ANNEXURE 7

Flood Compliance Report

prepared by

WMA Water

22, 24, 171 and 220
Bolong Road, Bomaderry

Cowman Stoddart Pty Ltd
PO Box 738
NOWRA NSW 2541

J:\Jobs\114044\Admin\SpecialtyPlantMar2018.docx
30 April 2018

Attention: Mr. S Richardson

Dear Steve,

Re: DCP2014 Chapter G9: Flood Compliance Report for Proposed Modification Application to MP06-0228, Shoalhaven Starches Expansion Project, Bolong Road, Proposed new Specialty Processing Facility and other works at 22, 24 and 171 Bolong Road, Bomaderry

This letter has been prepared by R W Dewar BSc, MEngSci, MIEAust CPEng Member No 477618 who has over 30 years of experience of floodplain management in NSW.

1 Introduction

Shoalhaven Starches Pty Ltd intend to construct a number of works as listed below at 22, 24 and 171 Bolong Road (refer GoogleMaps aerial photograph below). These works are required to utilise grain that is currently approved to directly feed the fermentation process in the ethanol production process; to instead increase the amount of flour production and in effect increase the starch and gluten production. This change in production is necessary due to the reduced increase in expected demand for ethanol in petrol.

Detailed plans of the plant upgrade are provided in Appendix A.

WMAwater Pty Ltd
DIRECTORS
M K Babister, RPEQ
R W Dewar
E J Askew
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Website: wmawater.com.au

All the sites for the proposed works are inundated in the 1% Annual Exceedance Probability (AEP) flood event by floodwaters from the Shoalhaven River and this letter provides an assessment of the implications of this proposal on flood levels, flows and velocities.

WMAwater (formerly known as Webb McKeown & Associates) undertook the 1990 Shoalhaven River Flood Study and subsequent 2008 Floodplain Risk Management Study and Plan for Shoalhaven City Council. We have also undertaken many similar type flood assessments for Shoalhaven Starches in the past and are therefore very familiar with flooding in the Shoalhaven River floodplain and the implications for flooding of further development in the northern floodplain and along Bolong Road.

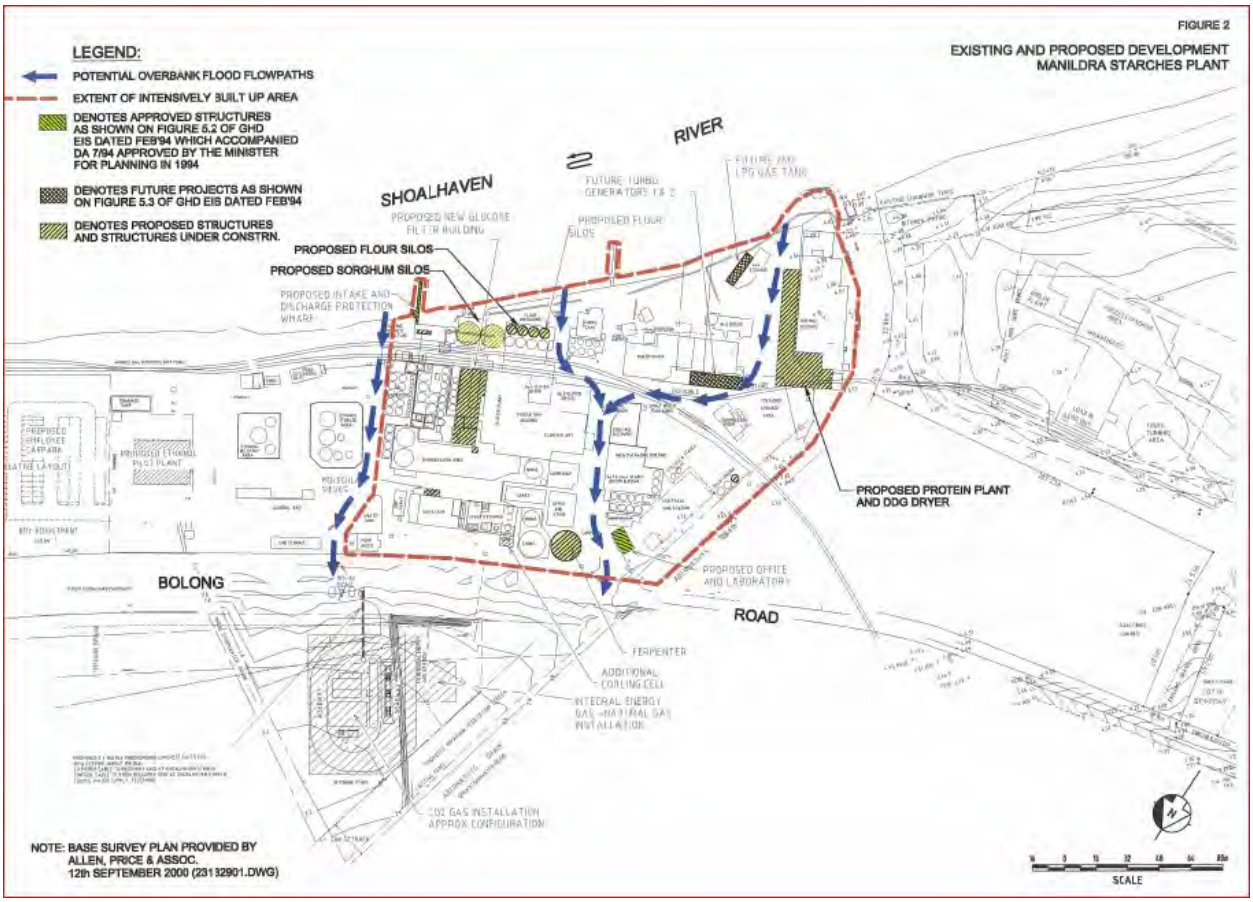
2 Description of Proposal

The proposal is to construct plant as described in Appendix A. Indicative ground levels at the sites adjacent to Abernethys Creek are around 3.5 to 4.5 mAHD (Figure 1) and the 1% AEP flood level is 5.7 mAHD according to the Flood Certificate (this provides the maximum levels for all sites) obtained on 5th April 2018 (attached as Appendix B). Figure 2 provides the 1% AEP peak flood depths based on the TUFLOW modelling as the Flood Certificate is based on prior flood study results (refer Section 3 of this letter for an explanation on the difference).

The Flood Certificate also advises that in the 1% AEP event parts of the sites are described as High Hazard and Floodway and that the projected sea level rise estimates due to climate change will not increase the 1% AEP flood level at this site. It should be noted that the high hazard and floodway classifications (and all other flood related data) were taken from the hydraulic model established in the 1990 Shoalhaven River Flood Study. These are the maximum classifications for the site and the hazard will decrease towards Bolong Road as floodwaters dissipate into the northern floodplain.

The construction of any works on the floodplain will cause a loss of temporary floodplain storage and a loss of hydraulic conveyance. The resulting increase in flood levels will depend upon the magnitude of these losses. Given that parts of the proposed plant are on piers and / or raised above the 1% AEP flood level and the floodplain storage area of the Shoalhaven River floodplain is of the order of 100km^2, the loss of temporary floodplain storage due to the works is generally too small to be accurately evaluated. The main issue from a flooding perspective is therefore the construction of plant as it will impede flow from the Shoalhaven River crossing the site to enter the northern floodplain (i.e reduce the hydraulic conveyance through the site and potentially raise flood levels elsewhere).

Prior to construction of the Shoalhaven Starches plant at Bomaderry there would have been significant flow through the site during a flood, as there is across any river bank. However, since approximately 1960 the ongoing construction of the plant has effectively blocked the flow path through the site. This issue has been investigated in our October 2000 report titled "*Further Development within the Manildra starches Plant off Bolong Road, Bomaderry - Hydraulic Assessment*". The conclusions from that report are provided in Appendix C. In summary an agreement was reached that any future development within the intensively built-up area, as indicated on the Figure 2 below (taken from that report) would not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects.



Flood impact assessment of the proposed plant (i.e will the works impact on flood levels) has therefore been separated into the following two categories (Sections 2.1 and 2.2) according to their site locations.

2.1 Proposed Plant within the Intensively Built Up Area as Described in the Figure above and in Appendix C

a) pipeline from product dryer bag house;
b) relocation of #7 boiler;
c) main substation extension;
d) #8 boiler and generator set;
e) lime silos;
f) flour mill C & flour mill A, B & C ventilation;
g) modification to rail unloading.

2.2 Proposed Plant outside the Intensively Built Up Area as Described in the Figure above and in Appendix C

a) product dryer, specialty product building and product dryer bag house;
b) sifter room;
c) indoor electrical sub station;
d) relocation of 25 car parking spaces.

3 Compliance with Chapter G9: Development on Flood Prone Land (DCP2014)

The following sections describe compliance with Chapter G9: Development on Flood Prone Land (DCP2014 Amended 1st July 2015). As the works will not involve fill, or subdivision of lands, compliance with these performance criteria has not been addressed.

3.1 Performance Criteria - General (Section 5.1 of DCP only)

PERFORMANCE CRITERIA	RESPONSE
P1 Development or work on flood prone land will meet the following:	
The development will not increase the risk to life or safety of persons during a flood event on the development site and adjoining land.	Up to 15 additional workers from will be on the site as a result of the proposed works. Thus the proposed development will increase the number of workers from Shoalhaven Starches who may be subject to flood risk. Shoalhaven Starches already has a Flood Plan to ensure safety of personnel, to minimise flood damages and to assist with recovery. This plan will be updated to ensure that it accounts for the additional workers and new plant on the site.
The development or work will not unduly restrict the flow behaviour of floodwaters.	Refer Hydraulic Impact Assessment below.
The development or work will not unduly increase the level or flow of floodwaters or stormwater runoff on land in the vicinity. The development or work will not exacerbate the adverse consequences of floodwaters flowing on the land with regard to erosion, siltation and destruction of vegetation.	The proposed development is within existing built up industrial land with minimal vegetation on the site. All runoff under existing and future conditions will reach the ground in nearly identical locations and thus the works will have no impact on erosion or siltation.
The structural characteristics of any building or work that are the subject of the application are capable of withstanding flooding in accordance with the requirements of the Council.	**A separate structural report will be provided.**
The development will not become unsafe during floods or result in moving debris that potentially threatens the safety of people or the integrity of structures.	**A separate structural report on the potential failure of existing buildings and stored equipment and product will be provided.**
Potential damage due to inundation of proposed buildings and structures is minimised.	Inundation of the site and the proposed plant and / or debris impact may cause damage to electrical and other components feeding the equipment as well as damage to the plant itself. These issues will be considered in an updated Shoalhaven Starches Flood Plan.

PERFORMANCE CRITERIA	RESPONSE
The development will not obstruct escape routes for both people and stock in the event of a flood.	The proposed works will not occupy escape routes or cause workers to become trapped.
The development will not unduly increase dependency on emergency services.	The works will increase (by 15) the number of workers from Shoalhaven Starches who may be subject to flood risk. These issues will be examined in an updated Shoalhaven Starches Flood Plan.
Interaction of flooding from all possible sources has been taken into account in assessing the proposed development against risks to life and property resulting from any adverse hydraulic impacts.	Refer Hydraulic Impact Assessment below.
The development will not adversely affect the integrity of floodplains and floodways, including riparian vegetation, fluvial geomorphologic environmental processes and water quality.	The works will be constructed on land that is partly designated as high hazard floodway in the 1% AEP event (from flood certificate in Appendix B). The site is industrial land with limited existing vegetation and is beyond the influence of normal fluvial geomorphic processes. The works will have no impact on water quality.

3.2 Hydraulic Impact Assessment

As noted above a large number of the proposed works are within the agreed upon *intensively built up area*. As such the loss of flow conveyance due to construction of the works in this area will be minimal as the existing access corridors (which become flow paths during a flood) through the site will always remain. For this reason no hydraulic impact assessment has been undertaken for the works described in Section 2.1.

Of the four work items located outside the agreed upon *intensively built up area* (Section 2.2) item d) the relocation of 25 car parking spaces will involve no buildings, minimal earth works and all cars will be removed prior overtopping of the river bank. Thus the hydraulic impact of this work is nil.

Hydraulic modelling of items a), b) and c) in Section 2.2 has been undertaken as described below.

As items b) - sifter room and c) - indoor electrical sub station in Section 2.2 are relatively small and generally "shielded" by existing plant to the south (the generally direction of flow from the Shoalhaven River is from south to north) the impacts of these structures will be small. However item a) - product dryer, specialty product building and product dryer bag house in Section 2.2 is much larger and restricts an existing flow path through the site. The March 2018 Nearmap aerial photograph shows a cleared area where the specialty building is to be located. However existing conditions have been assumed as at the August 2015 Nearmap aerial photograph

which shows the presence of an existing building on the west of the recently constructed product dryer building.

3.2.1 Hydraulic Modelling

Hydraulic or flood modelling typically involves the setting up and calibration of two computer models. A hydrologic model that converts the rainfall to runoff and a hydraulic model that includes inflow from the hydrologic model, as well as ocean boundaries, which determines peak flood levels and velocities based on hydraulic formulae. Both models are calibrated to historical data, including historical flood levels and river flow gaugings, to ensure that they can replicate the historical events and are then used to determine design flood events. These are events that have a known probability of occurrence, such as the 1% Annual Exceedance Probability (AEP) event.

The CELLS model of the Shoalhaven River (established as part of the 1990 *Lower Shoalhaven River Flood Study*) represented the channel and floodplain as a series of interconnected cells, termed either river or floodplain cells. The river cells were connected by cross sections and the floodplain cells connected by weirs. Approximately 100 cells were used in the Shoalhaven River model with some cells over 4km^2 in area. The CELLS model is termed a one dimensional (1D) branched model in that it cannot account for flow in other than the one direction but has "branches" which allow flow to extend across the floodplain. The model used both field survey for weirs as well as bathymetric survey for the river cross sections at approximately 1 to 2 kilometre spacing.

The CELLS model is an unsteady flow model in that it modelled the full flood event (rising and falling water levels) and not just the peak and included ocean tidal hydrographs at both entrances, namely the Shoalhaven Heads and Crookhaven River, and some six flow hydrographs from the WBNM hydrologic model. Council's Flood Certificates are based on results from the CELLS model.

Since 1990 there have been significant advancements in the field of hydraulic modelling, though in hydrologic modelling there has been significantly less advancements and the WBNM model used previously is still used today.

The main advancements in hydraulic modelling are through the use of more complex computer software (TUFLOW) that allows the river and floodplain to be discretised into a grid. This is typically 15m by 15m on large rivers and up to 2m by 2m on small urban catchments. These models are termed 2 Dimensional (2D) in that they determine the flow direction between grid cells producing vector velocities. These models are thus able to more accurately define the topography and in turn can more accurately represent the hydraulic effects of even a small development on a large floodplain. The use of TUFLOW allows more accurate definition of all hydraulic parameters (hazard, hydraulic classification, peak velocities and depths etc.) on the site. Thus rather than a single value provided from the CELLS model (1990 *Lower Shoalhaven River Flood Study)* TUFLOW is able to demonstrate that hazard, velocity and other parameters will change as flow crosses over the northern bank and enters the northern floodplain.

