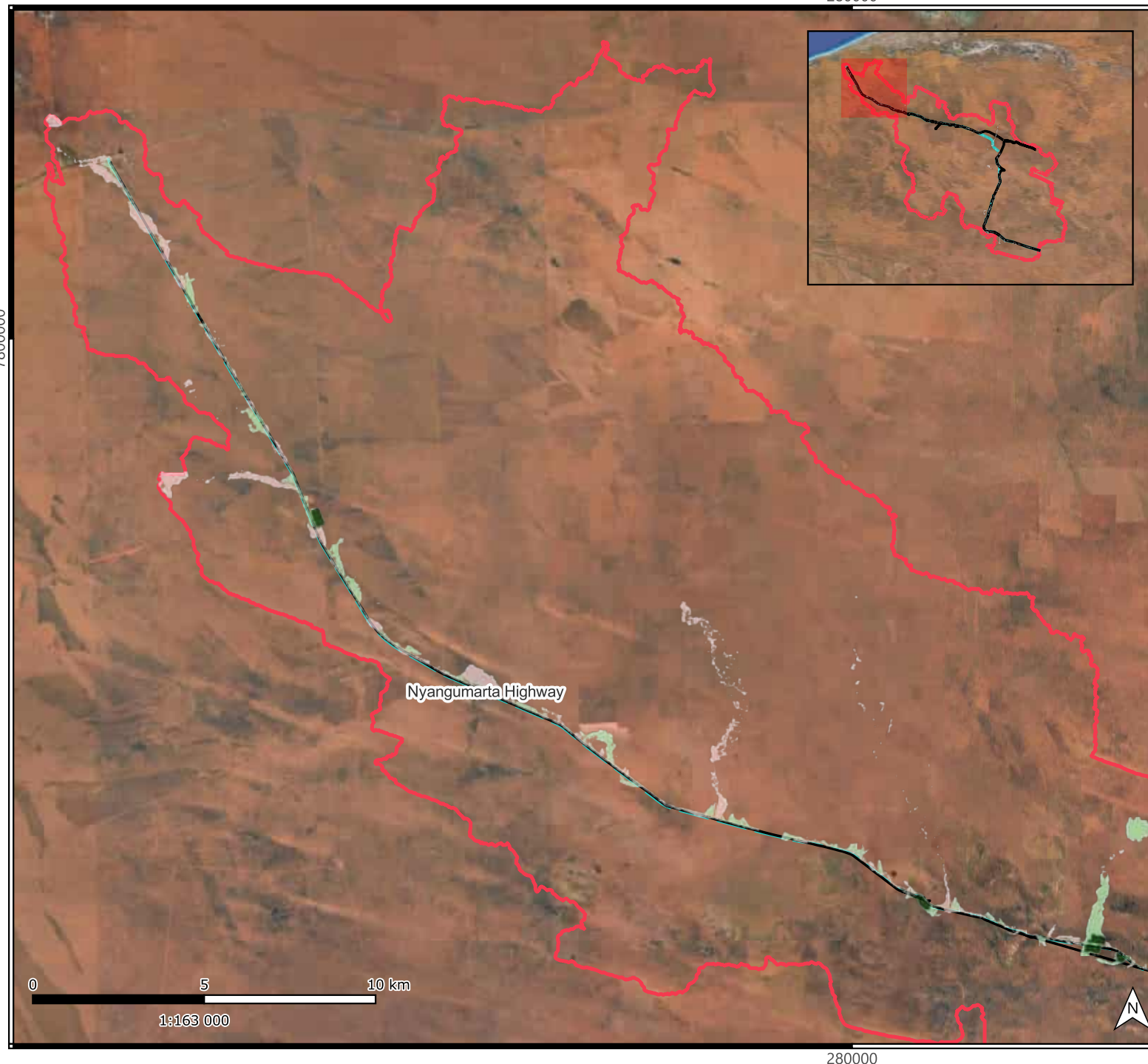
Notes:

