



**Cowman Stoddart Pty Ltd**

PO Box 738

NOWRA

NSW 2541

J:\Jobs\114044\Admin\FlourMillBAssessmentSept2016.docx

14 October 2016

**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 Flour Mill B**

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

## **1 Introduction**

Shoalhaven Starches intend to undertake the construction of a new Flour Mill B located at their Bomaderry plant to increase the amount of flour that will be able to be produced on the site. The proposal involves:

- Deconstruct and dismantle pipe bridge between existing flour mill and starch plant to make way for new flour mill;
- Remove 7 existing flour silos;
- Relocate 6 existing flour silos to Paper Mill site for storage;
- Relocate 1 flour silo to new location for mill feed;
- Install transfer pipeline for mill feed from existing flour mill building to new mill feed silo location;
- Install new flour transfer blowline to starch plant, on existing pipe bridge;
- Install conveyors between existing grain silos and intake system for new flour mill;
- Construct flour mill & temper bin building;
- Construct new mill feed weighing system in enclosure for process optimisation.

Appendix A provides plans of the proposal referred to above as well as a site plan. The location of the proposed new flour mill on the current GoogleMaps aerial photograph is shown below.

### **WMAwater PTY LTD**

#### **DIRECTORS**

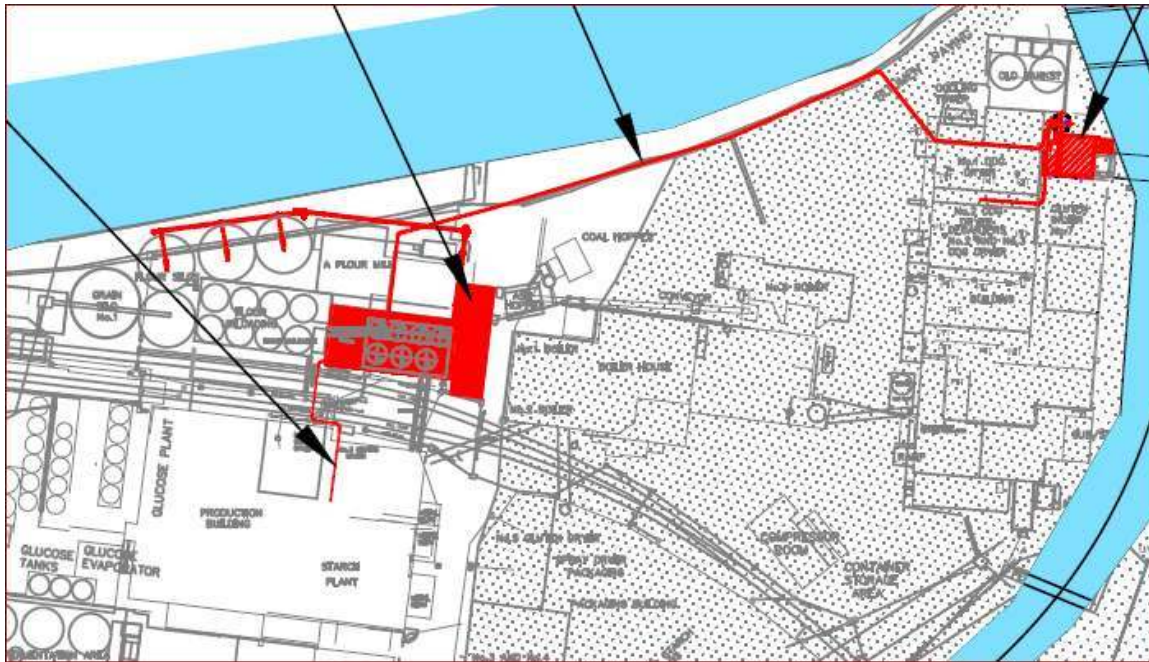
M K Babister BE(Hons), MEngSc GradDipMgt, FIEAust  
R W Dewar BSc(Hons), MEngSc, MAIG, MIEAust  
E J Askew BE(Hons), MIEAust  
S D Gray BE, MEng

#### **ASSOCIATES**

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### **ABN 14 600 315 053**

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Website: wmawater.com.au



The site is 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. 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 within the confines of the existing Shoalhaven Starches plant on Bolong Road.

Our letter of September 2015 (Appendix B) described alterations to the existing Flour Mill which have now been undertaken.

## 2 Description of Proposal

The proposal is to construct plant as described in Appendix A. An indicative ground level at the site is 4.2 mAHD and the 1% AEP flood level is approximately 5.6 mAHD according to the Flood Certificate obtained on 16<sup>th</sup> August 2016 (attached as Appendix C).

## 3 Council Flood Certificate

Council's flood certificate (Appendix C) advises that the site is inundated in the 1% AEP event and is described as High Hazard and Floodway. The projected sea level rise estimates due to climate change will not increase the 1% AEP flood level at this site as it is too far upstream from the ocean.

## 4 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 1<sup>st</sup> July 2015). As the works will not involve fill, excavation or subdivision of lands compliance with these performance criteria have not been addressed.

### 4.1 Performance Criteria - General (Section 5.1 of DCP only)

PERFORMANCE CRITERIA	RESPONSE
<b>P1 Development or work on flood prone land will meet the following:</b>	
<b>The development will not increase the risk to life or safety of persons during a flood event on the development site and adjoining land.</b>	The works are such that their construction will increase the number of workers on the site by 4 but there will be no additional threat to the safety of any worker during a flood.
<b>The development or work will not unduly restrict the flow behaviour of floodwaters.</b>	Refer Hydraulic Impact Assessment below.
<b>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</b>	The works are within existing built up industrial land clear of vegetation. Due to there being no significant increase in footprint and all runoff under existing and future conditions reaching the ground in

PERFORMANCE CRITERIA	RESPONSE
and destruction of vegetation.	nearly identical locations, 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.	<b>A separate structural report will be provided.</b>
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.	<b>A separate structural report will be provided. In particular this will need to consider the safe storage of the 6 silos at the Paper Mill during times of flood (will they float?).</b>
Potential damage due to inundation of proposed buildings and structures is minimised.	The works are largely sealed structures and/or above the PMF flood level which means there will be minimal damage due to inundation, even in a PMF, unless the structure itself fails. There will potentially be some damage to electrical and other components feeding the equipment and these are considered in Shoalhaven Starches Flood Plan.
The development will not obstruct escape routes for both people and stock in the event of a flood.	The works will not occupy escape routes or cause workers to become trapped.
The development will not unduly increase dependency on emergency services.	The works are such that their construction will increase the number of workers on the site by 4 but there will be no additional threat to the safety of any worker during a flood and no increase in dependency on emergency services.
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 designated as high hazard floodway in the 1% AEP event. The site is industrial land with nil existing vegetation and is beyond the influence of normal fluvial geomorphic processes. The works will have no impact on water quality.



#### **4.2 Hydraulic Impact Assessment - Works within the Existing Shoalhaven Starches Plant Area**

The aerial image above from GoogleMaps indicates that the position of the proposed flour mill is surrounded by an extensive array of existing plant and buildings. Thus the flow path of floodwaters from the Shoalhaven River over the river bank and towards Bolong Road and through the plant is already significantly impeded. Typical photographs within the site are shown below to illustrate the already densely developed area.