3.2.2 Hydraulic Modelling Process

The hydraulic effects (change in flood levels, flows or velocities) of the proposed works (items a), b) and c) in Section 2.2) at the Shoalhaven Starches plant site at Bomaderry were analysed using the TUFLOW hydraulic model established for the Shoalhaven Starches 2013 *Shoalhaven River Flood Study.* This model was calibrated to match the historical flood level data for the 1974, 1975, 1978 and 1988 floods and used to provide updated design flood levels for the Shoalhaven River downstream of Nowra.

The modelling process was to compare the peak flood levels in each grid cell for the *Existing* and *Proposed* scenarios. The *Existing* scenario represents the existing floodplain including all proposed but un-built approved Shoalhaven Starches structures. The *Proposed* scenario reflects the existing floodplain but including the proposed plant (items a), b) and c) in Section 2.2 as described in Appendix A). The comparison between the *Existing* and *Proposed* scenarios is termed a flood impact map.

More frequent events, smaller than the 1% AEP, have not been modelled as the northern river bank of the Shoalhaven River is not overtopped to any significant extent until an event larger than the 5% AEP. Thus in these small more frequent events there would be nil impact on peak flood levels of the proposed works. Larger events than the 1% AEP will occur but these events are obviously extremely rare and are not used for flood related planning determinations by Councils except when their failure has potential catastrophic consequences (such as dam failure).

3.2.3 Hydraulic Modelling Results

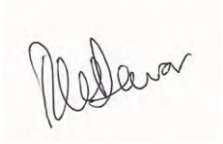
The flood impact maps for the 1% AEP, 0.5% AEP and PMF / Extreme events are provided as Figures 3 to 5. The different colours reflect the change in peak water levels as a result of the proposed works. In summary the purple tones reflect a decrease in flood level whilst the blue/green/brown tones reflect an increase in peak level.

The proposed works do slightly decrease the amount of floodwaters from entering the northern floodplain across the river bank. Thus immediately upstream and to the east of the proposed works there is an increase in peak level in the 1% and 0.5% AEP events but minimal impact in the PMF / Extreme event. The increase in level in the 1% and 0.5% AEP events is largely within the confines of land owned by Shoalhaven Starches.

Downstream of the proposed works on Bolong Road there is a reduction in peak level of less than 0.1m. This occurs because the proposed works reduce slightly the amount of flood waters crossing through the site and thus flood levels are slightly lowered.

Should you have any questions or require further clarification regarding the above do not hesitate to contact the undersigned.

Yours Sincerely,
WMAwater



R W Dewar
Director

See Annexure 2 - Plan Details of Proposed Modifications

Appendix A

EXISTING – BLACK.

NEW PROPOSALS – RED

PROPOSED PRODUCT DRYER, SPECIALITY PRODUCT BUILDING & PRODUCT DRYER BAG HOUSE. (Drws.MN6531–002 to –004)

APPROVED EXIT.

APPROVED PACKER, WAREHOUSE & ASSOCIATED INFRASTRUCTURE.

APPROVED CONTAINER STORAGE AREA.

PROPOSED SIFTER ROOM. (Drw. MN6531–014)

PROPOSED MAIN SUB–STATION EXTENSION. (Drw. MN6531–013)

PROPOSED RELOCATION OF #7 BOILER. (Drw. MN6531–005 to –009)

RE–VEGETATION ALONG DRAIN BANK.(18M NOMINAL).

RE–VEGETATION ALONG DRAIN BANK.(20M NOMINAL). SCREEN PLANTS ALONG BOLONG ROAD.

PROPOSED INDOOR ELECTRICAL SUB–STATION. (Drw. MN6531–010 & –011)
RELOCATE 26 CAR PARKING SPACES.

PROPOSED FLOUR MILL C & FLOUR MILL A,B, & C VENTILATION.(Drw. MN244–002 to–007,–010,–011.)

PROPOSED LIME SILOS. (Drw. MN6531–005 to –009)

PROPOSED #8 BOILER & GENERATOR SET. (Drw. MN6531–005 to –009)

PROPOSED MODIFICATION TO RAIL UNLOADING. (Drw. MN6531–012)

MANILDRA LAND

OPEN PADDOCKS

BOLONG ROAD

RAILWAY STREET

SOUTH COAST RAILWAY

PRIVATE

EASEMENT TO DRAIN WATER

Min. 18M SETBACK

MANILDRA

COMPLEX

SYRUPS TANK

Shoalhaven River

MANILDRA GROUP 100% AUSTRALIAN	DRAWN PC	DATE 08–01–18	SITE MANILDRA–SHOALHAVEN STARCHES PTY LTD.
	DESIGNED PC	DATE	JOB TITLE PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
	CHKD MH	DATE	DWG TITLE APPROVED & NEW PROPOSALS. OVER ALL SITE PLAN.
	APPD BH	DATE 08/01/18	PROJECT No. 6531A DWG No. MN6531-001
		SCALE 1:2500	SHT SIZE A3 SHEET OF REV. P08

EXISTING APPROVED PLANT — BLACK.
PROPOSED BUILDINGS,SILOS & ASSOCIATED WORKS FOR SPECIALITY PRODUCTS & PRODUCT DRYER BUILDINGS. —RED.

CLEARY BROS.

LOT BOUNDARY

BOLONG ROAD

LOT BOUNDARY

36M SET BACK

Carpark

5.1M

43M

12.3M

19M

20M

12M

Existing Maintenance & Store Building

PROPOSED PRODUCT SILOS.

PROPOSED PRODUCT DRYER.

PROPOSED SPECIALITY PRODUCTS BUILDING.

EXISTING PRODUCT DRYER.

PROPOSED PRODUCT DRYER BAG HOUSE.

31.9M Min. SET BACK

EXISTING INTERIM PACKAGING FACILITY.

8.5M

PROPOSED PRODUCT SILOS.

PROPOSED BUNDED STORAGE.

DDG OUTLOAD

EVAPORATOR

DDG UNLOADING

EXISTING SWITCH ROOM

EXISTING SWITCH ROOM (ELEVATED)

REFERENCE DRG.No.	REV	REFERENCE DRAWING
REFERENCE DRG.No.	REV	REFERENCE DRAWING

REVISIONS

REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
-						

REVISIONS

REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD

MANILDRA GROUP
Commitment to Excellence

DRAWN	Paul Caruana	DATE	13/01/17
DESIGNED.		DATE	
CHKD		DATE	
APPD		DATE	
SCALE	1 : 500		

SITE: MANILDRA – SHOALHAVEN STARCHES PTY LTD
JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
DWG TITLE: PROPOSED EXPANSION STRUCTURES. PLAN VIEW.
PROJECT No: 6531
DWG No: MN6531-002
SHT SIZE: A3
SHEET: OF
REV: P07

564 x 891

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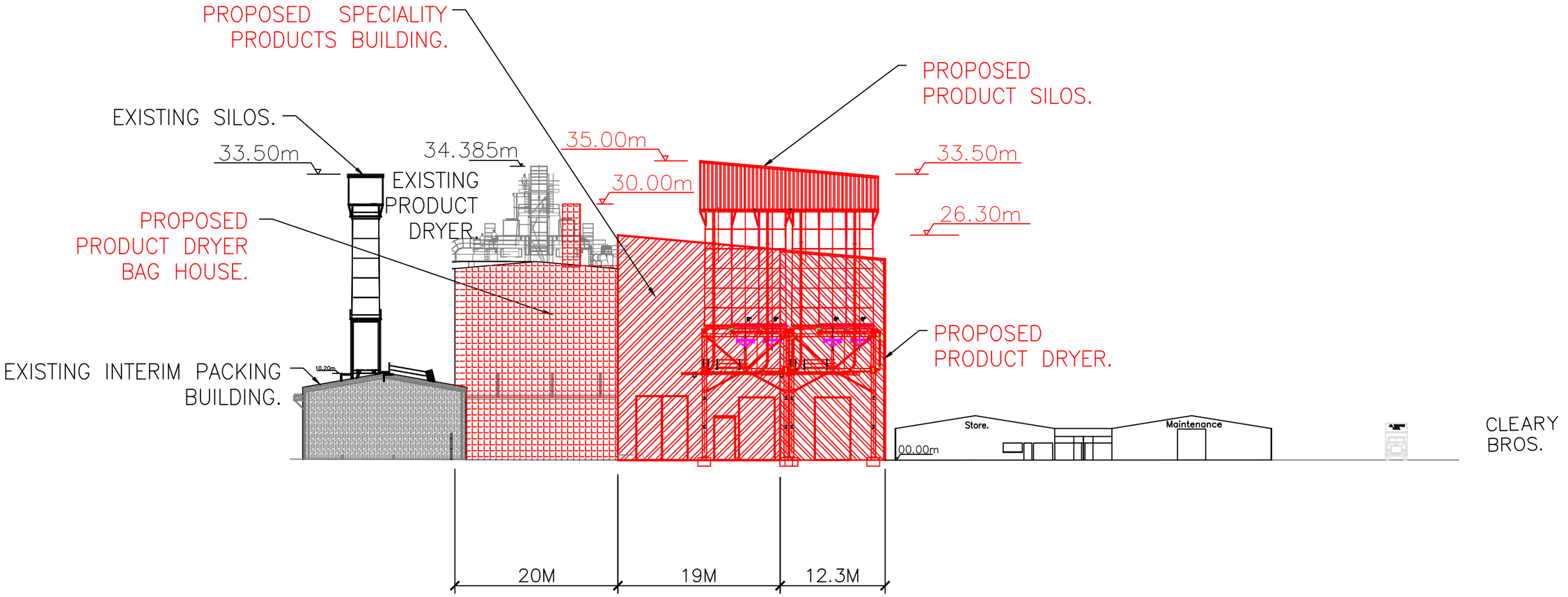
PROPOSED BUILDINGS,SILOS & ASSOCIATED WORKS FOR SPECIALITY PRODUCTS & PRODUCT DRYER BUILDINGS. —RED.



NORTHERN ELEVATION(FRONT).

REFERENCE	DRG.No.	REV	REFERENCE DRAWING
REFERENCE	DRG.No.	REV	REFERENCE DRAWING

REVISIONS	REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
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REVISIONS	REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD

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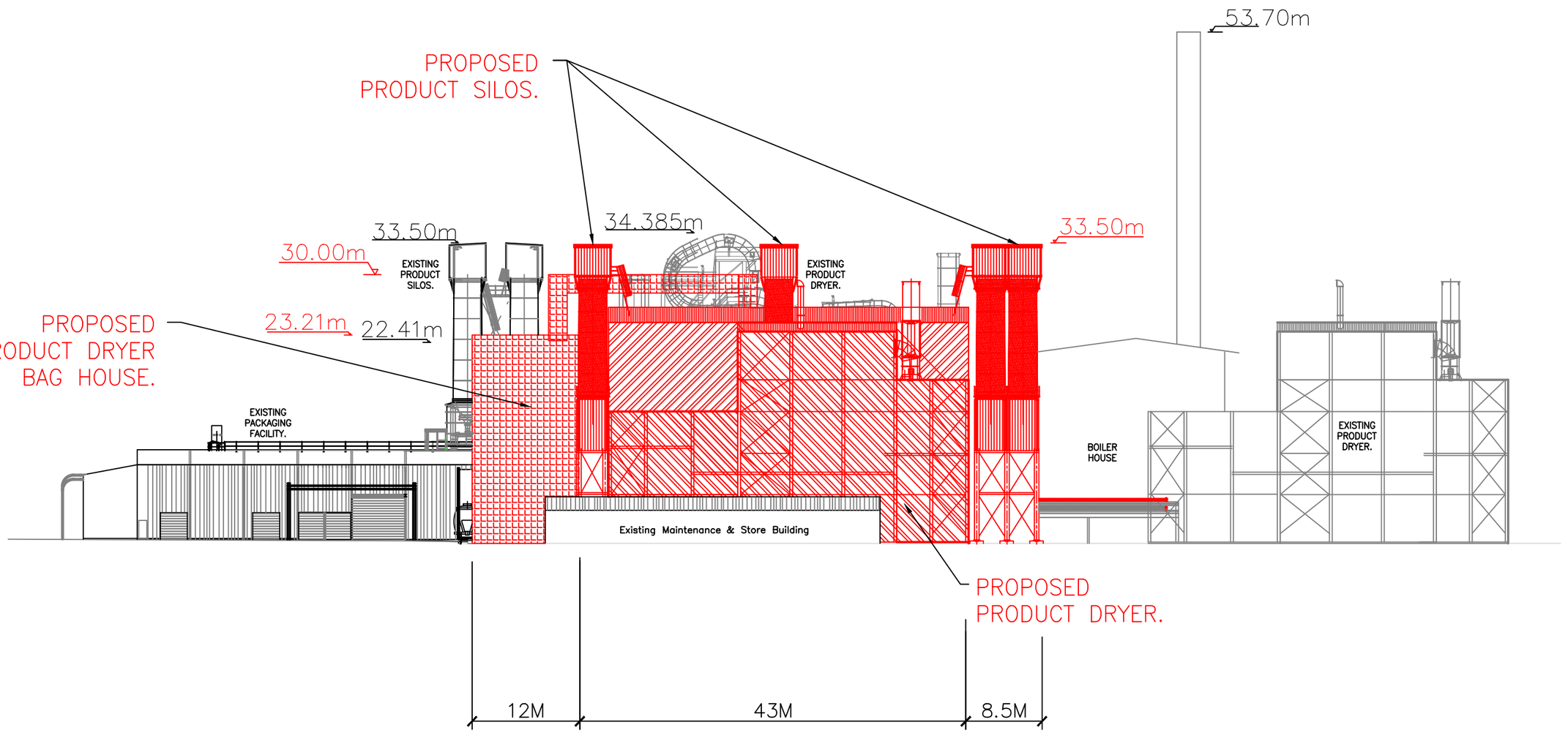
DRAWN	Paul Caruana	DATE	13/01/17
DESIGNED.		DATE	
CHKD		DATE	
APPD		DATE	
SCALE	1 : 500		

SITE: MANILDRA – SHOALHAVEN STARCHES PTY LTD
JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
DWG TITLE: PROPOSED EXPANSION STRUCTURES. NORTHERN ELEVATION.
PROJECT No. 6531
DWG No. MN6531-003
SHT SIZE: A3
SHEET
OF
REV. P07

564 x 891

EXISTING APPROVED PLANT – BLACK.
PROPOSED BUILDINGS,SILOS & ASSOCIATED WORKS FOR SPECIALITY PRODUCTS & PRODUCT DRYER BUILDINGS. –RED.