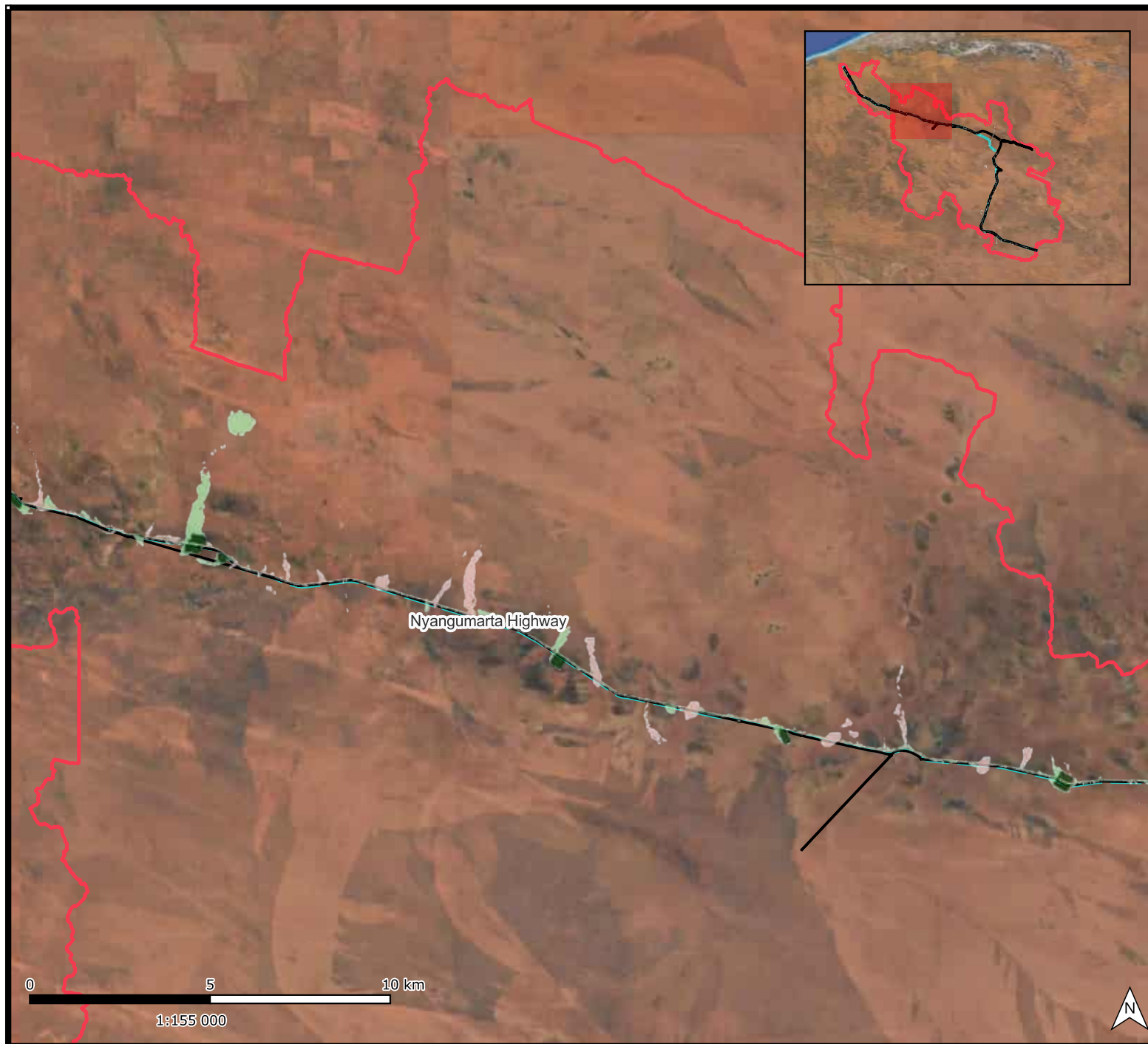
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)





Winu Copper Gold Project Surface Water Management Plan Depth Difference 10% AEP Flood Depth (Location B)

Project No.
311012-01475

Client
Rio Tinto

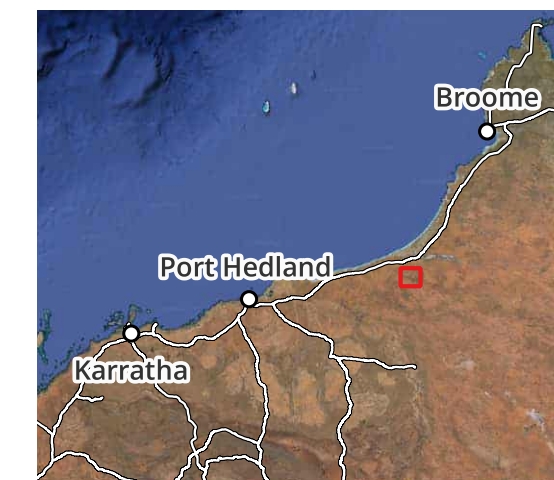
Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024