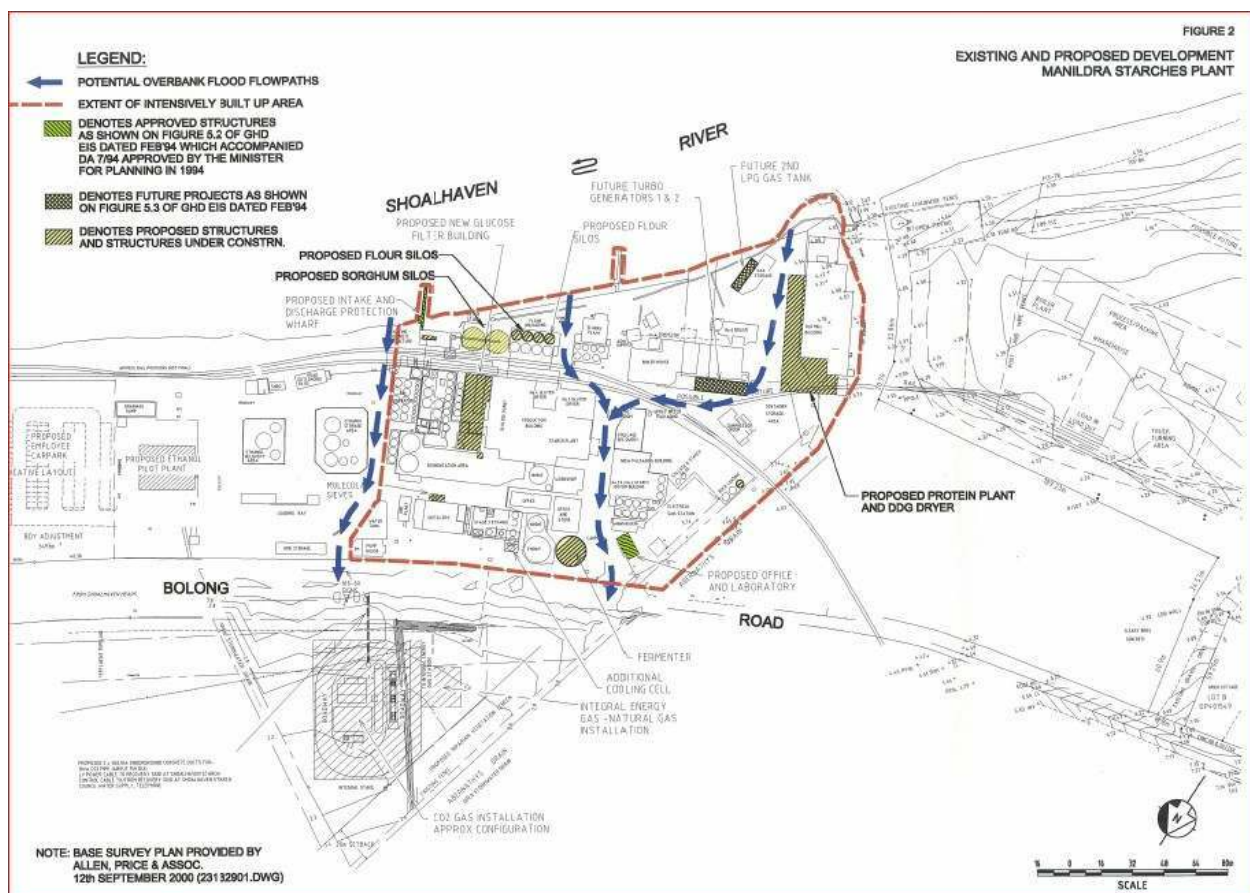
Photo 1: Approximate Location of Mill Feed Silo Structure



Photo 2: View South Towards Existing Flour Mill

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 not all the proposed works are on the ground (i.e above the 1% AEP flood level or even the PMF) and the floodplain storage area of the Shoalhaven River floodplain is of the order of 100km<sup>2</sup> the loss of temporary floodplain storage due to the proposed works is too small to be evaluated.

The loss of hydraulic conveyance depends on the extent of the restriction to a flowpath caused by the works. 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 D. 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.



Since publication of that report in 2000 a TUFLOW 2 dimensional hydraulic model has been established by Shoalhaven Starches in order to assess the hydraulic impact of any future works. This model is much more detailed than the CELLS model available in 2000, however the proposed development and surrounding existing plant is still considered too complex to be accurately assessed using the TUFLOW hydraulic model. One of the main issues is that large

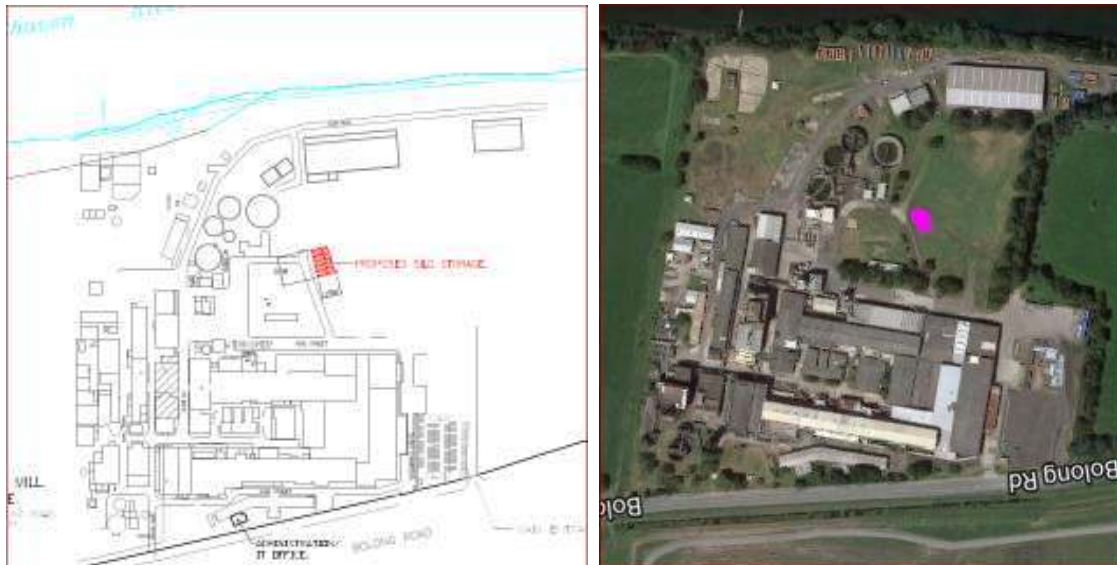


parts of the plant are on piers and there are a multitude of pipes which makes it impossible to accurately reflect each of these structures using the TUFLOW model.

In conclusion WMAwater consider that there would be no significant increase in the 1% AEP flood level as a result of the proposed works within the existing Shoalhaven Starches plant area.

#### 4.3 Hydraulic Impact Assessment - Works at the Paper Mill

Details of the storage area for the 6 silos (approximately 30m by 19m) at the Paper Mill are shown below.



Each development on the floodplain has the potential to cause an impact upon flood levels. The potential impacts of works within the floodplain on hydraulic characteristics are twofold - firstly a loss of temporary floodplain storage volume and secondly a loss of flow area. It is the loss of flow area which produces the greatest impact, as the area of floodplain storage lost due to all works since 1990, represents approximately less than 1% of the total available floodplain storage area for the northern floodplain (say 3000+ hectares). However the proposed storage location for the silos is surrounded on the north side by the Paper Mill plant which already heavily restricts the flow of escaping floodwaters from the Shoalhaven River travelling northward.

The hydraulic effects (change in flood levels, flows or velocities) of the proposed 6 silo storage area (approximately 30m by 19m) at the Paper Mill 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.

A flood impact map (1% AEP event) for proposed 6 silo storage area for the 1% AEP event is provided in Appendix E and indicates no change in design flood levels.