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REFERENCE	DRG.No.	REV	REFERENCE DRAWING

REVISIONS	REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
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REVISIONS	REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD

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DRAWN	Paul Caruana	DATE	13/01/17
DESIGNED.		DATE	
CHKD		DATE	
APPD		DATE	
SCALE	1 : 500		

SITE: MANILDRA – SHOALHAVEN STARCHES PTY LTD
JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
DWG TITLE: PROPOSED EXPANSION STRUCTURES. WESTERN ELEVATION.
PROJECT No. 6531
DWG No. MN6531-004
SHT SIZE: A3
SHEET
OF
REV. P07

546 x 841

EXISTING APPROVED PLANT – BLACK.

PROPOSED NEW #8 BOILER/GENERATOR SET, LIME SILOS & RELOCATION OF #7 BOILER –RED.

14M

2.2M

8M

2.2M

PROPOSED RELOCATION OF #7 BOILER.

No.2 BOILER

BOILER HOUSE

No.1 BOILER

FLOUR MILL B

CONVEYOR

HOPPER

ASH

No.6 BOILER

PROPOSED #8 BOILER.

14.5M

COAL HOPPER

PROPOSED PIPE BRIDGE.

9M

EXISTING POSITION OF #7 BOILER.

21M

PROPOSED LIME SILOS.

PROPOSED PIPE BRIDGE.

10M

PROPOSED GENERATOR SET.

7.2M

17M

DDG DRYER BUILDING

TANK

CONC SLAB

RAMP

NORTHERN ELEVATION

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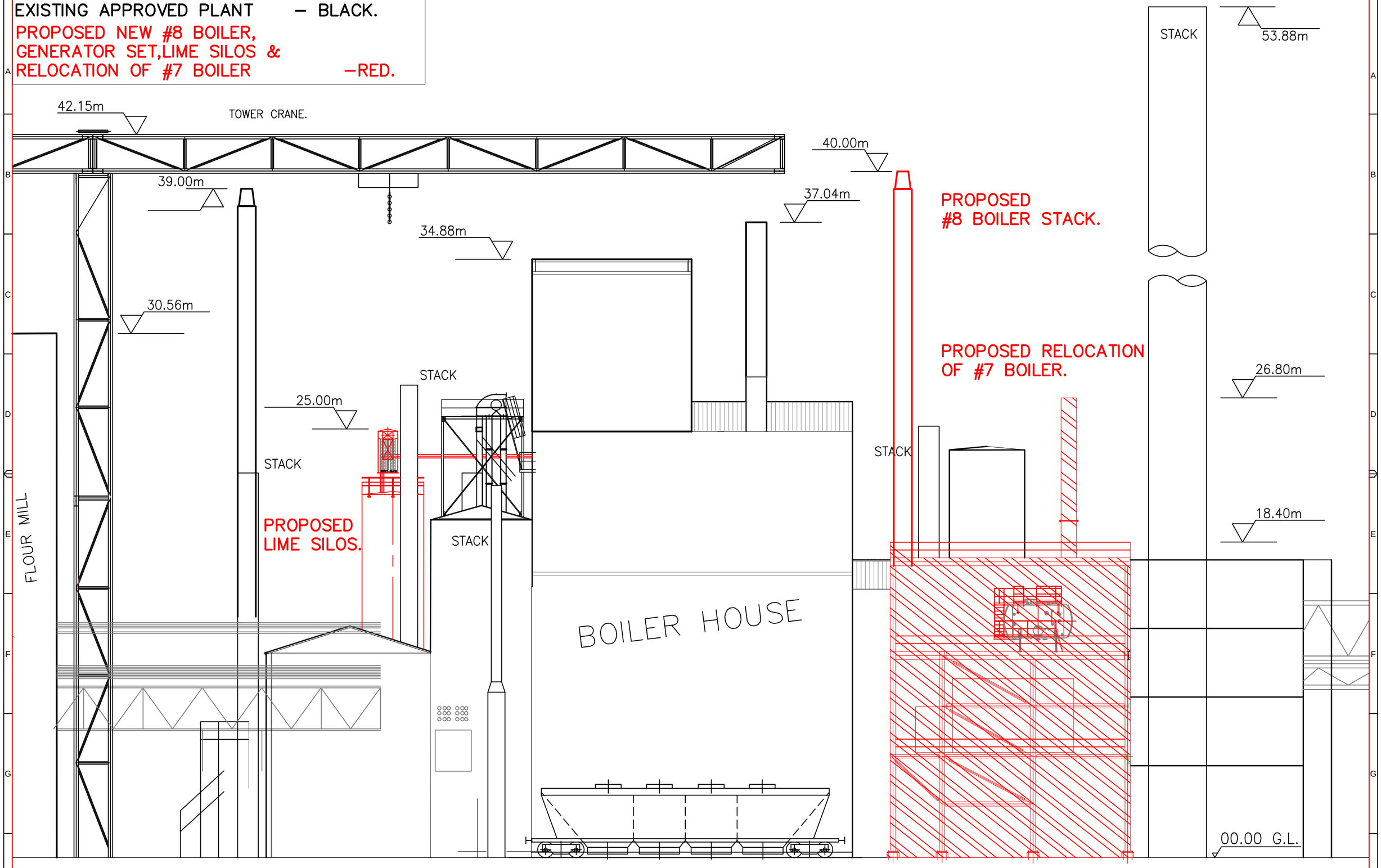
DRAWN Paul Caruana	DATE 13/01/17	SITE MANILDRA – SHOALHAVEN STARCHES PTY LTD	SHT SIZE A3
DESIGNED.	DATE	JOB TITLE PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.	SHEET
CHKD	DATE	DWG TITLE PROPOSED NEW BOILER,GENERATOR SET,LIME SILOS & BOILER RELOCATION.SITE PLAN.	OF
APPD	DATE	PROJECT No. 6531C DWG No. MN6531-005	REV. P08
SCALE 1 : 300			

EXISTING APPROVED PLANT — BLACK.

PROPOSED NEW #8 BOILER, GENERATOR SET,LIME SILOS & RELOCATION OF #7 BOILER —RED.



NORTHERN ELEVATION

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DESIGNED.	DATE	JOB TITLE PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.	SHEET OF
CHKD	DATE	DWG TITLE PROPOSED NEW BOILER,GENERATOR SET,LIME SILOS & BOILER RELOCATION.NORTHERN ELEVATION.	REV. P08
APPD	DATE		
SCALE 1:200		PROJECT No. 6531C / DWG No. MN6531-006	

EXISTING APPROVED PLANT — BLACK.

PROPOSED NEW #8 BOILER, GENERATOR SET,LIME SILOS & RELOCATION OF #7 BOILER —RED.

STACK

53.88m

42.15m

TOWER CRANE.

40.00m

37.04m

34.88m

BOILER HOUSE

26.80m

PROPOSED LIME SILOS.

25.00m

18.40m

PROPOSED RELOCATION OF #7 BOILER.

17.00m

PROPOSED #8 BOILER.

PROPOSED PIPE BRIDGE.

13.00m

App. EXISTING PIPING.

PROPOSED GENERATOR SET.

00.00 G.L.

WESTERN ELEVATION

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DRAWN: Paul Caruana	DATE: 19/01/17	SITE: MANILDRA - SHOALHAVEN STARCHES PTY LTD	SHT SIZE: A3
DESIGNED:	DATE	JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.	SHEET: OF 1
CHKD	DATE	DWG TITLE: PROPOSED NEW BOILER #8,GENERATOR SET,LIME SILOS & BOILER RELOCATION.WESTERN ELEVATION.	REV. P08
APPD	DATE		
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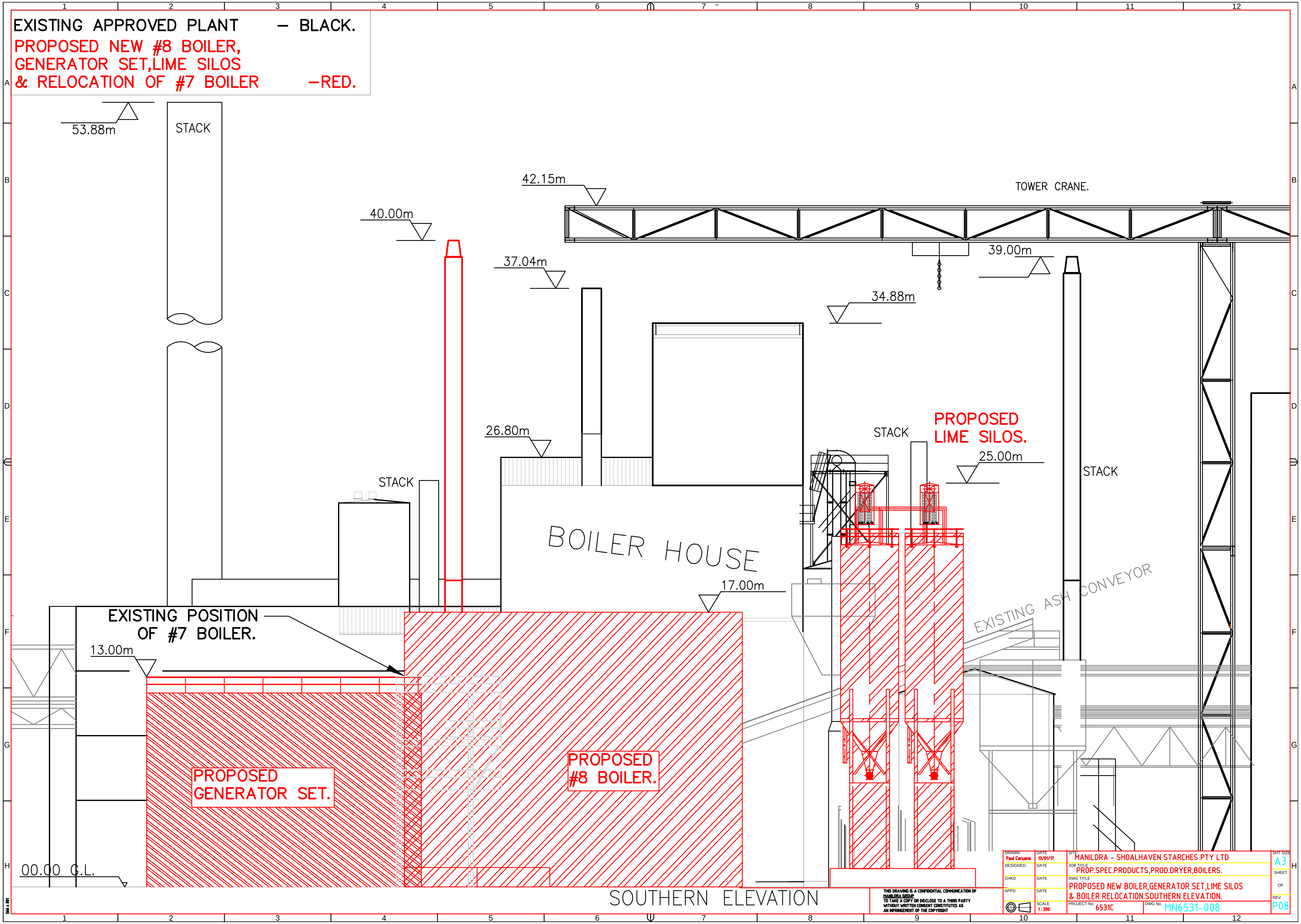
564 x 891



EXISTING APPROVED PLANT — BLACK.
PROPOSED NEW #8 BOILER, GENERATOR SET, LIME SILOS & RELOCATION OF #7 BOILER —RED.
53.88m
STACK
42.15m
TOWER CRANE.
40.00m
37.04m
39.00m
34.88m
26.80m
STACK
PROPOSED LIME SILOS.
25.00m
STACK
STACK
BOILER HOUSE
17.00m
EXISTING ASH CONVEYOR
EXISTING POSITION OF #7 BOILER.
13.00m
PROPOSED GENERATOR SET.
PROPOSED #8 BOILER.
00.00 G.L.
SOUTHERN ELEVATION
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DRAWN Paul Caruana
DATE 13/01/17
DESIGNED. DATE
CHKD DATE
APPD DATE
SCALE 1:200
SITE MANILDRA - SHOALHAVEN STARCHES PTY LTD
JOB TITLE PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
DWG TITLE PROPOSED NEW BOILER,GENERATOR SET,LIME SILOS & BOILER RELOCATION.SOUTHERN ELEVATION.
PROJECT No. 6531C
DWG No. MN6531-008
SHT SIZE A3
SHEET OF
REV. P08

EXISTING APPROVED PLANT — BLACK.
PROPOSED NEW #8 BOILER, GENERATOR SET,LIME SILOS & RELOCATION OF #7 BOILER —RED.

STACK

42.15m

TOWER CRANE.

37.04m

34.88m

26.80m

25.00m

PROPOSED LIME SILOS.

STACK

STACK

STACK

18.40m

PROPOSED PIPE BRIDGE.

7.00m

PROPOSED RELOCATION OF #7 BOILER.

13.00m

PROPOSED PIPE BRIDGE.

PROPOSED #8 BOILER.

BOILER HOUSE

PROPOSED GENERATOR SET.

00.00 G.L.

EASTERN ELEVATION

MANILDRA GROUP
100% AUSTRALIAN

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DRAWN: Paul Caruana	DATE: 13/01/17	SITE: MANILDRA - SHOALHAVEN STARCHES PTY LTD	SHT SIZE: A3
DESIGNED.	DATE	JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.	SHEET
CHKD	DATE	DWG TITLE: PROPOSED NEW BOILER,GENERATOR SET,LIME SILOS & BOILER RELOCATION.EASTERN ELEVATION.	OF
APPD	DATE		REV.
SCALE: 1 : 200		PROJECT No.: 6531C DWG No.: MN6531-009	P08

EXISTING APPROVED PLANT — BLACK.
PROPOSED NEW INDOOR SUB-STATION —RED.

Drain

Abernathys

RE-VEGETATION ALONG DRAIN BANK.(20M NOMINAL).

GAS FACILITY

MANILDRA GAS STATION

INTEGRAL ENERGY GAS NATURAL GAS INSTALLATION

MANILDRA LAND

APPROVED CAR PARK

PPOLE

12M

8M SET BACK

CONC PPOLE

SCREEN PLANTS ALONG BOLONG ROAD.