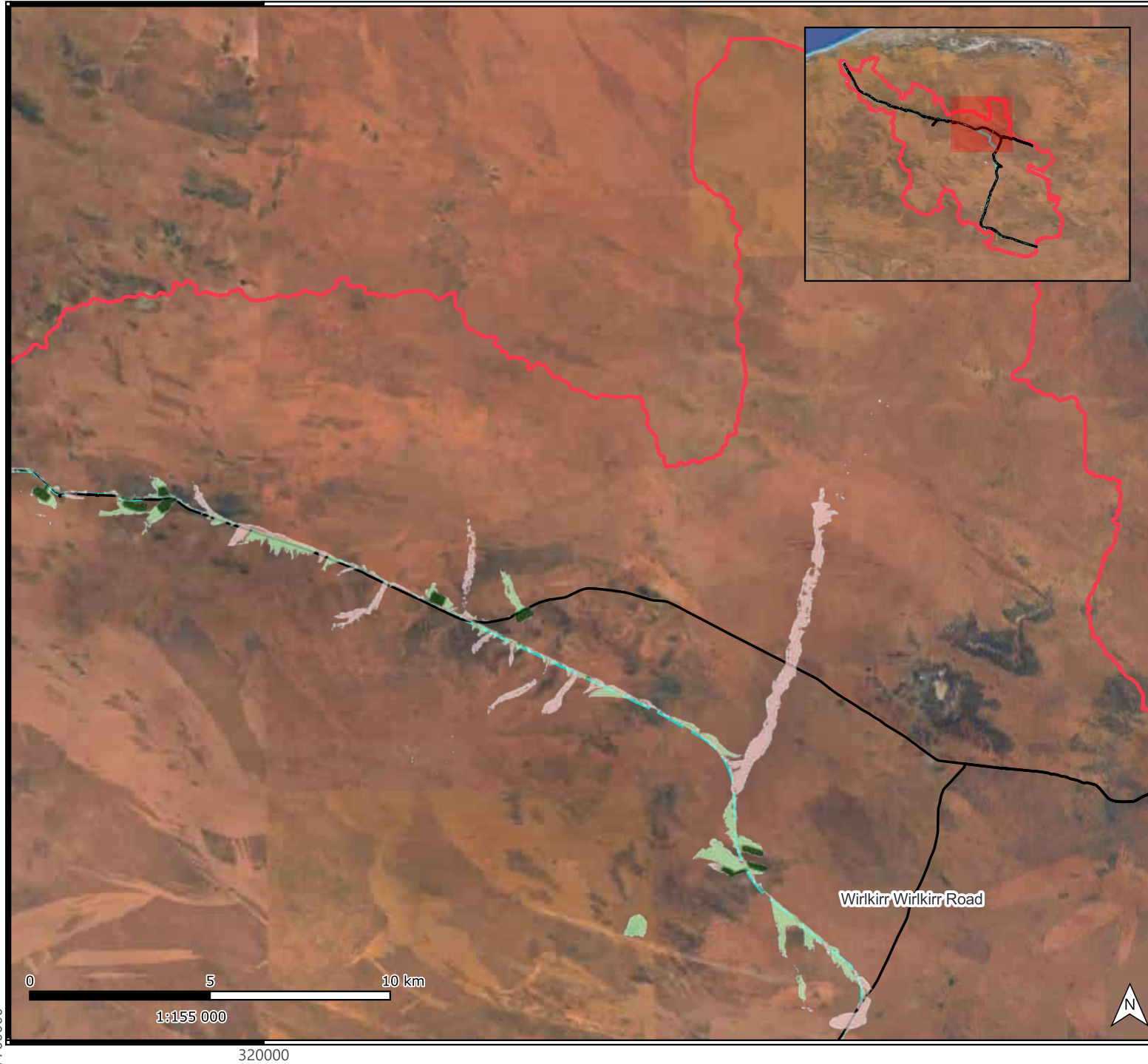


Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 10% AEP Flood Depth (Location C)

Project No.
311012-01475

Client
Rio Tinto

Notes:

Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



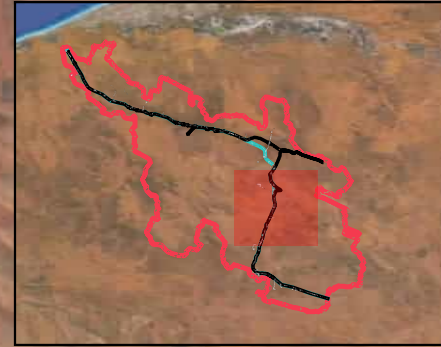
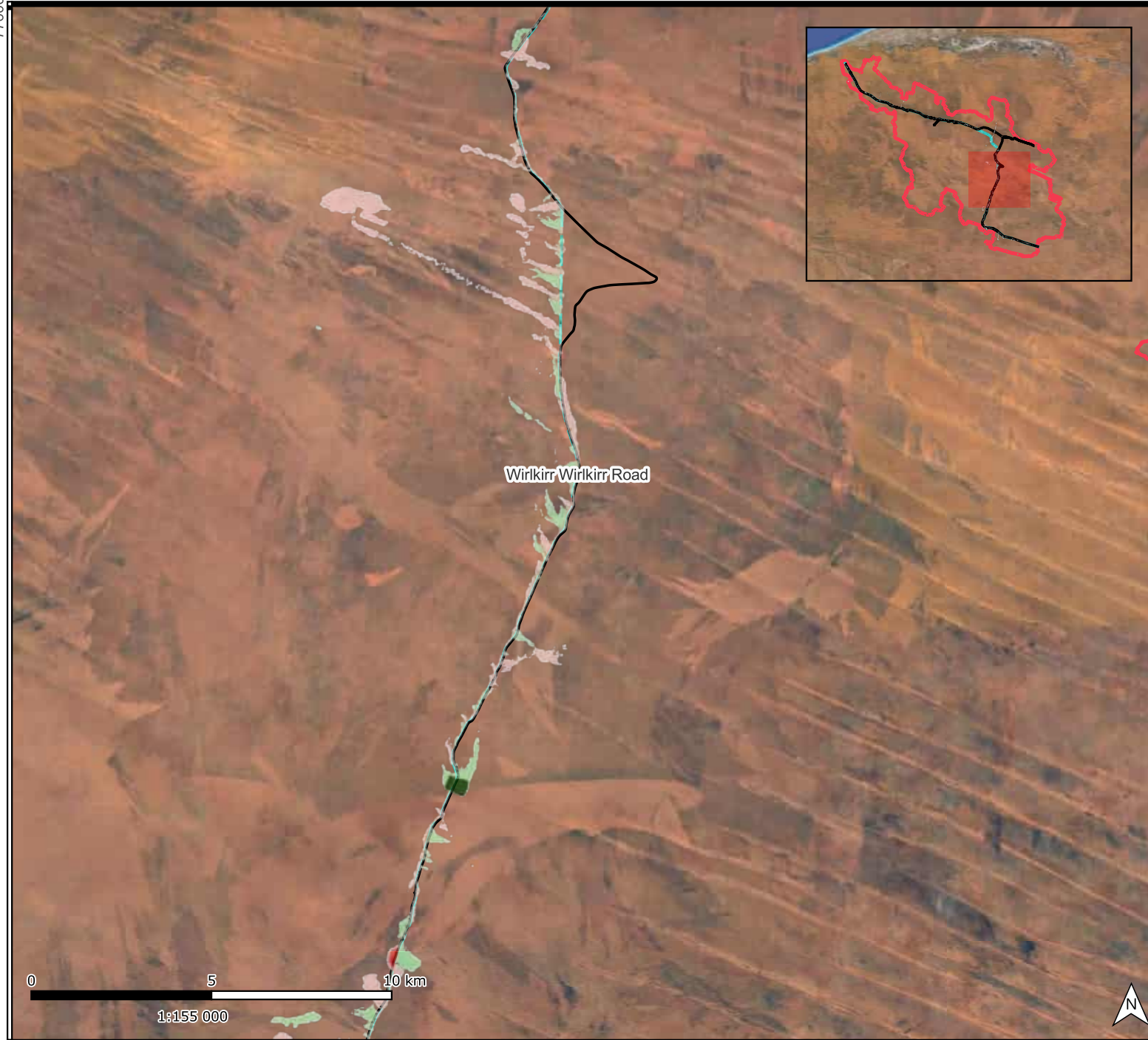
Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)



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Winu Copper Gold Project Surface Water Management Plan Depth Difference 10% AEP Flood Depth (Location D)

Project No.
311012-01475

Client
Rio Tinto

Notes:

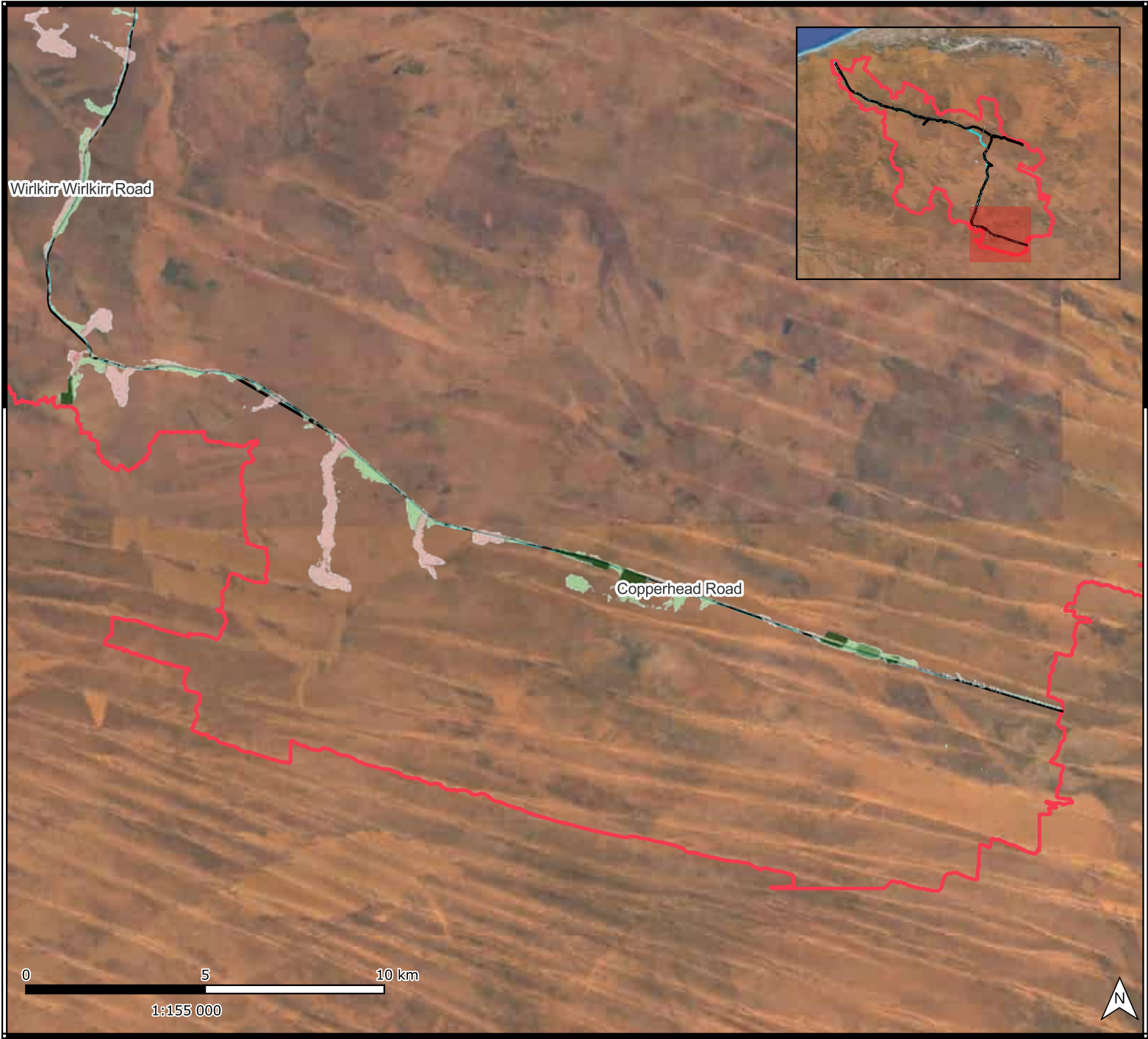
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date: 20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
- ≤ -1 (decrease)
- $-1 - -0.5$
- $-0.5 - -0.25$
- $-0.25 - -0.01$
- $-0.01 - 0.01$
- $0.01 - 0.25$
- $0.25 - 0.5$
- $0.5 - 1.0$
- > 1.0 (increase)





Winu Copper Gold Project
Surface Water Management Plan
Depth Difference
10% AEP Flood Depth (Location E)

Project No. 311012-01475 Client Rio Tinto

Notes:
Project CRS: GDA94 / MGA zone 51
Exported by User: Caitlyn.Rusli
Date:20/06/2024



Legend

- Proposed Access Road
- Existing Access Road
- Model Extent
- Flood Depth (m)
 - ≤ -1 (decrease)
 - 1 - -0.5
 - 0.5 - -0.25
 - 0.25 - -0.01
 - 0.01 - 0.01
 - 0.01 - 0.25
 - 0.25 - 0.5
 - 0.5 - 1.0
 - > 1.0 (increase)