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

Yours Sincerely,

**WMAwater**

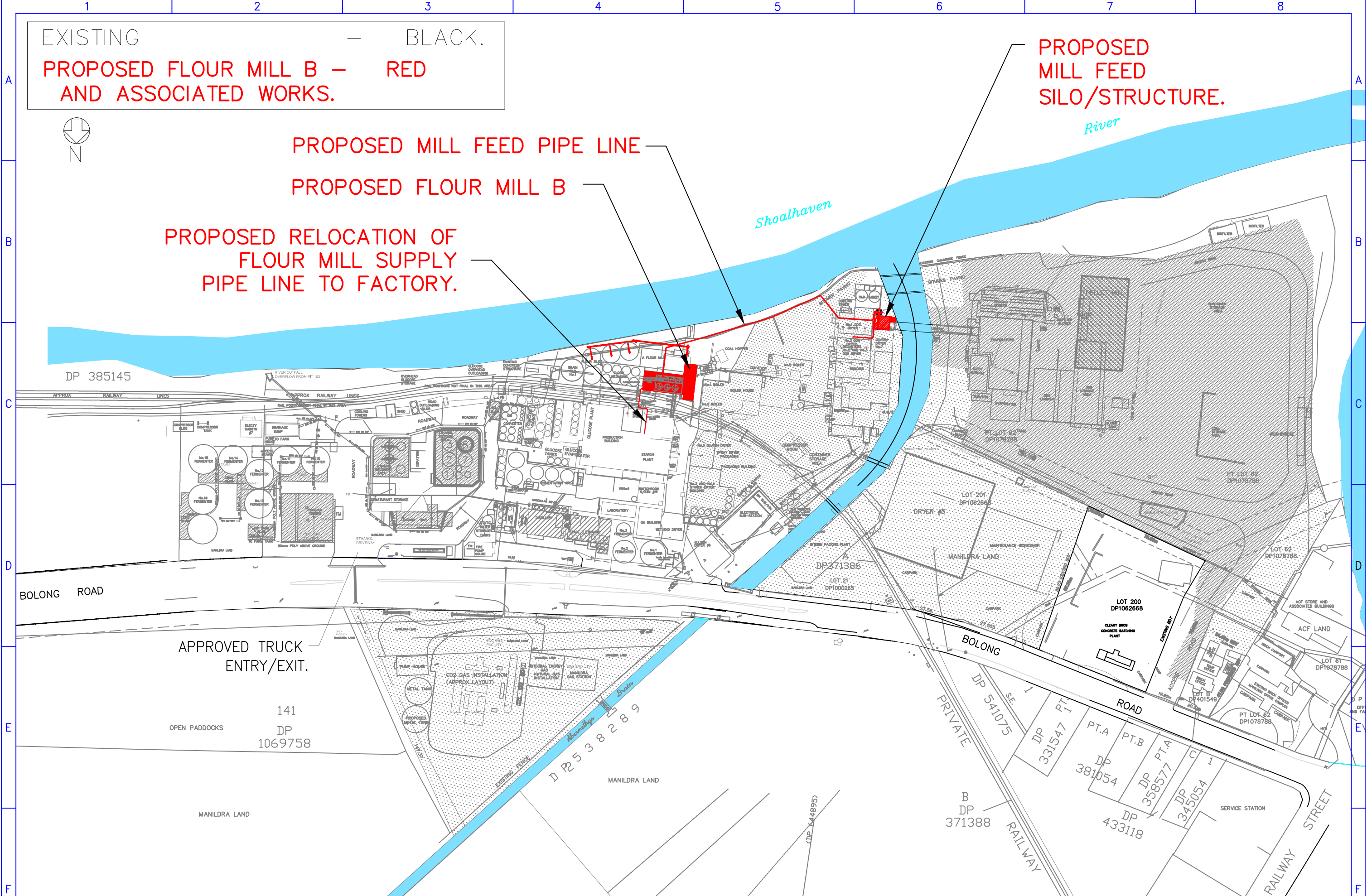
A handwritten signature in blue ink, appearing to read "R W Dewar", on a light orange rectangular background.

R W Dewar

**Director**







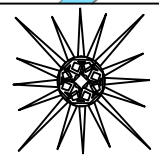
EXISTING — BLACK.  
PROPOSED FLOUR MILL B — RED  
AND ASSOCIATED WORKS.

PROPOSED  
MILL FEED  
SILO/STRUCTURE.

PROPOSED MILL FEED PIPE LINE  
PROPOSED FLOUR MILL B

PROPOSED RELOCATION OF  
FLOUR MILL SUPPLY  
PIPE LINE TO FACTORY.

E	30/9/16	ALL	Mill feed discharge pipe added.	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	Mill feed reinstated, gantry reinstated.	P.C.	B.H.
A	22/9/16	ALL	Mill Feed removed.	P.C.	B.H.
ISS	DATE	ZONE	CHANGE	AMENDMENTS BY	CKD

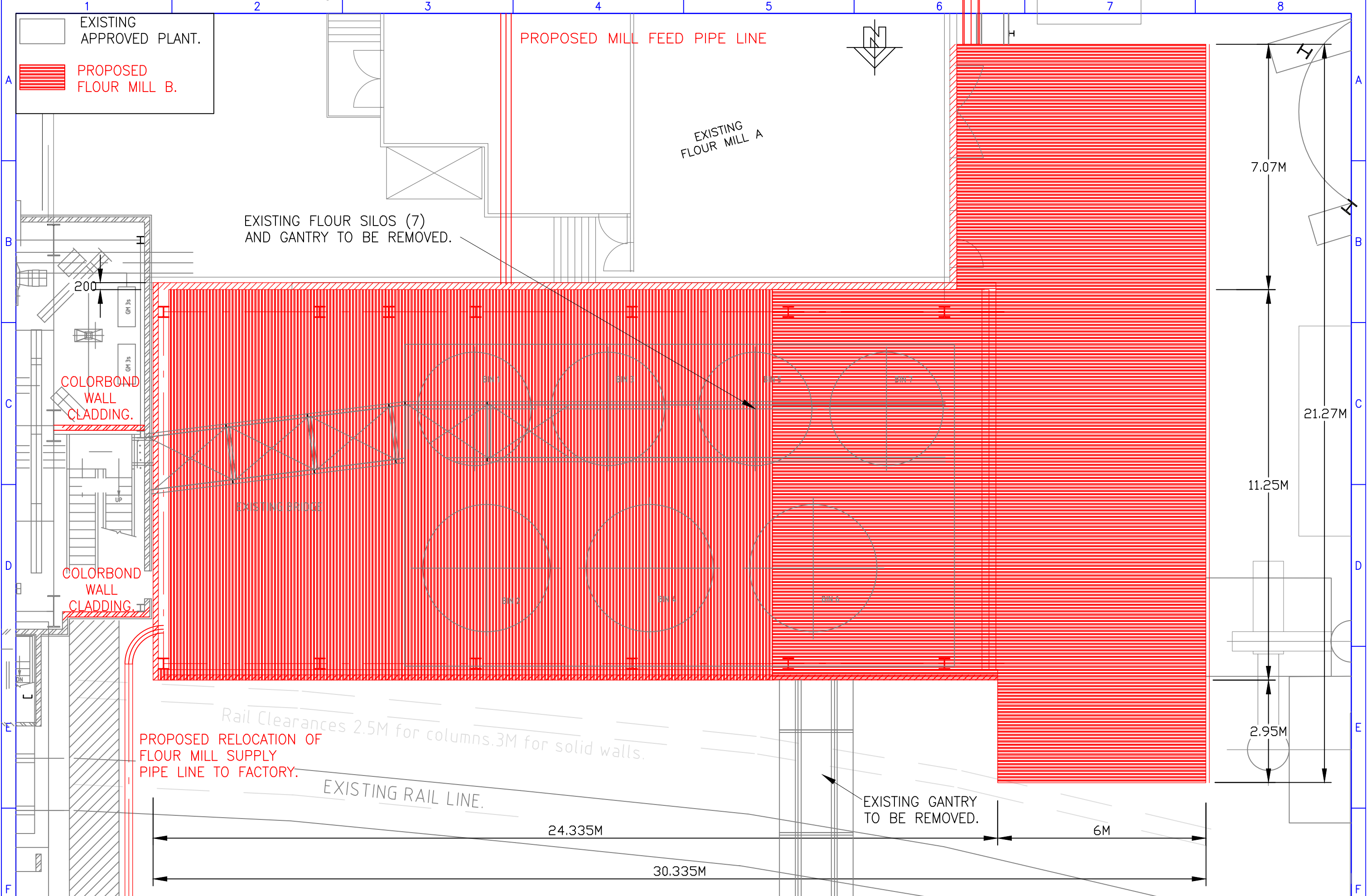



**MANILDRA  
GROUP**  
Commitment to Excellence

DRAWN P.C.  
TRACED  
CHECKED  
APPROVED  
DRG PRACTICE  
AS1100

TITLE: SHOALHAVEN STARCHES.NOWRA.  
PROPOSED FLOUR MILL B.  
OVERALL SITE PLAN.