PPOLE

26.2M

PPOLE

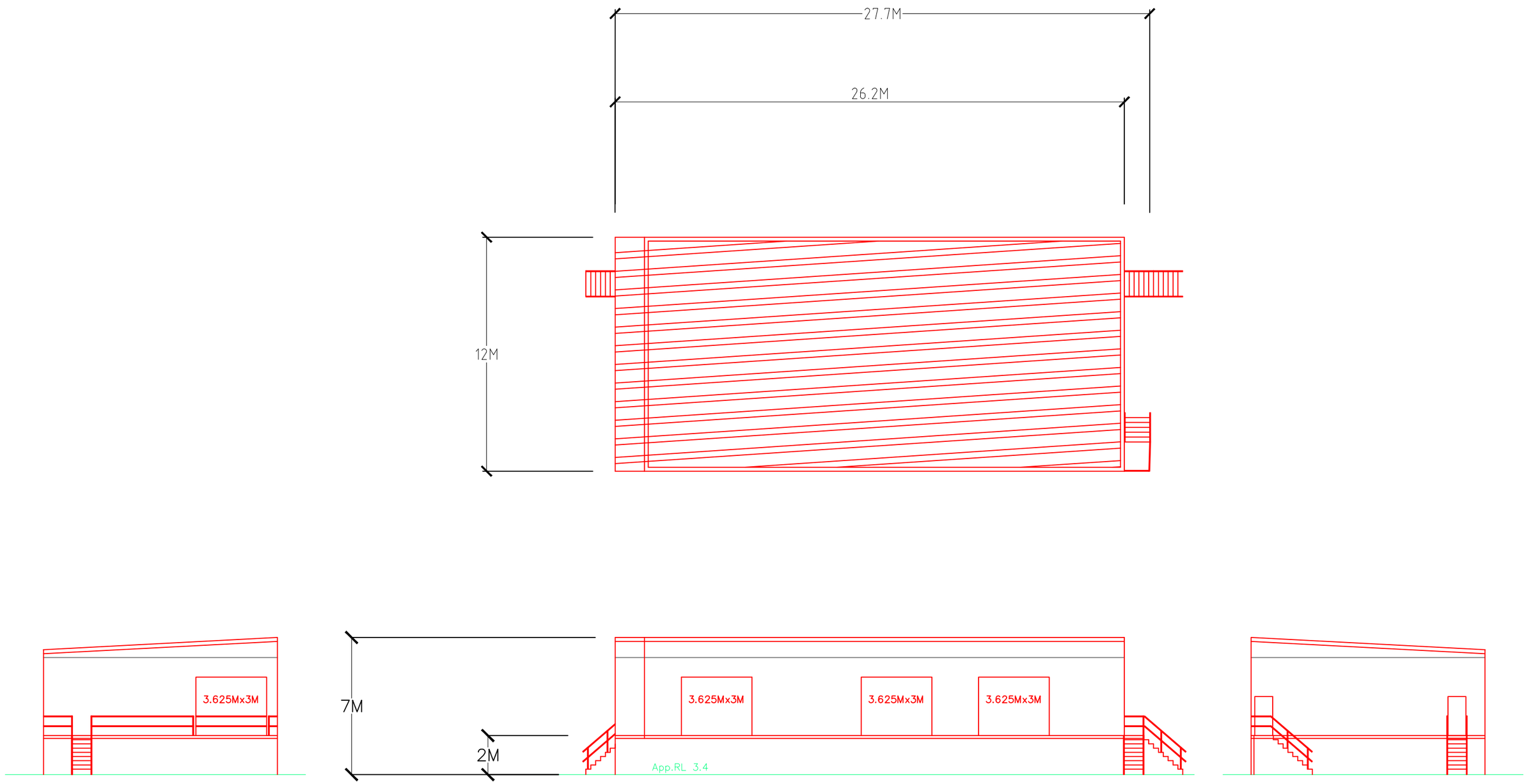
PLAN VIEW

BOLONG ROAD

MANILDRA GROUP
100% AUSTRALIAN

DRAWN: Paul Caruana	DATE: 3/01/17	SITE: MANILDRA – SHOALHAVEN STARCHES PTY LTD	SHT SIZE: A3
DESIGNED:	DATE	JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.	SHEET: OF
CHKD	DATE	DWG TITLE: PROPOSED NEW HV SUB-STATION. SITE PLAN.	REV.
APPD	DATE		
SCALE: 1 : 200		PROJECT No. 6531	DWG No. MN6531-010 P07

564 x 881



PROPOSED INDOOR SUB-STATION.

MANILDRA GROUP
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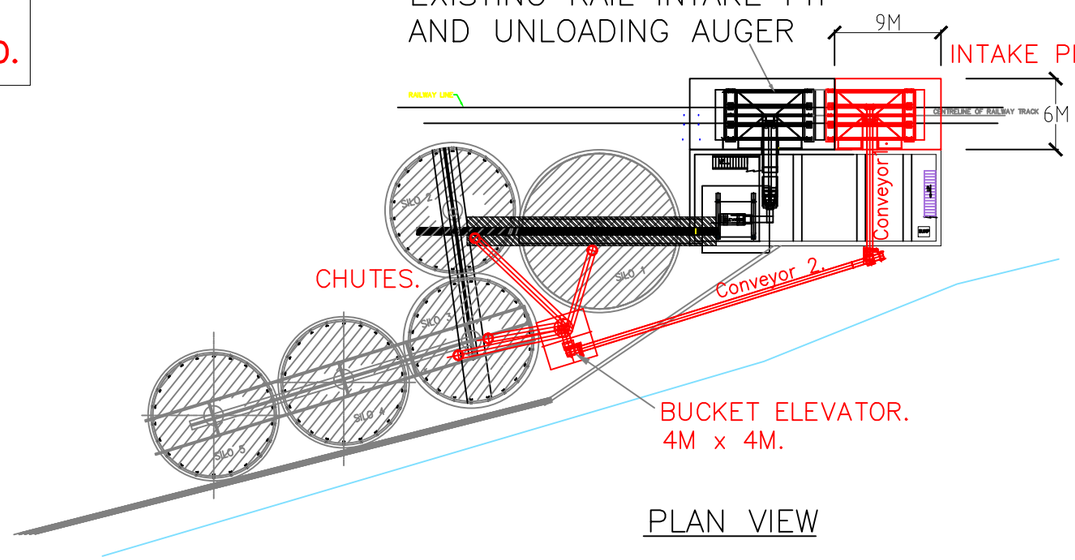
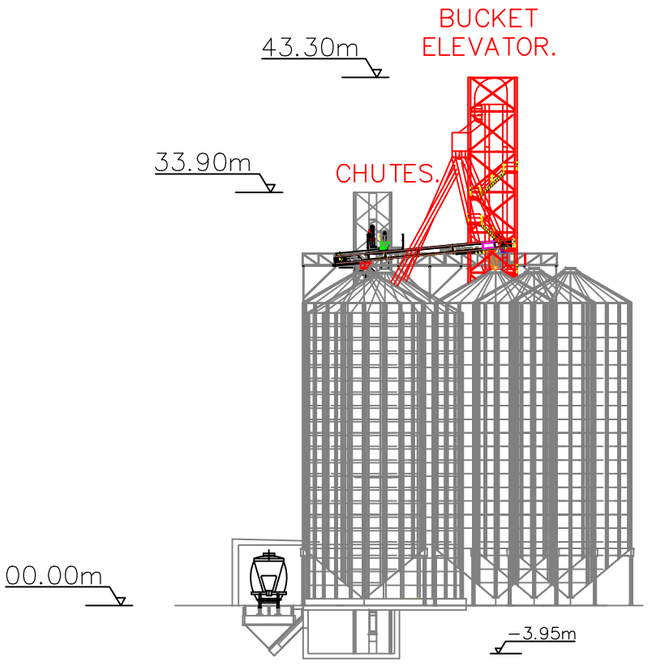
DRAWN	Paul Caruana 13/01/17	SITE	MANILDRA – SHOALHAVEN STARCHES PTY LTD
DESIGNED.		JOB TITLE	PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
CHKD		DWG TITLE	PROPOSED NEW HV SUB-STATION. BUILDING DETAIL
APPD		SCALE	1 : 200
		PROJECT No.	6531
		DWG No.	MN6531-011
		SHT SIZE	A3
		SHEET	
		OF	
		REV.	P07

EXISTING APPROVED PLANT – BLACK.
PROPOSED MODIFICATION TO RAIL UNLOADING –RED.

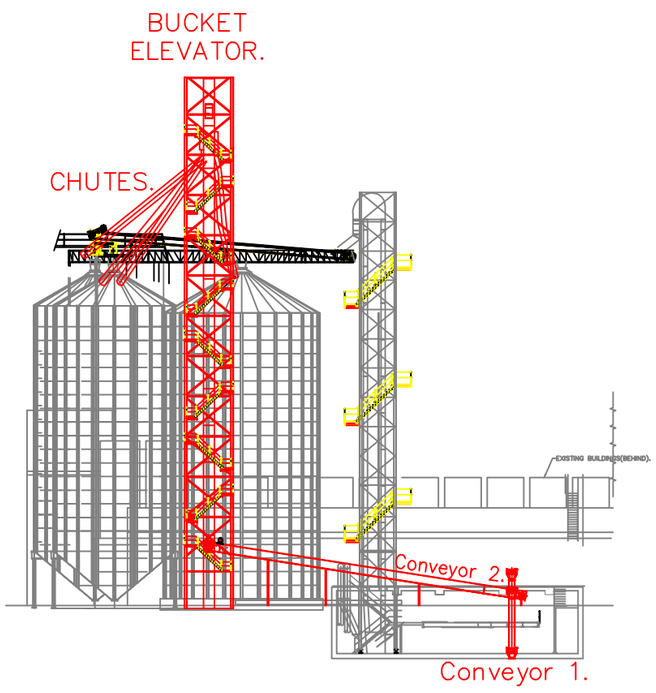
EXISTING RAIL INTAKE PIT AND UNLOADING AUGER



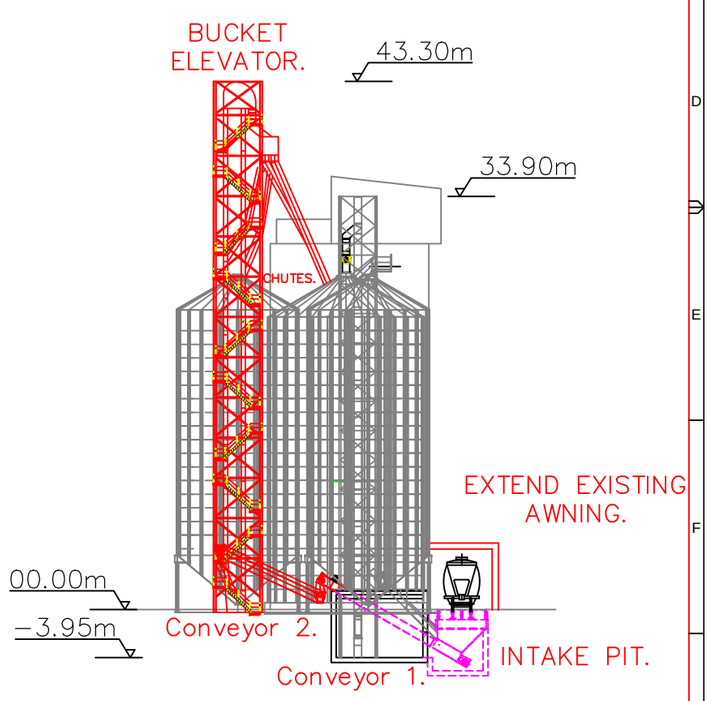
PLAN VIEW



WESTERN ELEVATION



SOUTHERN ELEVATION



EASTERN ELEVATION

REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
REV1	ALL	PROPOSAL.	P.C.	22/02/18	M.H.	

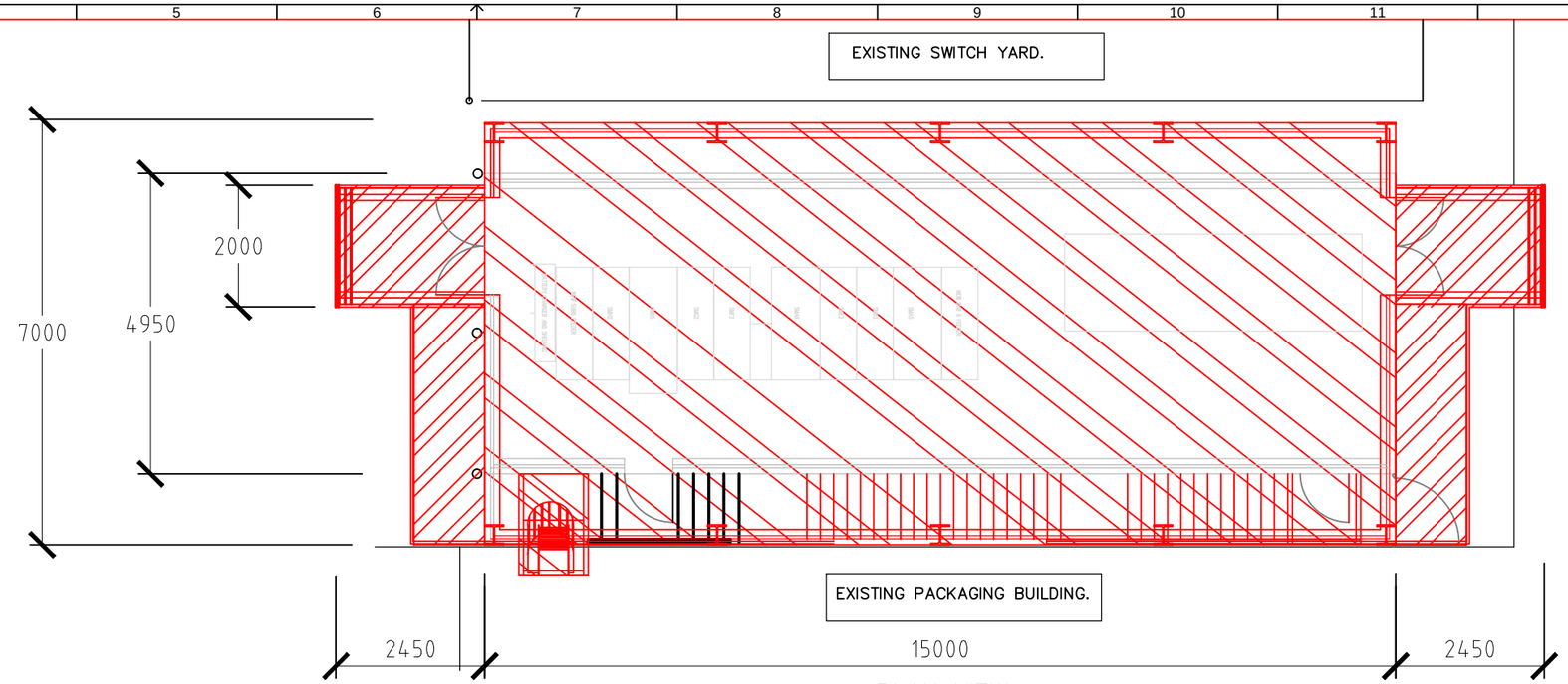
MANILDRA GROUP
100% AUSTRALIAN

DRAWN	Paul Caruana	DATE 03/02/18
DESIGNED.		DATE
CHKD		DATE
APPD		DATE
SCALE	1 : 500	

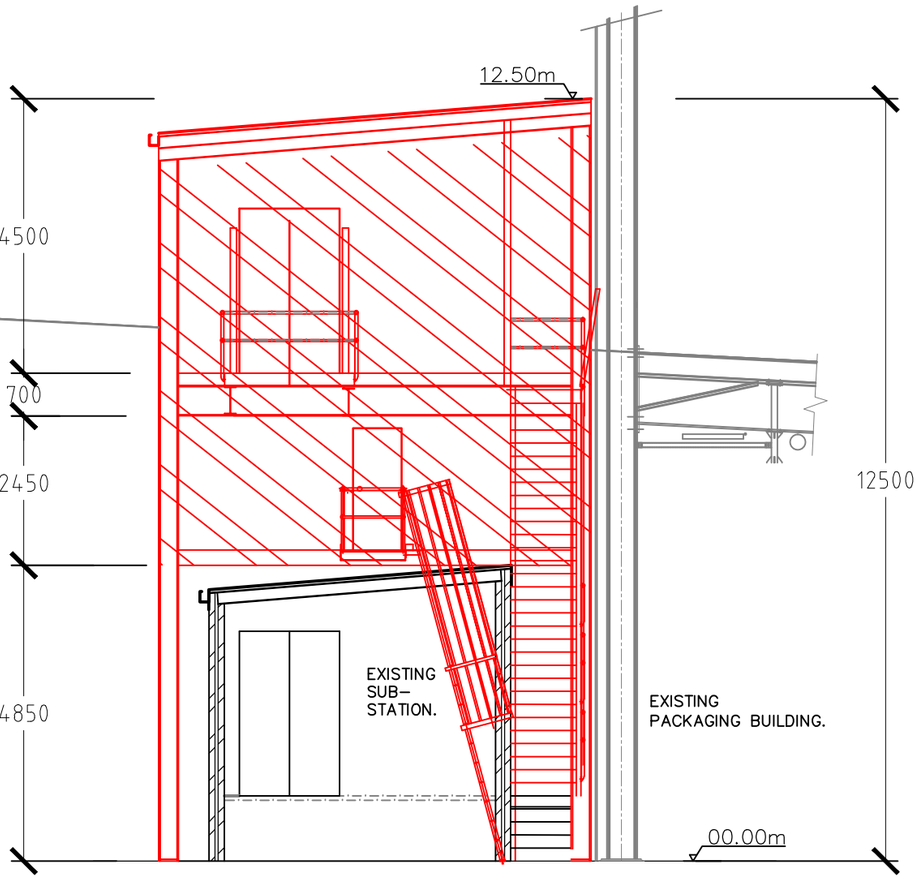
SITE: MANILDRA – SHOALHAVEN STARCHES PTY LTD
JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
DWG TITLE: PROPOSED MODIFICATION TO RAIL UNLOADING. PLAN & ELEVATIONS.
PROJECT No. 6531
DWG No. MN6531-012
SHT SIZE A3
SHEET
OF
REV. P07

EXISTING APPROVED PLANT – BLACK.

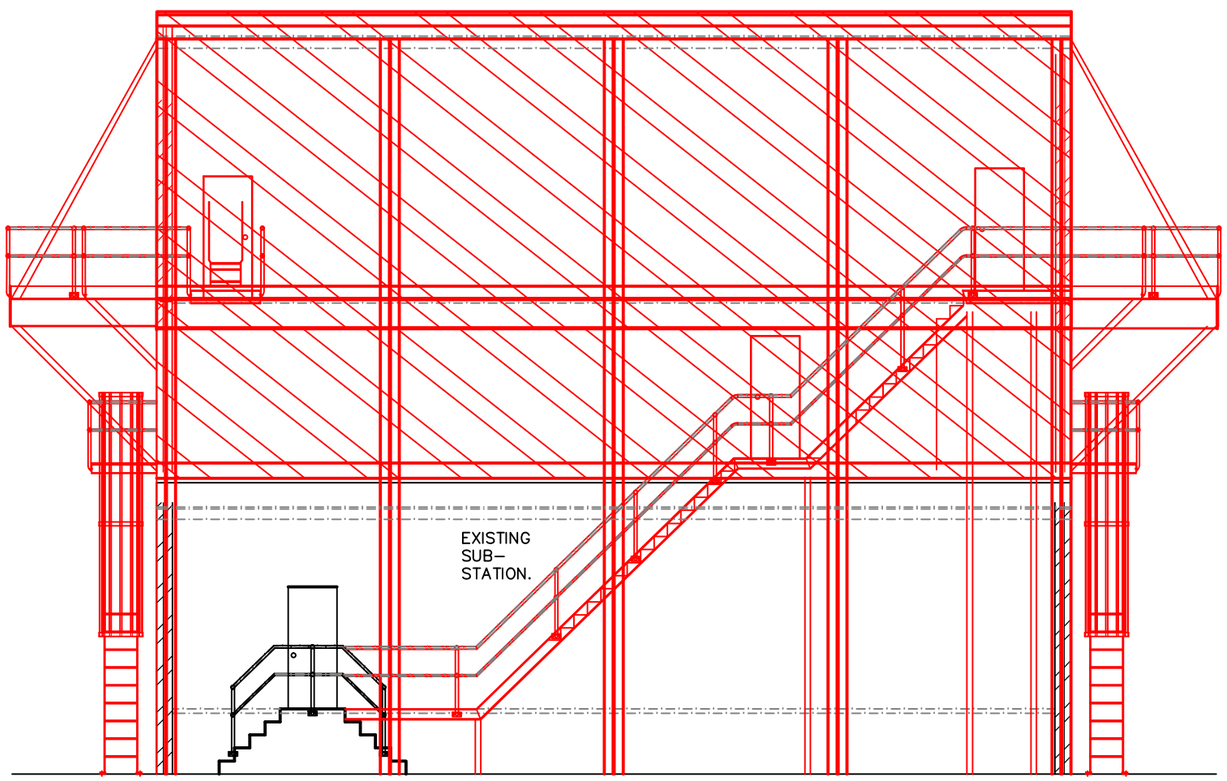
PROPOSED 2ND STOREY EXTENSION TO EXISTING MAIN SUB STATION. – RED.



PLAN VIEW.



WESTERN ELEVATION.



SOUTHERN ELEVATION.

Commitment to Excellence

MANILDRA GROUP

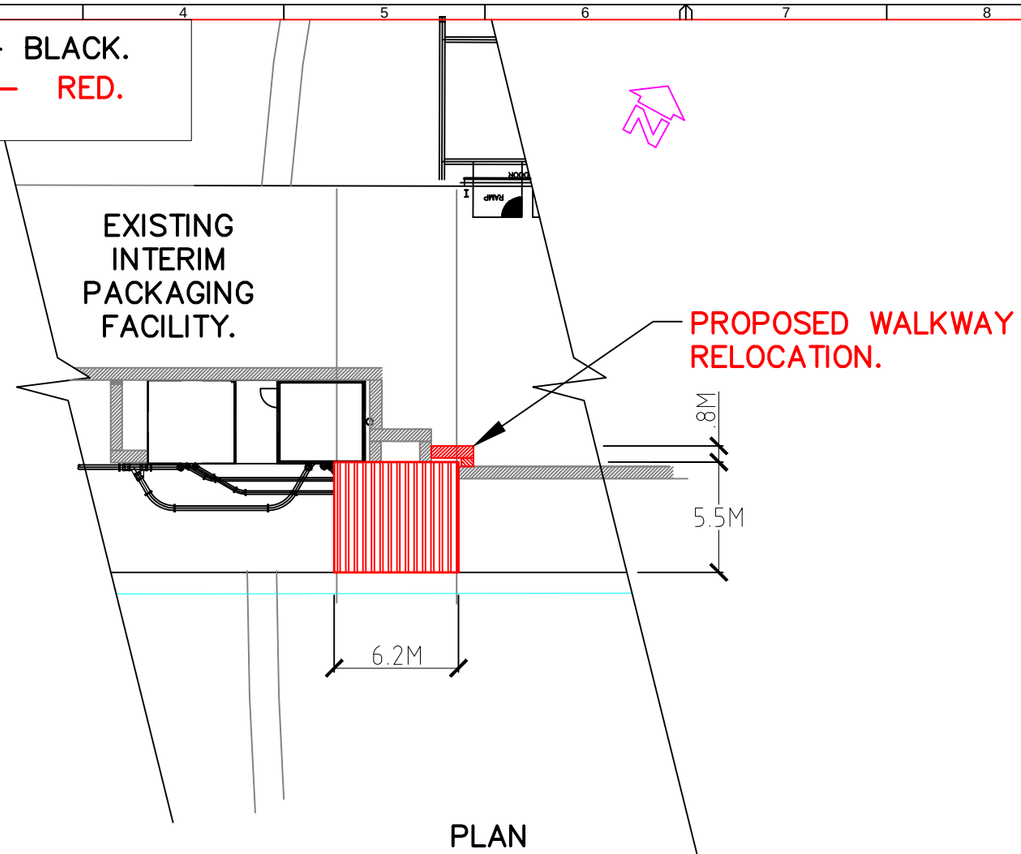
100% AUSTRALIAN

GEM OF THE WEST

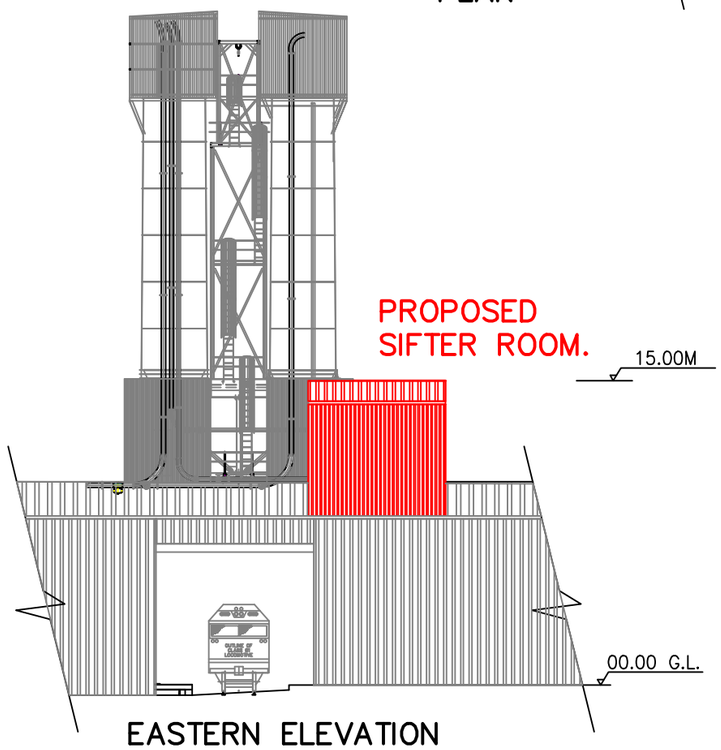
DRAWN: Paul Caruana	DATE: 22/03/18	SITE: MANILDRA – SHOALHAVEN STARCHES PTY LTD	PAPER SIZE: A3
DESIGNED:	DATE	JOB TITLE: PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.	SHEET
CHKD	DATE	DWG TITLE: PROPOSED 2nd STOREY EXTENSION TO MAIN SUB–STATION.PLAN VIEW & ELEVATIONS.	OF
APPD	DATE		REV.
SCALE: 1 : 100		PROJECT No.: 6531 DWG No.: MN6531-013	P08

564 x 891

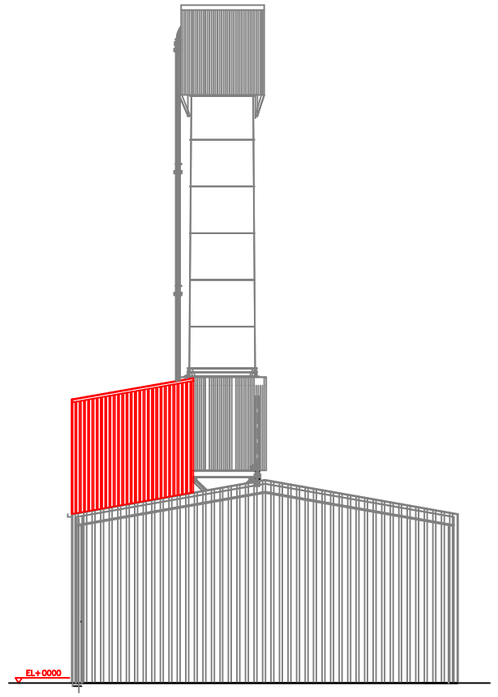
EXISTING APPROVED PLANT – BLACK.
PROPOSED SIFTER ROOM – RED.



PLAN



EASTERN ELEVATION

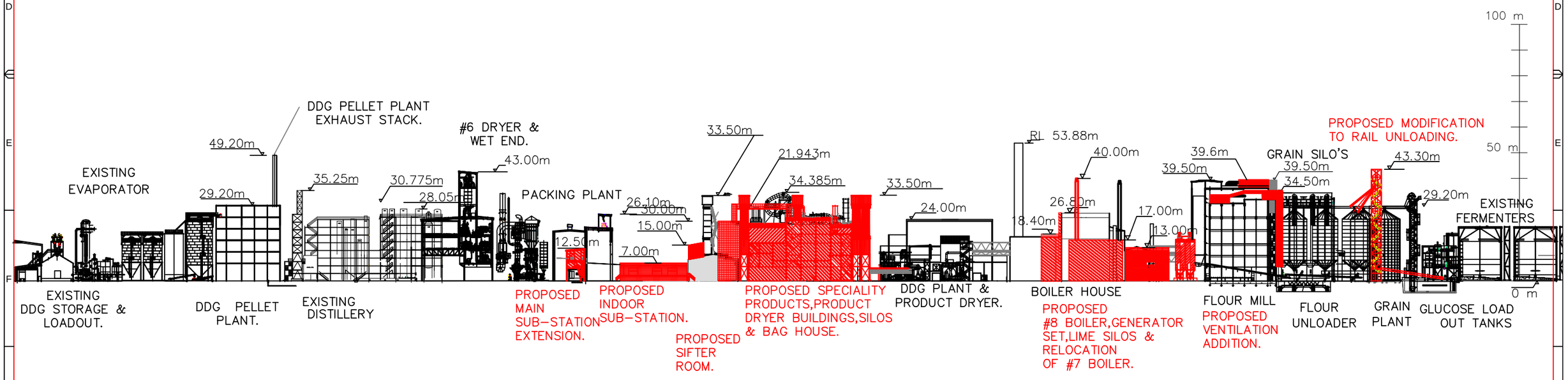


NORTHERN ELEVATION

MANILDRA GROUP 100% AUSTRALIAN	DRAWN Paul Caruana	DATE 13/01/17	SITE MANILDRA – SHOALHAVEN STARCHES PTY LTD
	DESIGNED.	DATE	JOB TITLE PROP.SPEC.PRODUCTS,PROD.DRYER,BOILERS.
	CHKD	DATE	DWG TITLE PROPOSED SIFTER ROOM WALKWAY RELOCATION. SITE PLAN & ELEVATIONS.
	APPD	DATE	SCALE 1:300
			PROJECT No. 6531C
			DWG No. MN6531-0014
			SHT SIZE A3
			SHEET OF
			REV. P07

EXISTING APPROVED PLANT.