SIZE A3  
SCALE: 1:2000  
MANILDRA-5566  
DRG No. MN244-001E

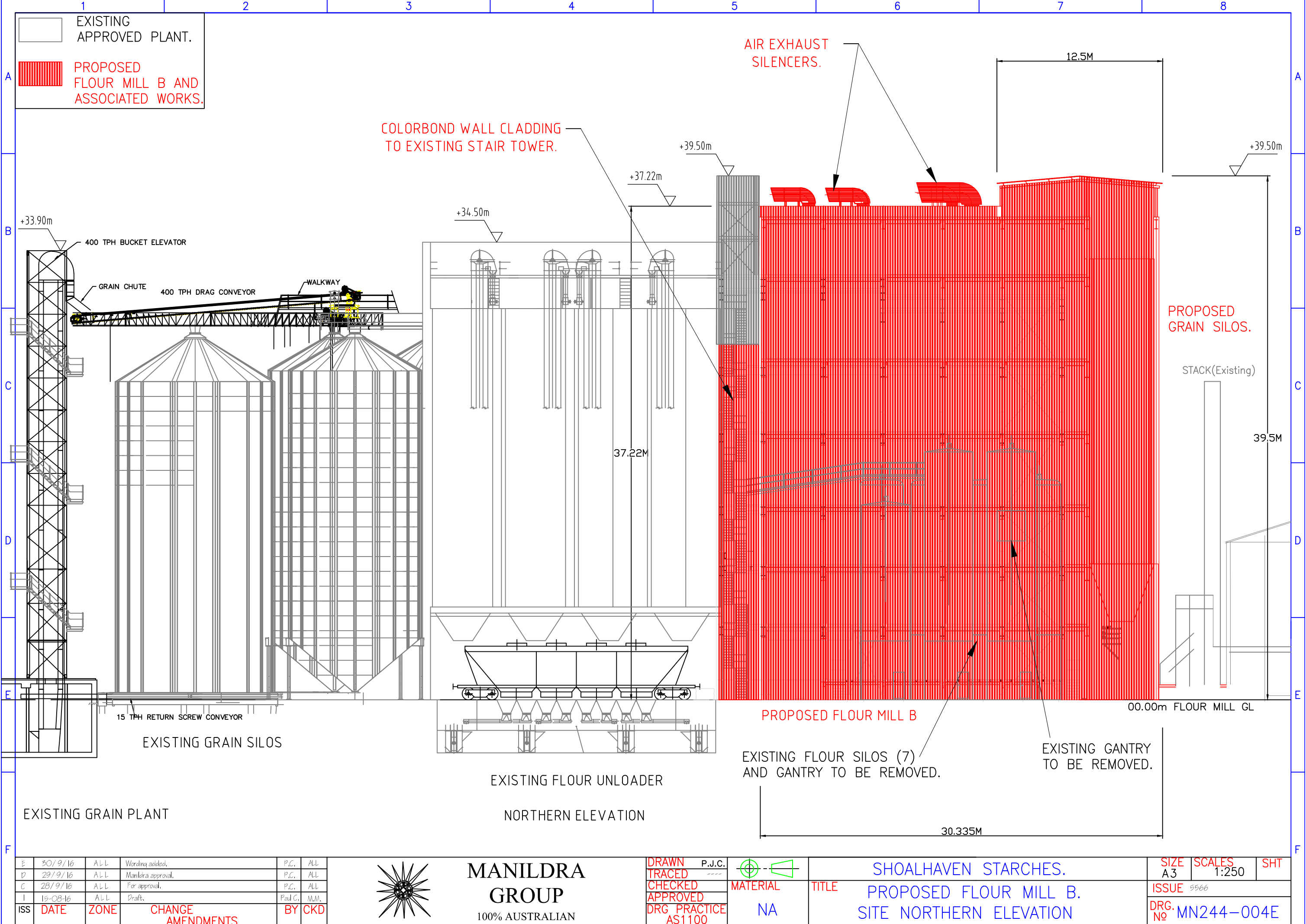


<div><div><div>30/9/16</div><div>ALL</div><div>No changes to this drawing.</div><div>P.C.</div><div>ALL</div></div><div><div>29/9/16</div><div>ALL</div><div>Manildra approval.</div><div>P.C.</div><div>ALL</div></div><div><div>28/9/16</div><div>ALL</div><div>For approval.</div><div>P.C.</div><div>ALL</div></div><div><div>28/9/16</div><div>ALL</div><div>Gantry reinstated.</div><div>P.C.</div><div>B.H.</div></div></div>				<div><div><div><div></div><div>PC Drafting.</div><div>0439 436508</div><div>Est. 2001</div></div><div><div>Commitment to Excellence</div><div></div><div>GEM OF THE WEST</div></div></div><div><div>MANILDRA GROUP</div><div>100% AUSTRALIAN</div></div></div>	<div><div>DRAWN</div><div>TRACED</div><div>CHECKED</div><div>APPROVED</div><div>DRG PRACTICE</div><div>AS1100</div></div> <div><div>P.J.C.</div><div>---</div><div>MATERIAL</div><div>NA</div></div>	<div><div>TITLE</div><div>EXISTING GANTRY</div></div> <div><div>SHOALHAVEN STARCHES.</div><div>PROPOSED FLOUR MILL B.</div><div>FLOUR MILL PLAN.</div></div>	<div><div>SIZE</div><div>A3</div></div> <div><div>SCALES</div><div>1:100</div></div> <div><div>SHT</div><div></div></div>
<div><div>ISS</div><div>DATE</div><div>ZONE</div><div>CHANGE AMENDMENTS</div><div>BY</div><div>CKD</div></div>				<div><div>ISSUE</div><div>5566</div></div> <div><div>DRG No</div><div>MN244-002E</div></div>			





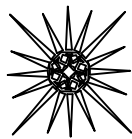




EXISTING GRAIN PLANT

EXISTING FLOUR UNLOADER  
NORTHERN ELEVATION

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D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
I	18-08-16	ALL	Draft.	Paul C.	M.M.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD



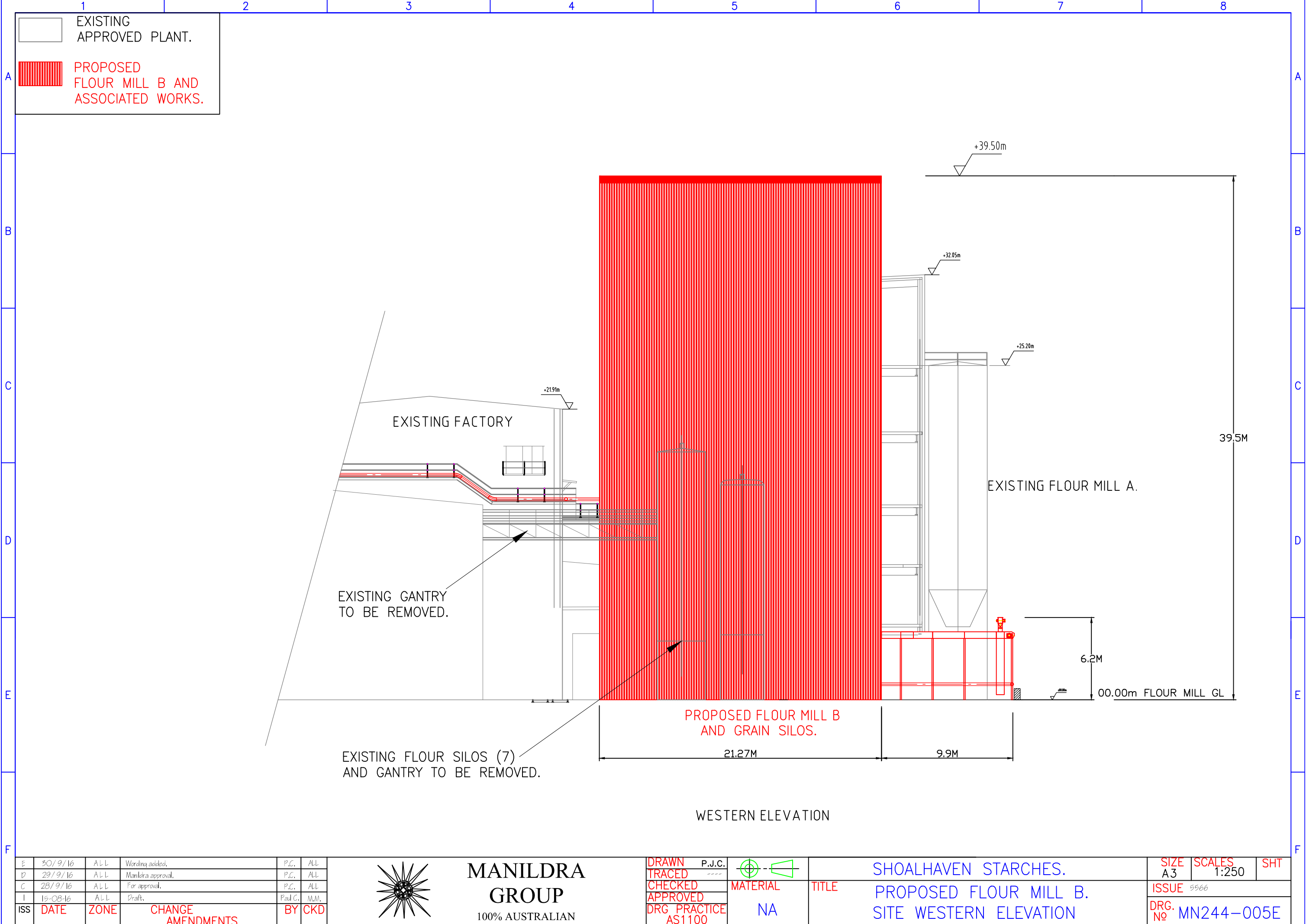
MANILDRA  
GROUP  
100% AUSTRALIAN

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

MATERIAL  
NA

SHOALHAVEN STARCHES.  
PROPOSED FLOUR MILL B.  
SITE NORTHERN ELEVATION

SIZE A3	SCALES 1:250	SHT
ISSUE 5566		
DRG. No MN244-004E		



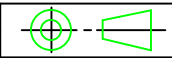
WESTERN ELEVATION

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D	29/9/16	ALL	Manindra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
I	18-08-16	ALL	Draft.	Paul C.	M.M.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD



**MANILDRA GROUP**  
100% AUSTRALIAN

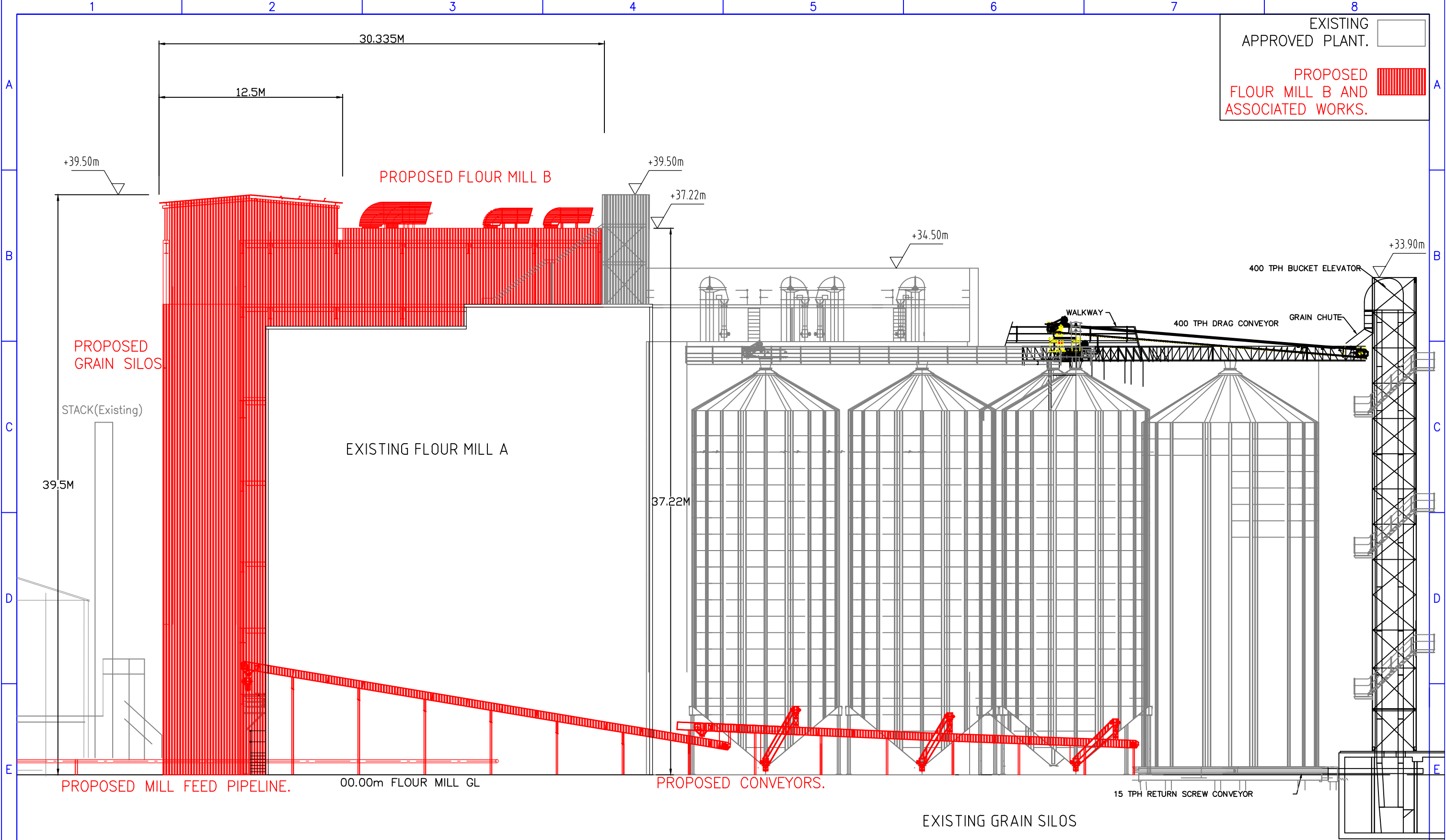
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TRACED  
CHECKED  
APPROVED  
DRG PRACTICE AS1100



MATERIAL  
NA

SHOALHAVEN STARCHES.  
PROPOSED FLOUR MILL B.  
SITE WESTERN ELEVATION

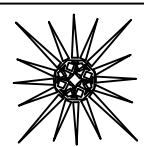
SIZE A3	SCALES 1:250	SHT
ISSUE 5566		
DRG. No MN244-005E		



SOUTHERN ELEVATION

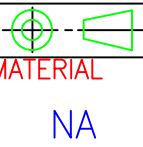
EXISTING GRAIN PLANT

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D	29/9/16	ALL	Manildra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
I	18-08-16	ALL	Draft.	Paul C.	M.M.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD



**MANILDRA GROUP**  
100% AUSTRALIAN

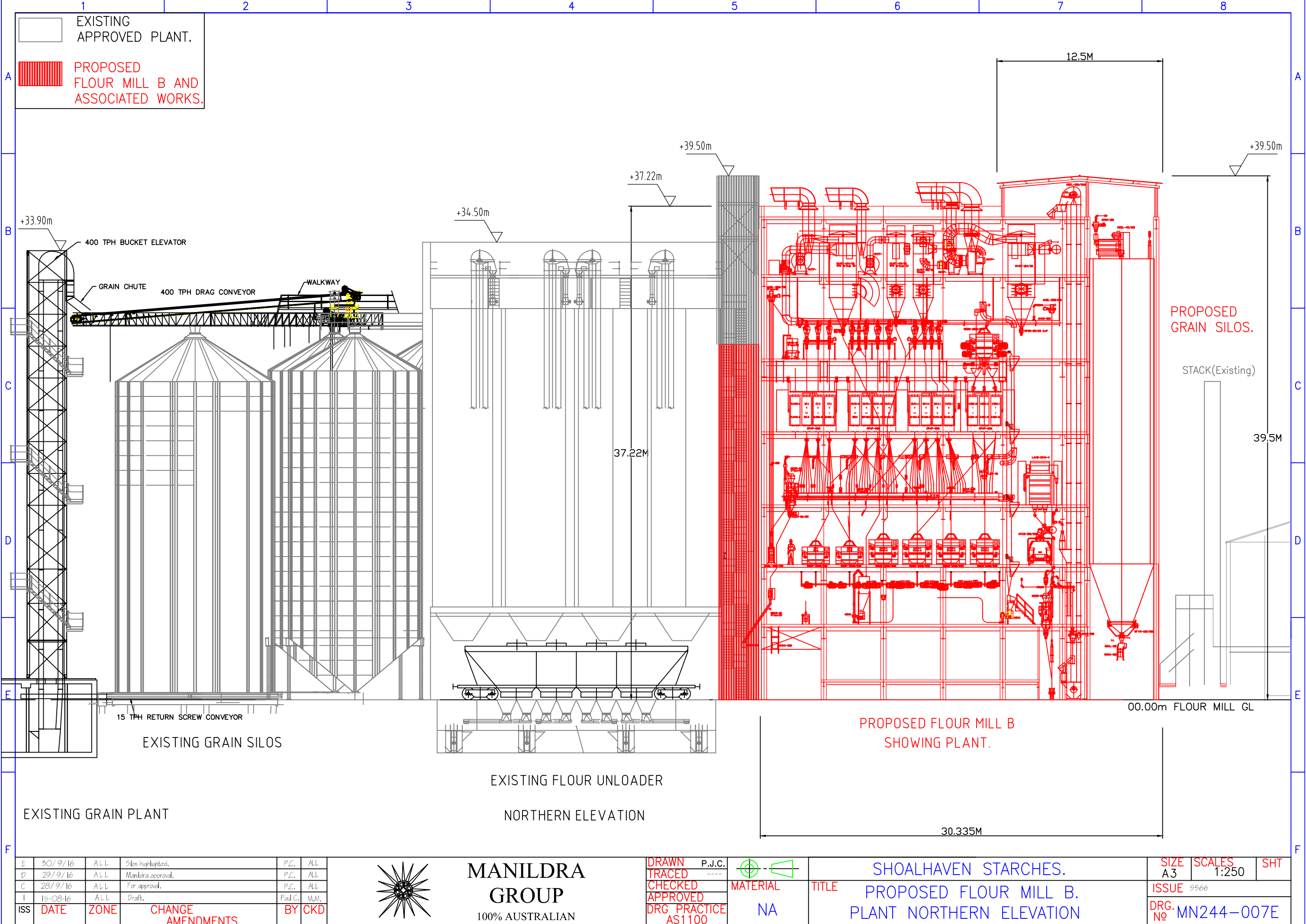
DRAWN P.J.C.  
TRACED  
CHECKED  
APPROVED  
DRG PRACTICE AS1100