PROPOSED BUILDINGS,SILOS,BOILERS, SUB–STATIONS,FLOUR MILLS VENTILATION,MODIFICATION TO RAIL UNLOADING & ASSOCIATED WORKS FOR SPECIALITY PRODUCTS & PRODUCT DRYER. –RED.



TYPICAL ELEVATIONS OF STRUCTURES ON SHOALHAVEN STARCHES SITE.

NOMINAL GROUND LEVEL 00.00

0 50 m 100 m

REFERENCE

DRG.No.	REV	REFERENCE DRAWING

REFERENCE

DRG.No.	REV	REFERENCE DRAWING

REVISIONS

REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
–						

MANILDRA GROUP
Commitment to Excellence

DRAWN Paul Caruana	DATE 13/01/17	SITE SHOALHAVEN STARCHES PTY LTD	SHT SIZE A3
DESIGNED.	DATE	JOB TITLE PROP. SPEC. PROD,PROD. DRYER,BOILERS.	SHEET
CHKD	DATE	DWG TITLE PRODUCT DRYERS,SILOS,BOILERS,SUB–STATION & RAIL UNLOADING.SITE ELEVATION.	OF
APPD	DATE		REV. P08
	SCALE 1 : 1500	PROJECT No. 6531	DWG No. MN6531-015

564 x 891

EXISTING
APPROVED PLANT.

PROPOSED FLOUR
MILL C.

EXISTING
FLOUR MILL A

PROPOSED FILTER EXHAUSTS
WITH SILENCERS.

APPROVED FLOUR MILL B.

200

GM 3s

GM 3s

UP

DN

5.725M

PROPOSED FLOUR MILL C
WITHIN APPROVED BUILDING.

EXISTING RAIL LINE.

24.335M

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
J	08/02/18	ALL	Filter exhaust tagged & moved south.	P.C.	B.H.
H	07/02/18	ALL	B mill shown as approved.	P.C.	B.H.
G	19/01/18	ALL	Wording changed for flour mill C.	P.C.	B.H.
F	23/11/17	ALL	Ventilation added.	P.C.	M.M.

PC Drafting,
0439 436508
Est. 2001

Commitment to Excellence
GEM OF THE WEST

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

MATERIAL NA

TITLE
SHOALHAVEN STARCHES.
FLOUR MILL C.
FLOUR MILL PLAN.

SIZE A3 | SCALES 1:100 | SHT

ISSUE 5566

DRG Nº MN244-002K

EXISTING
APPROVED PLANT.

PROPOSED
FLOUR MILL C.

Shoalhaven River

PROPOSED FILTER EXHAUSTS
WITH SILENCERS.

APPROVED CONVEYORS.

EXISTING COOLING
WATER PUMPS
SWITCH ROOM

EXISTING
FLOUR MILL A

ASH
HOPPER

SILO 04

SILO 05

SILO 06

SILO 07

ø12M SILO

ø10M SILO

EXISTING
FLOUR UNLOADER

APPROVED
FLOUR MILL B.

BOILER
HOUSE

Rail Clearances

Rail Clearances 2.5M for columns.3M for solid walls.

EXISTING RAIL LINE.

PROPOSED FLOUR MILL C
WITHIN APPROVED BUILDING.

PLAN VIEW - FLOUR UNLOADER

FACTORY BUILDING

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
J	08/02/18	ALL	Filter exhaust tagged & moved south.	P.C.	B.H.
H	07/02/18	ALL	B mill shown as approved.Ventilation shown separate prop.	P.C.	B.H.
G	19/01/18	ALL	Mill C added.	P.C.	B.H.
F	25/11/17	ALL	Ventilation added.	P.C.	M.M.
E	30/9/16	ALL	Silos highlighted.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL

PC Drafting.
0439 436508
Est. 2001

Commitment to Excellence
GEM OF THE WEST

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

FINISH NA

MATERIAL NA

SHOALHAVEN STARCHES.

TITLE FLOUR MILL C.
SITE PLAN.

SIZE A3 | SCALES 1:250 | SHT

ISSUE 5566

DRG. № MN244-003K

EXISTING
APPROVED PLANT.

PROPOSED FLOUR MILL
VENTILATION ADDITION –RED.

Shoalhaven River

7800

EXISTING MILL FEED PIPELINE.

2400 5000

PIT

EXISTING COOLING WATER PUMPS SWITCH ROOM

5000

5000

ASH HOPPER

SILO 105

SILO 104

SILO 103

PROPOSED A FLOUR MILL VENTILATION ADDITION.

EXISTING FLOUR MILL A

PROPOSED CENTRE LINE OF CONVEYOR

EXISTING FLOUR UNLOADER

PROPOSED B FLOUR MILL VENTILATION ADDITION.

ø12M SILO

ø10M SILO

5650

BOILER HOUSE

2150

Rail Clearances

Rail Clearances 2.5M for columns.3M for solid walls.

EXISTING RAIL LINE.

5500

11650

EXISTING GANTRY

PLAN VIEW – FLOUR UNLOADER

FACTORY BUILDING

EXISTING GANTRY
TO BE REMOVED.

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
F	23/11/17	ALL	Ventilation added.	P.C.	M.M.
E	30/9/16	ALL	Silos highlighted.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
B	28/9/16	ALL	Gantry reinstated.	P.C.	B.H.

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GEM OF THE WEST

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

FINISH NA

MATERIAL NA

SHOALHAVEN STARCHES.

TITLE FLOUR MILL B.
SITE PLAN WITH FLOUR SILO.

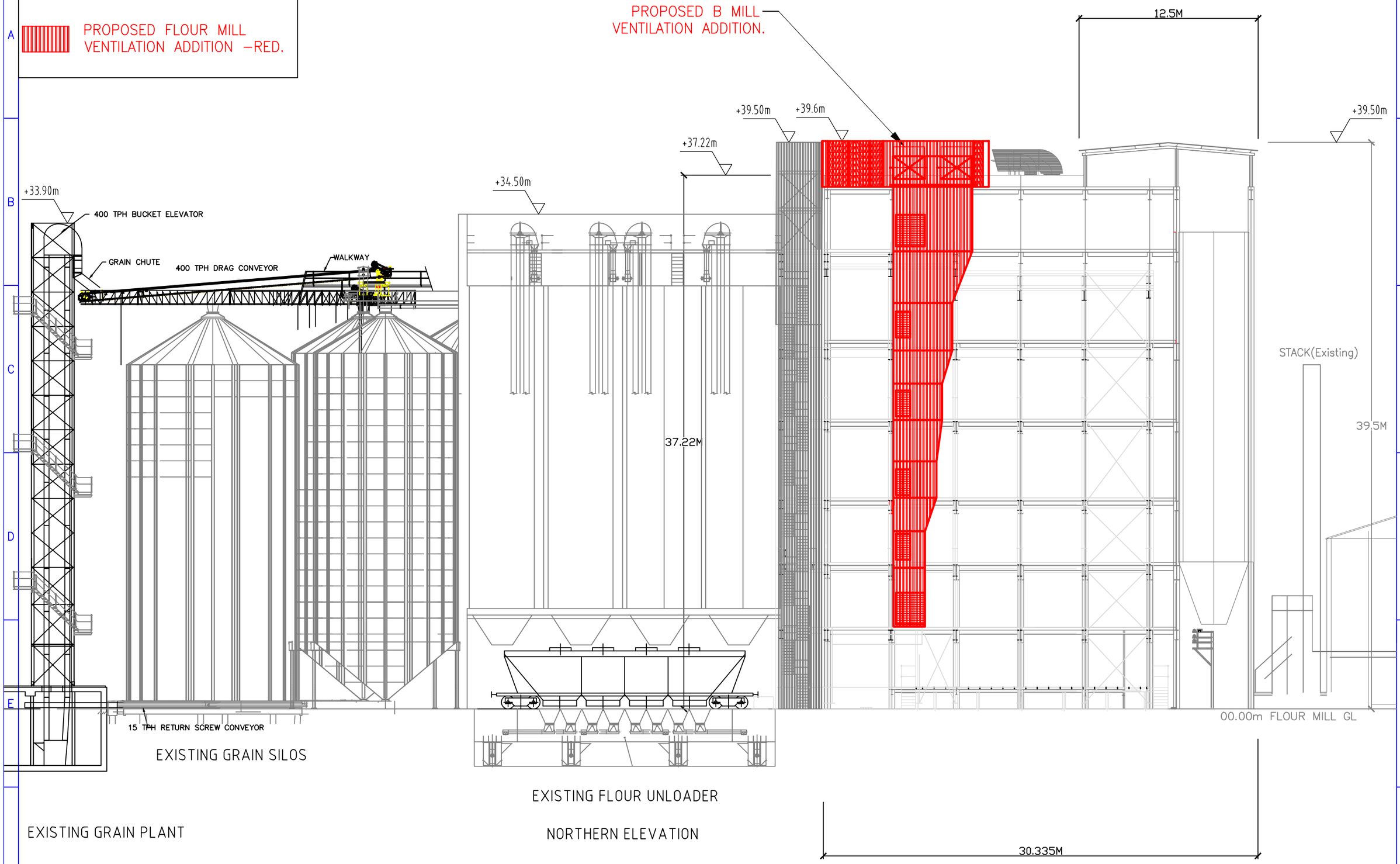
SIZE A3 | SCALES 1:250 | SHT

ISSUE 5566

DRG. № MN244–003F

EXISTING
APPROVED PLANT.

PROPOSED FLOUR MILL
VENTILATION ADDITION –RED.



EXISTING GRAIN SILOS

EXISTING FLOUR UNLOADER

EXISTING GRAIN PLANT

NORTHERN ELEVATION

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
F	23/11/17	ALL	Ventilation added.	P.C.	M.M.
E	30/9/16	ALL	Wording added.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
1	19-08-16	ALL	Draft.	Paul C.	M.M.

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

MATERIAL
NA

TITLE
SHOALHAVEN STARCHES.
FLOUR MILL B.
SITE NORTHERN ELEVATION

SIZE A3 | SCALES 1:250 | SHT

ISSUE 5566

DRG. Nº MN244–004F

EXISTING
APPROVED PLANT.

PROPOSED
FLOUR MILL C.

PROPOSED FILTER EXHAUSTS
WITH SILENCERS.

PROPOSED FLOUR MILL C
WITHIN APPROVED BUILDING.

+39.50m

+37.70m

+36.40m

+25.20m

+21.91m

GRAIN
SILOS.

APPROVED
FLOUR
MILL B.

EXISTING FACTORY

39.5M

EXISTING FLOUR MILL A.

36.4M

37.7M

00.00m FLOUR MILL GL

EASTERN ELEVATION

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
J	08/02/18	ALL	Filter exhaust tagged & moved south.	P.C.	B.H.
H	07/02/18	ALL	B mill shown as approved. Ventilation shown separate prop.	P.C.	B.H.
G	19/01/18	ALL	Mill C added.	P.C.	B.H.
E	30/9/16	ALL	Wording added.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL

MANILDRA
GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED ----
CHECKED
APPROVED
DRG PRACTICE AS1100

MATERIAL
NA

TITLE
SHOALHAVEN STARCHES.
PROPOSED FLOUR MILL C.
SITE EASTERN ELEVATION

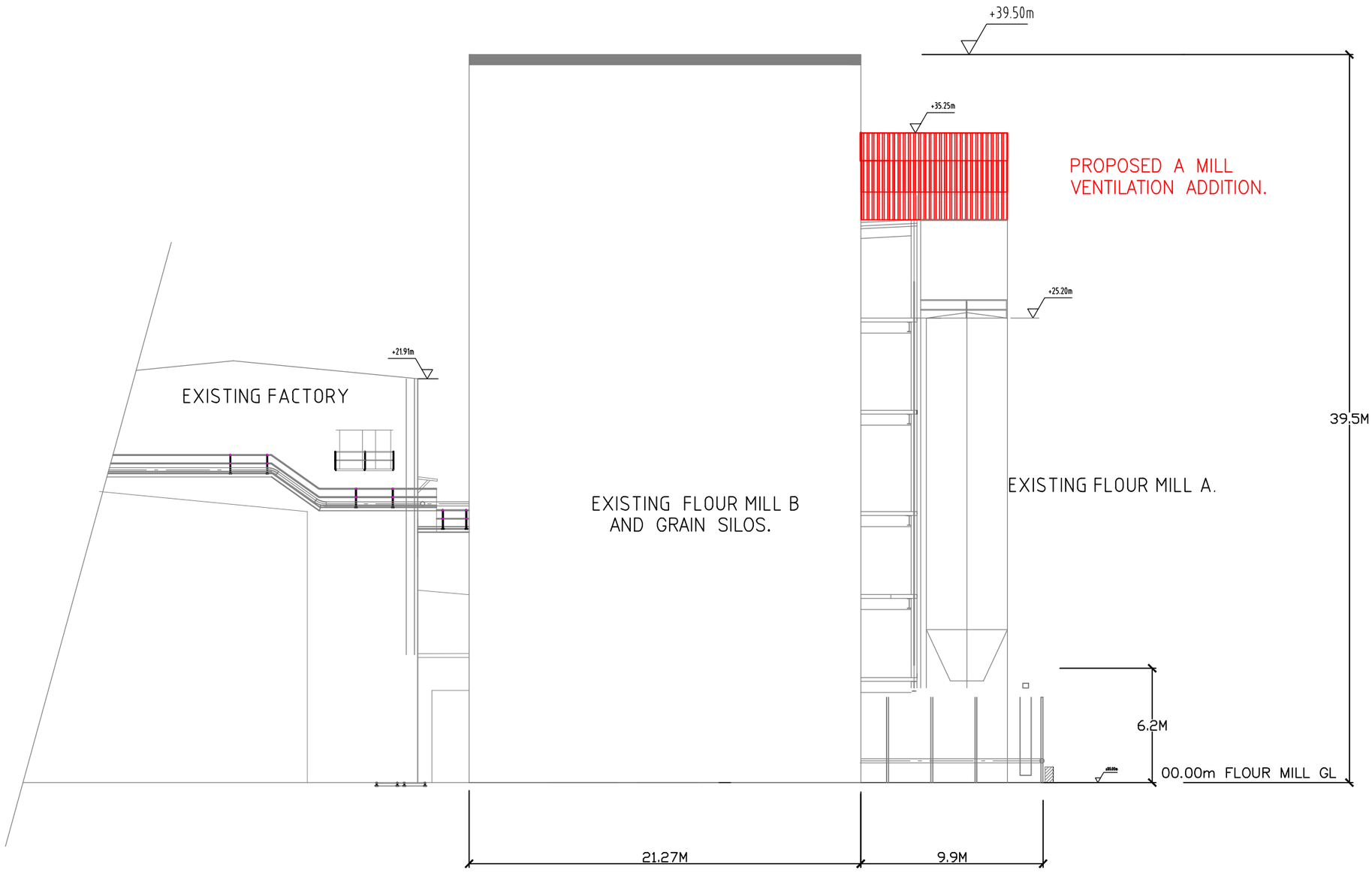
SIZE A3 | SCALES 1:250 | SHT

ISSUE 5566

DRG. Nº MN244-005J

EXISTING
APPROVED PLANT.