MATERIAL  
NA

SHOALHAVEN STARCHES.  
PROPOSED FLOUR MILL B.  
SITE SOUTHERN ELEVATION

SIZE A3  
SCALE 1:250  
SHT  
ISSUE 5566  
DRG. No MN244-006E



EXISTING GRAIN PLANT

EXISTING FLOUR UNLOADER  
NORTHERN ELEVATION

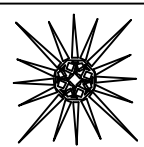
PROPOSED FLOUR MILL B  
SHOWING PLANT.

PROPOSED GRAIN SILOS.

STACK(Existing)

00.00m FLOUR MILL GL

E	30/9/16	ALL	Silos highlighted.	P.C.	ALL
D	29/9/16	ALL	Manidra approval.	P.C.	ALL
C	28/9/16	ALL	For approval.	P.C.	ALL
I	18-08-16	ALL	Draft.	Paul C.	M.M.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD



MANILDRA  
GROUP  
100% AUSTRALIAN

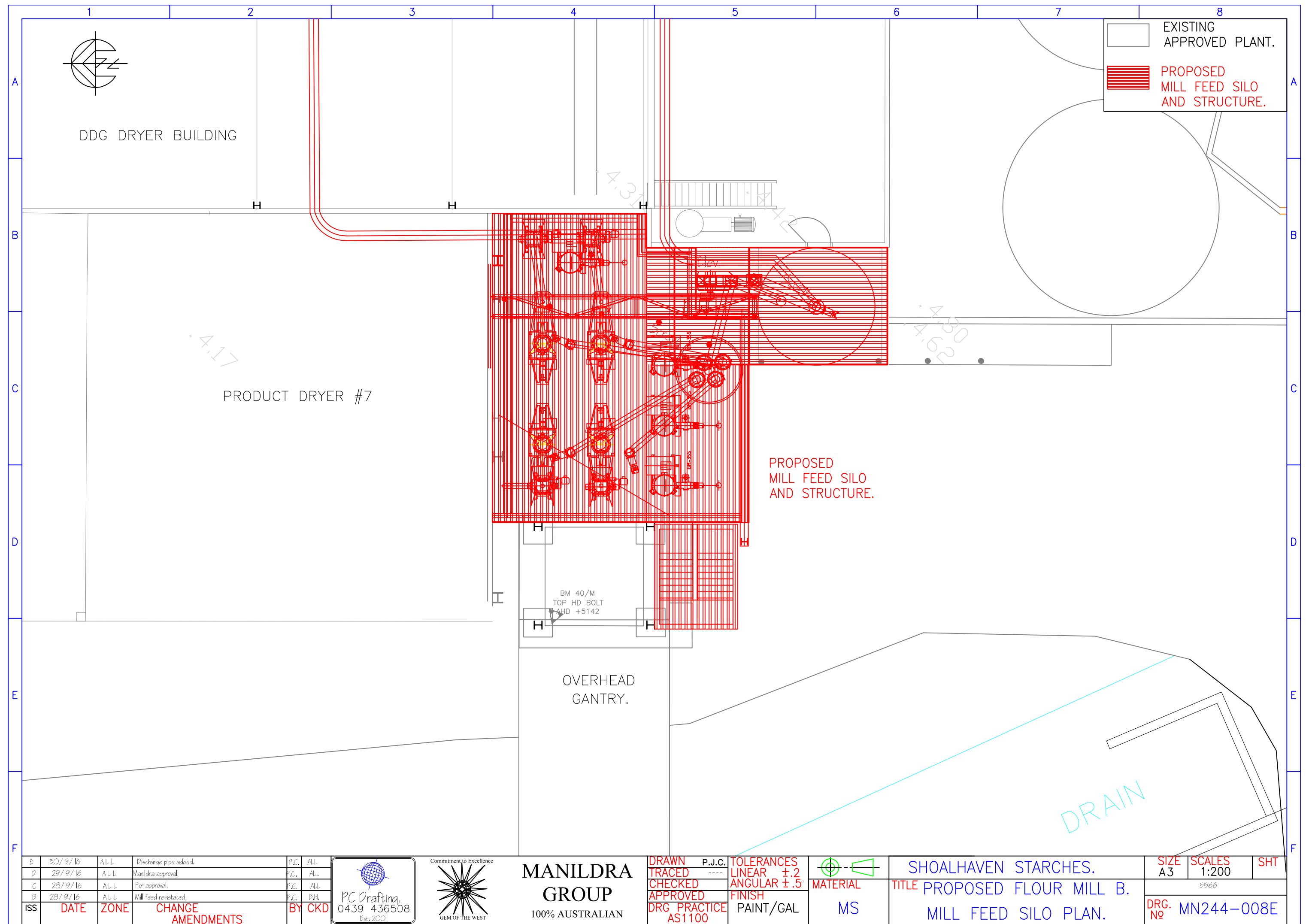
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CHECKED  
APPROVED  
DRG PRACTICE AS1100

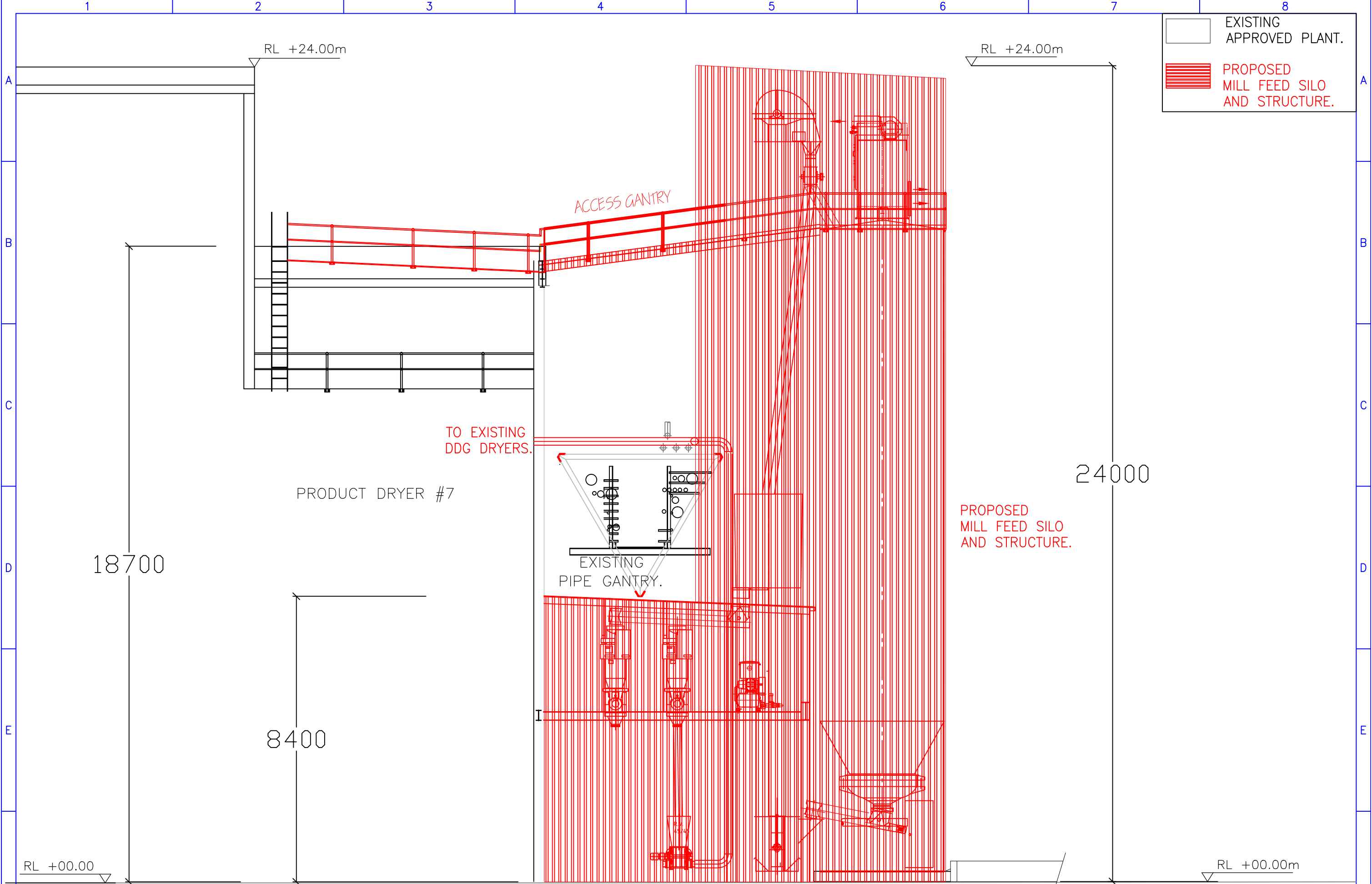
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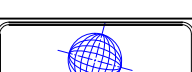