PROPOSED FLOUR MILL
VENTILATION ADDITION –RED.



WESTERN ELEVATION

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
F	23/11/17	ALL	Ventilation added.	P.C.	M.M.
E	30/9/16	ALL	Wording added.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
1	15-08-16	ALL	Draft.	Paul C.	M.M.

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

MATERIAL
NA

TITLE
SHOALHAVEN STARCHES.
PROPOSED FLOUR MILL B.
SITE WESTERN ELEVATION

SIZE A3 | SCALES 1:250 | SHT

ISSUE 5566

DRG. № MN244–005F

EXISTING
APPROVED PLANT.

PROPOSED FLOUR MILL
VENTILATION ADDITION –RED.

30.335M

12.5M

+39.50m

APPROVED FLOUR MILL B

PROPOSED B FLOUR MILL
VENTILATION ADDITION.

+39.6m

+39.50m

+37.22m

+35.25m

PROPOSED A FLOUR MILL
VENTILATION ADDITION.

+34.50m

+33.90m

400 TPH BUCKET ELEVATOR

WALKWAY

400 TPH DRAG CONVEYOR

GRAIN CHUTE

4700

3200

APPROVED
GRAIN SILOS.

STACK(Existing)

EXISTING FLOUR MILL A

39.5M

37.22M

00.00m FLOUR MILL GL

15 TPH RETURN SCREW CONVEYOR

EXISTING GRAIN SILOS

SOUTHERN ELEVATION

EXISTING GRAIN PLANT

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
F	23/11/17	ALL	Ventilation added.	P.C.	M.M.
E	30/9/16	ALL	Wording added.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
1	15-08-16	ALL	Draft.	Paul C.	M.M.

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

MATERIAL
NA

TITLE
SHOALHAVEN STARCHES.
FLOUR MILL B.
SITE SOUTHERN ELEVATION

SIZE A3 | SCALES 1:250 | SHT

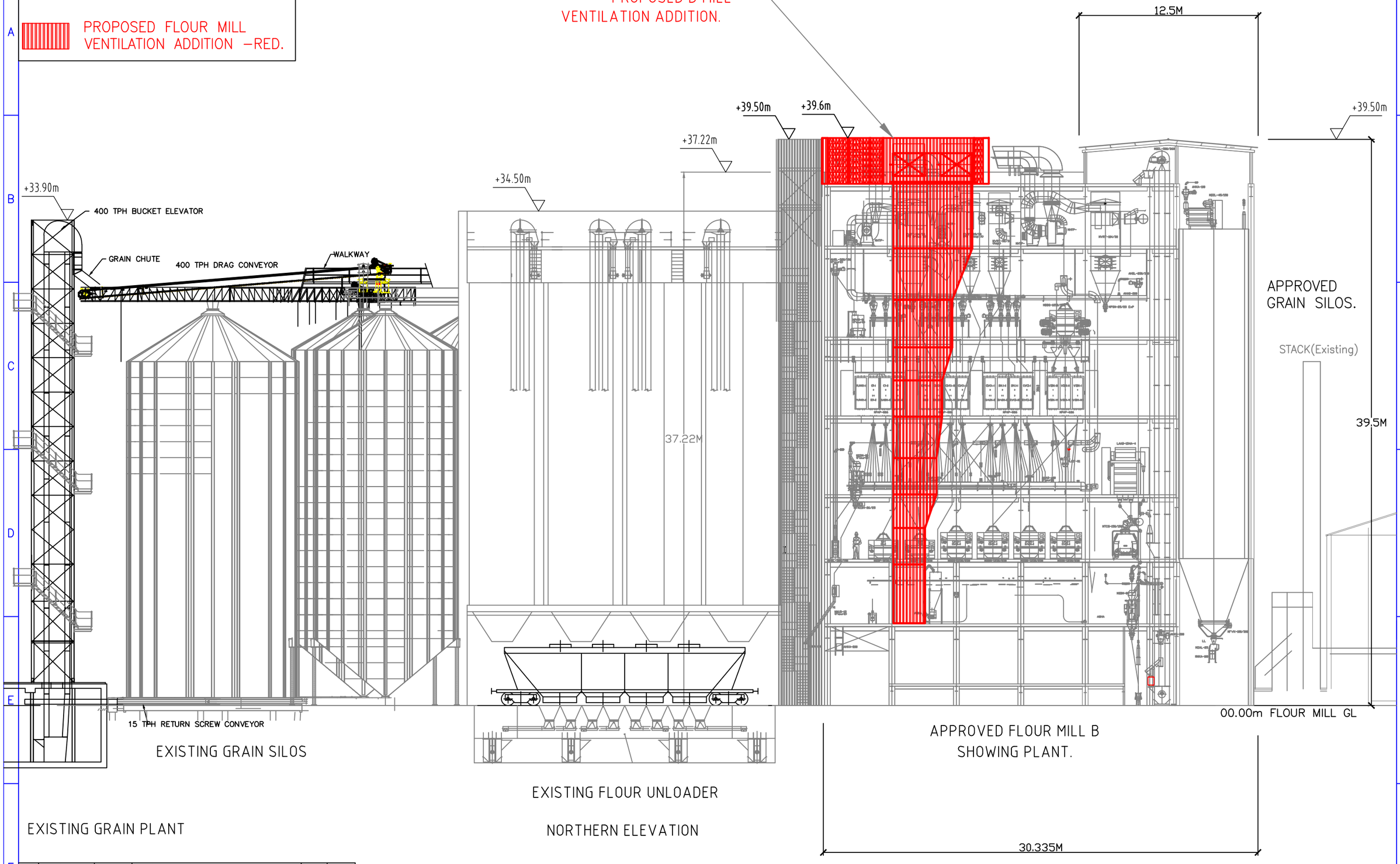
ISSUE 5566

DRG. № MN244–006F

EXISTING
APPROVED PLANT.

PROPOSED FLOUR MILL
VENTILATION ADDITION –RED.

PROPOSED B MILL
VENTILATION ADDITION.



EXISTING GRAIN SILOS

EXISTING FLOUR UNLOADER

APPROVED FLOUR MILL B
SHOWING PLANT.

EXISTING GRAIN PLANT

NORTHERN ELEVATION

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
F	23/11/17	ALL	Ventilation added.	P.C.	M.M.
E	30/9/16	ALL	Silos highlighted.	P.C.	ALL
D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
1	15-08-16	ALL	Draft.	Paul C.	M.M.

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

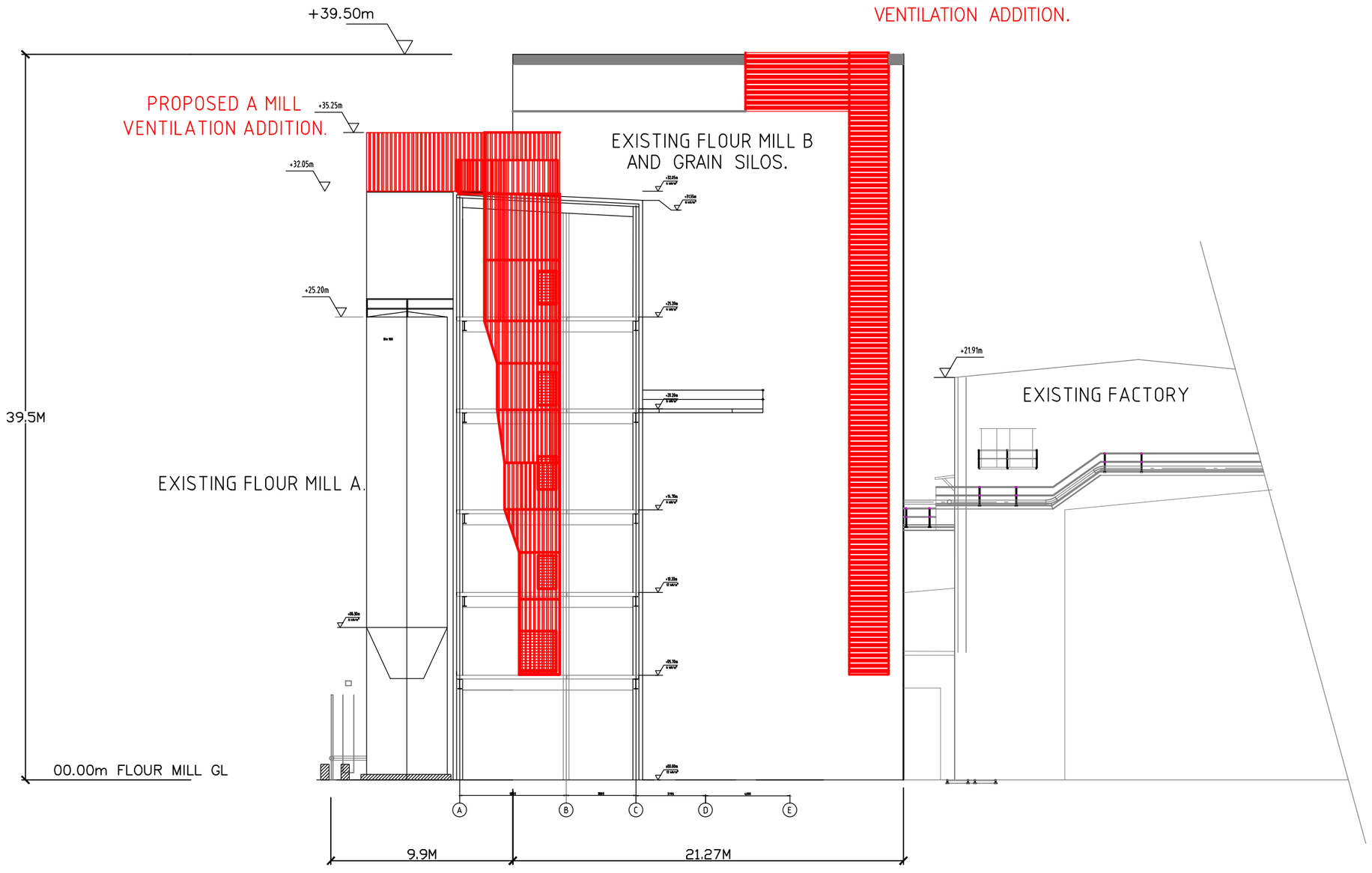
MATERIAL
NA

TITLE
SHOALHAVEN STARCHES.
FLOUR MILL B.
PLANT NORTHERN ELEVATION

SIZE A3 | SCALES 1:250 | SHT
ISSUE 5566
DRG. № MN244–007F

EXISTING
APPROVED PLANT.

PROPOSED FLOUR MILL
VENTILATION ADDITION –RED.



EASTERN ELEVATION

F	19-12-17	A.L.L	Manildra approval.	Paul C.	M.M.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

MATERIAL
NA

TITLE
SHOALHAVEN STARCHES.
PROPOSED FLOUR MILL B.
SITE EASTERN ELEVATION

SIZE A3 | SCALES 1:250 | SHT
ISSUE 5566
DRG. № MN244–011F

INPUT–GRAIN

APPROVED–6,720 T/WEEK
PROPOSED– 0 T/WEEK

GRAIN PLANT

FERMENTATION

3 FERMENTATION TANKS

COOLING TOWERS

DISTILLERY

MOLECULAR SIEVES

COOLING TOWERS

ETHANOL
APPROVED 300 MI/YEAR

GLUTEN DRYER & BUILDING.

SPECIALITY PRODUCTS PLANT.

INPUT–FLOUR

APPROVED –3,800 T/WEEK
PROPOSED–4,000 T/WEEK.

STARCH
PLANT

PRODUCT DRYER

GAS/COAL
INFRASTRUCTURE

GAS–FIRED 40MW
CO–GENERATION

COAL–FIRED 15MW
CO–GENERATION

TOTAL
40MW

STEAM

ELECTRICITY

PACKING PLANT

STARCH SALES

GLUTEN SALES

GLUCOSE

GLUCOSE PRODUCT SALES

POWER SUPPLY UPGRADE.

INPUT–WHEAT

FLOUR MILLS
A & B.

APPROVED
16,200 TPW
FLOUR

INPUT–WHEAT

FLOUR MILL
C.

PROPOSED
5,200 TPW
FLOUR

APPROVED FLOUR–20,000 T/WEEK.
PROPOSED FLOUR–25,400 T/WEEK.

DECANTERS

10 DECANTERS

EVAPORATION
PLANT

ADDITIONAL
EVAPORATOR

COOLING TOWERS

DDGS DRYERS

4 DDGS DRYERS

DDG PELLETISING
PLANT

INCREASE
DDGS STORAGE

DDGS
APPROVED–6400 T/WEEK
PROPOSED–7,500 T/WEEK

APPROVED – 56.7ML/WEEK.
PROPOSED – 70ML/WEEK.

WATER TREATMENT
Anaerobic / Aerobic treatment

WATER
REUSE

IRRIGATION ONTO MANILDRA FARM

FACTORY COOLING TOWERS

FACTORY PROCESS

APPROVED.

PROPOSED
MODIFICATION
JANUARY 2018.

SHOALHAVEN STARCHES.BOMADERRY.NSW.

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
D	01–03–18	All	Update.	P.C.	B.H.
C	01–02–18	All	More new infrastucture added.	P.C.	B.H.
B	31–01–18	All	Update.	P.C.	B.H.
A	30–01–18	All	Update.	P.C.	B.H.

Commitment to Excellence
GEM OF THE WEST

MANILDRA GROUP
100% AUSTRALIAN

DRAWN P.J.C.
TRACED
CHECKED
APPROVED
DRG PRACTICE AS1100

TOLERANCES
LINEAR ±.2
ANGULAR ±.5
FINISH
N.A.

CAPITAL WORKS PROJECT

PROPOSED MODIFICATION 2018.
PRODUCT FLOW DIAGRAM

SIZE A3 | SCALES nts | SHT 1

ISSUE 4768

DRG. № MN3–022D

Appendix B

Shoalhaven City Council

Bridge Rd, Nowra NSW 2541 **02 4429 3111**
Deering St, Ulladulla NSW 2539 **02 4429 8999**
Address all correspondence to
The General Manager, PO Box 42, Nowra NSW 2541 Australia
DX5323 Nowra Fax 02 4422 1816

COUNCIL REFERENCE: 28112E (D18/102788)
CONTACT PERSON: Kate Britton
DATE: 5 April 2018

Stephen Richardson

Thank you for your recent inquiry in relation to flood data held by Shoalhaven City Council.

Please find below the original details of your inquiry, some general information on flooding as well as the requested property specific Flood Certificate.

Details of Inquiry:

Name of Inquirer	Stephen Richardson	**Date Requested:** 14 Mar 2018
Reason for Enquiry	New Construction	
Contact Details	Phone: 44236198 Email: steve@cowmanstoddart.com.au Postal:	
Preferred Response	Email	
Notes		
Survey Detail	Not Provided	
Flood Safety Tip	**Causeways can kill! Never drive through flood waters! Wait and be safe!**	
General Flood Information	Shoalhaven City Council in conjunction with SES has produced site specific flood brochures for Shoalhaven Heads, Nowra / Bomaderry / Terara, Greenwell Point/Orient Point and Sussex Inlet. General Flood Information booklets, such as “What to do before, during & after a flood” prepared by Emergency Management Australia are also available. You can pick up free copies of all brochures at the City Administration Building in Nowra.	

FLOOD CERTIFICATE

According to the *Lower Shoalhaven River Floodplain Risk Management Plan – Climate Change Assessment (2011)* the following properties **are affected by the 1% AEP flood event:**

Bolong Rd, BOMADERRY - Lot 141 DP 1069758
160 Bolong Rd, BOMADERRY - Lot 1 DP 838753
171 Bolong Rd, BOMADERRY - Lot 241 DP 1130535
Bolong Rd, BOMADERRY - Lot B DP 334511
Bolong Rd, BOMADERRY - Lot A DP 42232
22 Bolong Rd, BOMADERRY - Lot 21 DP 1000265
Bolong Rd, BOMADERRY - Lot B DP 376494
Bolong Rd, BOMADERRY - Lot 1 DP 385146
24 Bolong Rd, BOMADERRY - Lot 201 DP 1062668

These properties have been treated as a whole and levels provided are the highest for each event across the entire area.

FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level	Not applicable	6.2m AHD	6.2m AHD
Hazard Category	High	High	High
Hydraulic Category	Floodway	Floodway	Floodway
Probable Maximum Flood Level	7.9m AHD	7.9m AHD	7.9m AHD
1% AEP Flood Level	5.7m AHD	5.7m AHD	5.7m AHD
2% AEP Flood Level	5.2m AHD	5.2m AHD	5.2m AHD
5% AEP Flood Level	5.0m AHD	5.0m AHD	5.0m AHD
10% AEP Flood Level	4.5m AHD	4.5m AHD	4.5m AHD
Velocity (1% AEP flood event)	1.0m/s*	0.9m/s*	0.9m/s*

* Minimal velocity information is available for this property therefore the provided velocity is approximate only

SITE SPECIFIC CONSIDERATIONS

1. Current NSW Government legislation requires climate change to be considered as part of this Floodplain Risk Management Study and Plan. Climate change related information evolves with time and it is expected that existing flood behaviour and levels may change in the future.

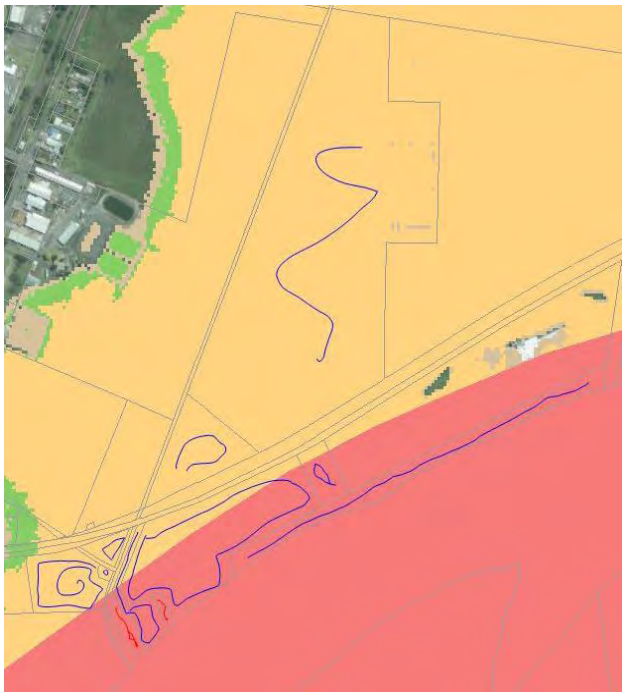
2. All applications for buildings, and the like, must take into account the projected 2050 flood information. All subdivision and other long-term planning must take into account the projected 2100 flood information.

3. Information provided in this flood certificate uses previous State Government sea level rise benchmarks (400mm and 900mm for the 2050 and 2100 horizon's respectively).

On Tuesday 10th February 2015 Council's Policy & Resources Committee resolved to no longer use State Government benchmarks and to "Establish a sea level rise benchmarks for planning purposes based on a 2030 horizon 100 mm, a 2050 horizon of 230 mm and 360 mm horizon for 2100". The new benchmarks will be incorporated into the flood information in future. Until studies incorporating the new benchmarks are undertaken Council will continue to use the best available information.

4. Not all of the property is categorised high hazard floodway. Part of the property is categorised high hazard flood storage. For more specific information regarding the different hazard and hydraulic categorisations on this property please contact Council's Natural Resource and Floodplain Unit on (02) 44293392.

1AEP 2050 1m contours



1AEP 2050 hazard and hydraulic categories

(Red-High hazard floodway; Yellow- High hazard storage; Green – Low hazard storage; Brown – Flood planning extent)

STANDARD CONSIDERATIONS

Properties below the Flood Planning Level:
Council considers the land in question to be below the flood planning level and therefore subject to flood related development controls. The conditions as set out below will reduce flood risk in flood events up to the Flood Planning Level, however the property may still be subject to flooding at higher levels during rare flood events.

Development controls apply to flood affected properties.

Development conditions will vary depending on flood hazard, hydraulic category as well as the type of development that is proposed. Please refer to the following documents for information on Council's flood related development controls and the NSW State Government's Floodprone Land Policy.

- Shoalhaven Development Control Plan – Chapter 9: Development on Flood Prone Land http://dcp2014.shoalhaven.nsw.gov.au/main-category/whole-document
- NSW Floodplain Development Manual 2005: http://www.environment.nsw.gov.au/floodplains/manual.htm

DISCLAIMER

Your enquiry relating to the likelihood of the land specified in the application being flooded has been referred to the Council's Floodplain Engineer.

In responding to your application the Council seeks to bring to your attention the fact that pursuant to s.733 of the Local Government Act a council does not incur liability in respect of the giving of any advice furnished in good faith by the Council relating to the likelihood of any land being flooded or the nature or extent of any such flooding.

The Council does not have a legal obligation to provide advice to you and to the extent that this reply is giving advice, the Council provides that advice in good faith with the intention of preserving, so far as is legally possible, the Council's immunity from liability pursuant to s.733 of the Local Government Act.

While all reasonable care has been taken to ensure the accuracy of the information given in this reply, its purpose is to provide a general indication of flood risk in the area. Flood lines shown on Council maps indicate the approximate extent of flooding only in relation to the abovementioned land.

The information provided may contain errors or omissions and the accuracy may not suit the purposes of all users. A site survey and further investigation are strongly recommended before commencement of any project based on this data.

The information given is the most current information at the time of the request. It is to be noted, however, that flood information is constantly reviewed and updated and as such, the information contained in this regard is current only on the day of issue.

Before acting upon the information provided in this reply, the Council urges you to obtain separate and independent advice as Council, in giving this information, does not intend it to be relied upon in such a fashion as to impose liability upon the Council.

Should you not be prepared to accept the information contained in this reply upon that basis then you should immediately notify Council.

GLOSSARY

AEP (Annual Exceedance Probability) means the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage – for example a 1% AEP flood event has a 1% chance of occurring in any one calendar year.

AHD (Australian Height Datum) is a common national surface level datum corresponding approximately to mean sea level.

Flood fringe is the part of the floodplain remaining after the floodway and flood storage areas have be defined.

Flood planning area is any land identified as being flood affected in the 1% AEP flood event plus freeboard.

Flood planning level (FPL) is the 1% AEP flood level plus freeboard. The FPL is used for planning purposes, as determined in floodplain risk management studies and incorporated in floodplain risk management plans.

Flood prone land means any land susceptible to flooding up to the probable maximum flood event (that is, land within the floodplain) as identified in an adopted Council flood study or floodplain risk management study and plan.

Flood storage areas are those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood.

Flood study is a technical investigation of flood behaviour. It defines the nature of flood risk by establishing the extent, level and velocity of floodwaters. The study also provides information on the distribution of flood flows across various sections of the flood plain for the full range of flood events up to and including the PMF.

Floodplain risk management plan is a plan developed in accordance with the principles and guidelines contained in the NSW Government Floodplain Management Manual. Usually includes both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.

Floodplain risk management study is a study that identifies and compares various risk management options. This includes an assessment of their social, economic, ecological and cultural impacts, together with opportunities to maintain and enhance river and floodplain environments.

Floodway means those parts of the floodplain where a significant discharge of water occurs during floods. They are often aligned with natural defined channels. Floodway's are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.

Freeboard is currently 0.5m for all catchments in the Shoalhaven. Freeboard is a factor of safety used to set the FPL (i.e. FPL = 1% AEP flood level plus freeboard (0.5m)). Freeboard takes into account uncertainties in flood modelling and climate change predictions, local factors that cannot be included in the flood model or wave action caused by wind, boats or vehicles driving through flood waters.

Hazard category represents the risk or danger to personal safety, evacuation movements and buildings and structures within the Flood Planning Area during the 1% AEP flood. There are only two possible hazard categories – high or low.

Hydraulic category describes the function of a specific part of the Flood Planning Area in conveying flood waters during a 1% AEP flood. There are three possible hydraulic categories – floodway, flood storage or flood fringe.

Probable maximum flood (PMF) is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.

Provisional is used for hazard categories that have been determined in a flood study. Hazard categories are provisional until the floodplain risk management study and plan has been completed and adopted by Council, as this document considers additions risks, not considered during the flood study.

3. CONCLUSIONS

3.1 Proposed Development

For the reasons detailed above, and as agreed in consultation with Council and DLWC, hydraulic modelling of the proposed development has not been undertaken. There is a need however, to consider (amongst other things) the flood hazard and structural assessment (with regard to velocity of floodwaters and impact by flood debris) of the proposed development. In quantifying the flood hazard, some important issues for consideration include:

- damage to the plant, including as a result of flood debris or structural failure,
- damage to the plant due to the possible buoyancy of equipment,
- malfunction of the plant (or any services on which the plant relies for operation) as a result of inundation and the associated risk of such malfunction to other users of the floodplain,
- access and evacuation.

3.2 Future Development

In consultation with Council and the DLWC, it is agreed that any future development of the Manildra Starches Plant within the intensively built-up area, as defined on Figures 2 and 4, will not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects. The hydraulic impacts and cumulative effects of such developments are considered to be insignificant given the intensive development already present. As mentioned in previous sections, the only opportunity for floodwaters to pass through the intensively built-up area of the site is through the limited number of gaps or openings between the plant and associated buildings. Although these gaps or openings may be relocated to accommodate any future development, the movement of overland floodwaters will never be completely blocked, as gaps or openings similar to those which currently exist will always be maintained for trafficability requirements.

Any proposed future development is not exempt from flood hazard and structural assessment as outlined in Section 3.1

3.3 Future Development on the Northern Floodplain

This study has identified that there is no need for hydraulic modelling of the proposed, or any future proposed development within the existing intensively built-up area of the Manildra Starches Plant (shown on Figures 2 and 4). However during the course of this investigation, and in consultation with Council and the DLWC, it should be noted that any further development upon the northern floodplain (outside the built-up area shown on Figures 2 and 4), and in particular any development adjacent to the river bank, has the potential to increase the cumulative impact on flood levels and velocities.

The main areas of concern on the northern river bank are the unrestricted low lying areas between high ground and the existing developments, termed flowpaths or floodways. The bank is relatively

Figures

FIGURE 1
ALS TOPOGRAPHY
EXISTING CONDITION

N

cadastre

DEM (mAHD)

- < 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5
- 4.5 - 5.0
- 5.0 - 5.5
- > 5.5

0 0.05 0.1 0.2 0.3 0.4 km

J:\Jobs\114044\ARC\Impacts\March18_EthanoL_newwork\Figure01_Existing_Ground_Topography_From_ALS.mxd

FIGURE 2
PEAK FLOOD DEPTH
1% AEP EVENT
EXISTING CONDITION

N

cadastre

Depth

0 to 0.2

0.2 to 0.5

0.5 to 1

1 to 1.5

>1.5

0 0.05 0.1 0.2 0.3 0.4 km

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FIGURE 3
PEAK FLOOD LEVEL IMPACT
1% AEP EVENT
PROPOSED DEVELOPMENT

N

cadastreMGA

Impact (m)

- -0.12 to -0.05
- -0.05 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.03 to 0.05
- 0.05 to 0.07
- 0.07 to 0.09
- No Longer Flooded
- Newly Flooded

0 0.05 0.1 0.2 0.3 0.4 km

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FIGURE 4
PEAK FLOOD LEVEL IMPACT
0.5% AEP EVENT
PROPOSED DEVELOPMENT

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N

cadastreMGA

Impact (m)

- <-0.05
- -0.05 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.03 to 0.05
- 0.05 to 0.07
- >0.07
- No Longer Flooded
- Newly Flooded

0 0.05 0.1 0.2 0.3 0.4 km

FIGURE 5
PEAK FLOOD LEVEL IMPACT
EXTREME EVENT
PROPOSED DEVELOPMENT

N

cadastreMGA

Impact (m)

- < -0.05
- -0.05 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.03 to 0.05
- 0.05 to 0.07
- >0.07
- No Longer Flooded
- Newly Flooded

0 0.05 0.1 0.2 0.3 0.4 km

J:\Jobs\114044\ARC\Impacts\March18_EthanolNewwork\Figure05_Peak_Flood_Level_Impact_Extreme_Proposed_Scenario.mxd