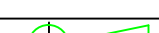
SHOALHAVEN STARCHES.  
PROPOSED FLOUR MILL B.  
PLANT NORTHERN ELEVATION

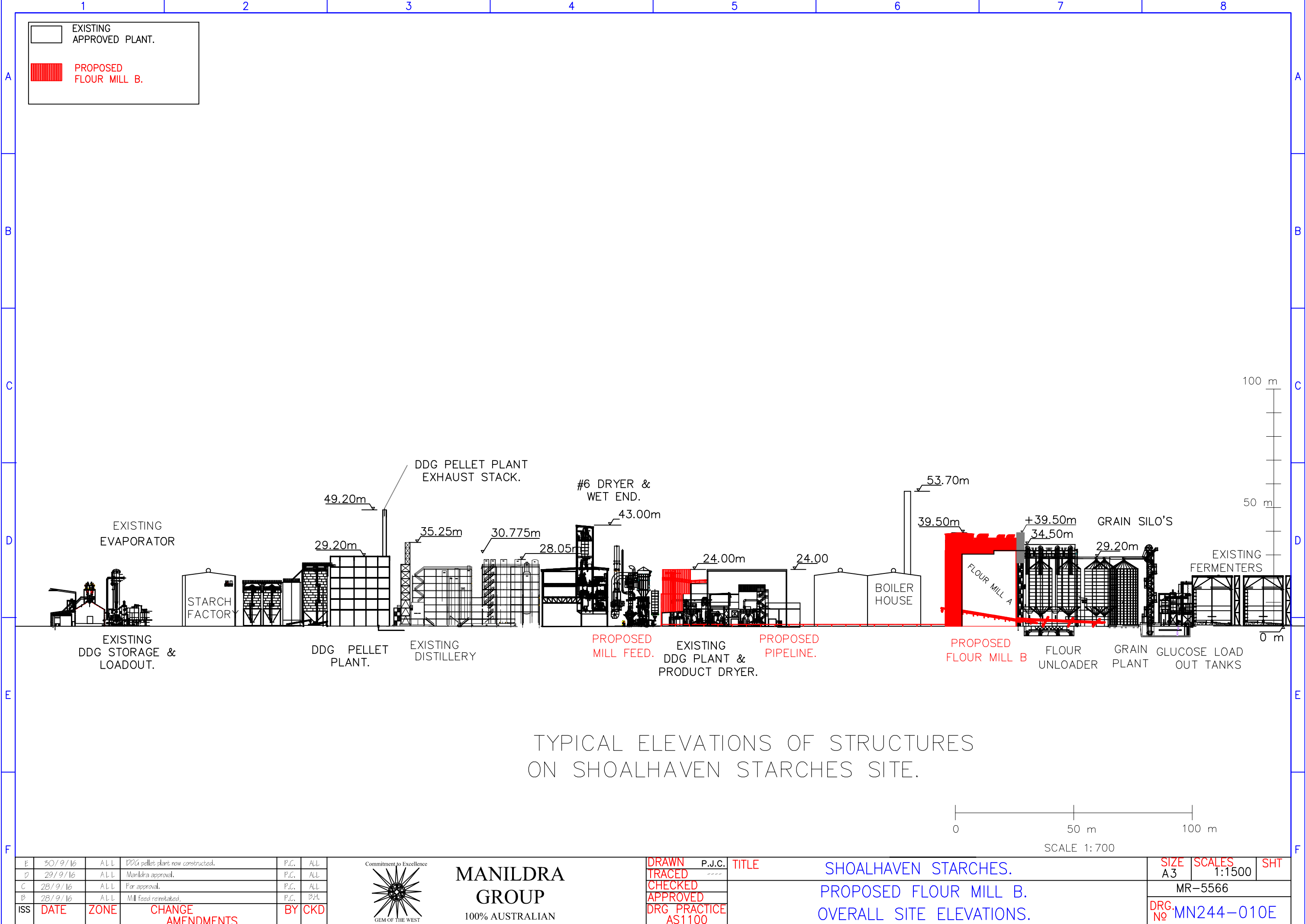
SIZE A3	SCALES 1:250	SHT
ISSUE 5566		
DRG. No MN244-007E		








E	30/9/16	ALL	Discharge pipe added.	P.C.	ALL	 <p>PC Drafting, 0439 436508 Est. 2001</p>	 <p>Commitment to Excellence <b>MANILDRA GROUP</b> 100% AUSTRALIAN</p>	<div><div>DRAWN</div><div>TRACED</div><div>CHECKED</div><div>APPROVED</div><div>DRG PRACTICE</div></div> <div><div>P.J.C.</div><div>---</div></div>	<div><div>TOLERANCES</div><div>LINEAR <math>\pm .2</math></div><div>ANGULAR <math>\pm .5^\circ</math></div><div>FINISH</div><div>PAINT/GAL</div></div>	 <div>MATERIAL</div> <div>MS</div>	SHOALHAVEN STARCHES.	SIZE A3	SCALES 1:100	SHT
D	29/9/16	ALL	Manidra approval.	P.C.	ALL						5566			
C	28/9/16	ALL	For approval.	P.C.	ALL						TITLE PROPOSED FLOUR MILL B.			
B	28/9/16	ALL	Mill feed reinstated.	P.C.	B.H.						MILL FEED SILO ELEVATION.			
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD	DRG. No MN244-09E								



E	30/9/16	ALL	DDG pellet plant now constructed.	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	Mill feed reinstated.	P.C.	B.H.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD

Commitment to Excellence

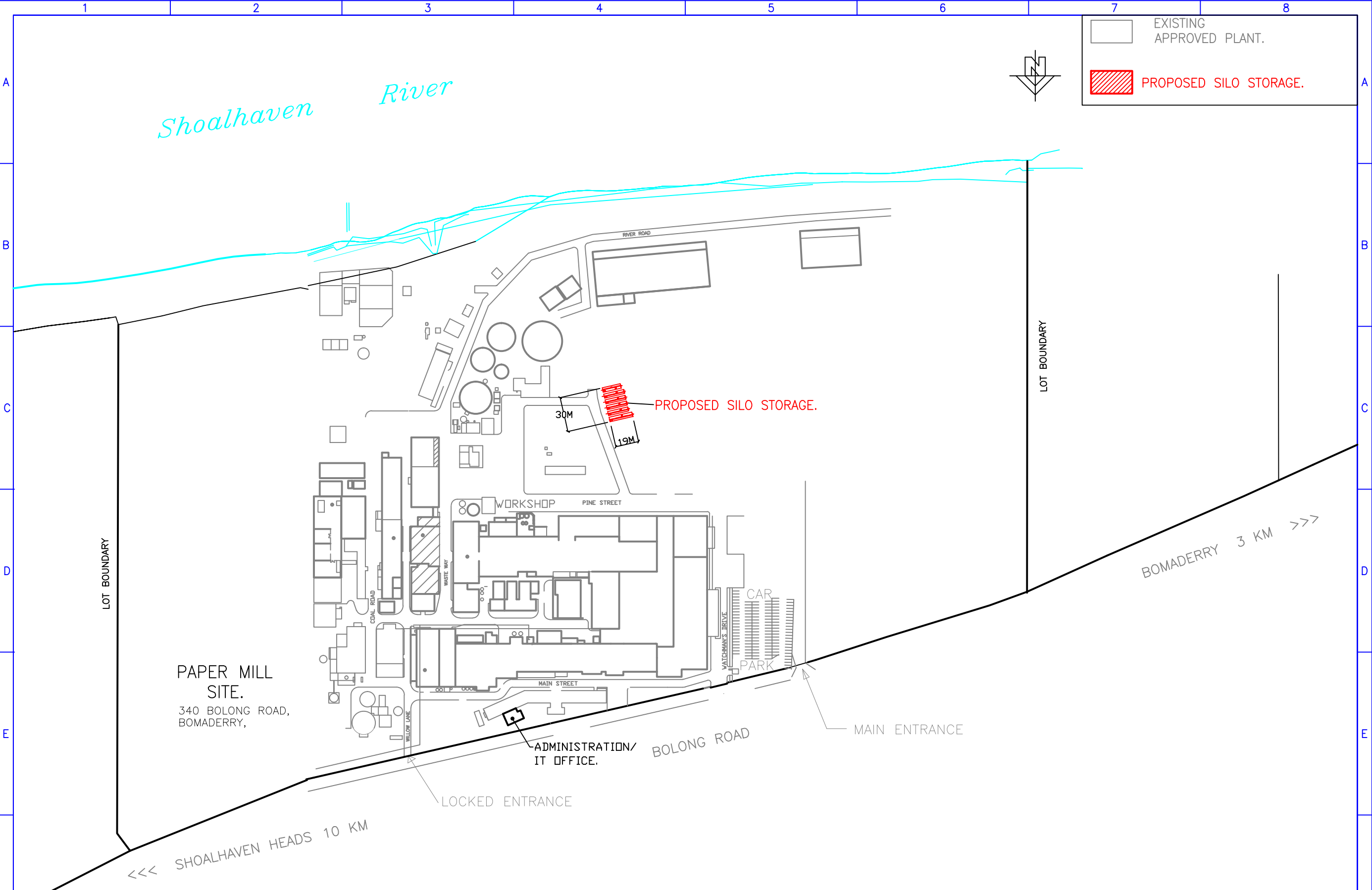


GEM OF THE WEST

MANILDRA GROUP

100% AUSTRALIAN

DRAWN	P.J.C.	TITLE	SIZE	SCALES	SHT
TRACED	----	SHOALHAVEN STARCHES.	A3	1:1500	
CHECKED		PROPOSED FLOUR MILL B.	MR-5566		
APPROVED		OVERALL SITE ELEVATIONS.	DRG No MN244-010E		
DRG PRACTICE	AS1100				



F	10/10/16	ALL	Dimensions added.	P.C.	B.H.
E	30/9/16	ALL	Future proposal removed.	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	Other proposals removed.	P.C.	B.H.
ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD



**MANILDRA GROUP**  
100% AUSTRALIAN

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

TITLE  
SHOALHAVEN STARCHES.  
PROPOSED FLOUR MILL B.  
REMOVED SILO STORAGE.

SIZE A3	SCALES 1:3000	SHT
MANILDRA-5566		
DRG. No MN244-011F		







**Cowman Stoddart Pty Ltd**

PO Box 738

NOWRA

NSW 2541

J:\Jobs\114044\Admin\FlourMillAssessmentSept2015.docx

25 September 2015

**Attention: Mr. S Richardson**

Dear Steve,

**Re: DCP2014 Chapter G9:Flood Compliance Report for Proposed Modification  
Application to MP06-0228, Shoalhaven Starches Expansion Project, Alterations to  
Existing Flour Mill, Bolong Road, Bomaderry**

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

## **1 Introduction**

Shoalhaven Starches intend to undertake modifications to the existing Flour Mill located at their Bomaderry plant to increase the amount of flour that will be able to be produced on the site. The proposal involves the installation of additional plant within the confines of the existing Flour Mill building. The only external addition to the existing building footprint is a small (3m by 4m) area located between the silos and the flour mill building. The proposal will involve additional plant being located on top of the existing building.

The alterations will result in an increase in flour that will be able to be produced by 2,700 tonnes per week to a total of 7,700 tonnes per week. New equipment will be housed entirely within the existing flour mill structure. No new storage silos will be required as part of this project.

Appendix A provides plans of the proposal as well as a site plan. The location of the proposed new flour mill on current GoogleMaps aerial photograph is shown below.

The site is 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 PTY LTD**

#### **DIRECTORS**

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R W Dewar BSc(Hons), MEngSc, MAIG, MIEAust  
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Email: enquiry@wmawater.com.au  
Website: wmawater.com.au



WMAwater (formerly known as Webb McKeown & Associates) undertook the 1990 Shoalhaven River Flood Study and subsequent 2008 Floodplain Risk Management Study and Plan. 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 within the confines of the existing Shoalhaven Starches plant on Bolong Road.

## 2 Description of Proposal

The proposal is to construct plant as described in Appendix A. An indicative ground level at the site is 4.2 mAHD and the 1% AEP flood level is approximately 5.6 mAHD according to the Flood Certificate obtained on 23<sup>rd</sup> September 2015 (attached as Appendix B).

## 3 Council Flood Certificate

Council's flood certificate (Appendix B) advises that the site is inundated in the 1% AEP event and is described as part High Hazard and part Floodway. The projected sea level rise estimates due to climate change will not increase the 1% AEP flood level at this site as it is too far upstream from the ocean.

## 4 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 1<sup>st</sup> July 2015). As the works will not involve fill, excavation or subdivision of lands compliance with these performance criteria have not been addressed.



#### 4.1 Performance Criteria - General (Section 5.1 of DCP only)

PERFORMANCE CRITERIA	RESPONSE
<b>P1 Development or work on flood prone land will meet the following:</b>	
The development will not increase the risk to life or safety of persons during a flood event on the development site and adjoining land.	The works are such that their construction will not increase the number of workers on the site or additionally threaten their safety during a flood.
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 works are within industrial land clear of vegetation and due to their being no increase in footprint 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 will be provided.
Potential damage due to inundation of proposed buildings and structures is minimised.	The works are largely sealed structures and/or above the PMF flood level which means there will be no damage due to inundation, even in a PMF, unless the structure itself fails. There will potentially be some damage to electrical and other components feeding the equipment and these are considered in Shoalhaven Starches Flood Plan.
The development will not obstruct escape routes for both people and stock in the event of a flood.	The works will not occupy escape routes or cause workers to become trapped.
The development will not unduly increase dependency on emergency services.	The works are such that their construction will not increase the number of workers on the site, additionally threaten their safety during a flood or increase the need for emergency services.
Interaction of flooding from all possible sources has been taken into account in assessing the proposed	Refer Hydraulic Impact Assessment below.

PERFORMANCE CRITERIA	RESPONSE
development against risks to life and property resulting from any adverse hydraulic impacts.	
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 designated as high hazard floodway in the 1% AEP event. The site is industrial land with nil existing vegetation and is beyond the influence of normal fluvial geomorphic processes. The works will have no impact on water quality.

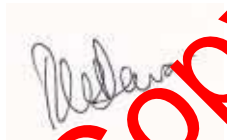
#### 4.2 Hydraulic Impact Assessment

The aerial image above from GoogleMaps indicates that the position of the proposed flour mill is surrounded by an extensive array of existing plant and buildings. Thus the flow path of floodwaters from the Shoalhaven River over the river bank and towards Bolong Road is already significantly impeded. In addition the majority of the proposed works are above the PMF (all except the 3m by 4m building extension) thus their construction will have nil impact on flood levels. Construction of the building extension will have an insignificant impact on flood levels due to the density of the surrounding existing plant and the small size of the extension.

In conclusion WMAwater consider that there should be no increase in the 1% AEP flood level as a result of the proposed works.

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

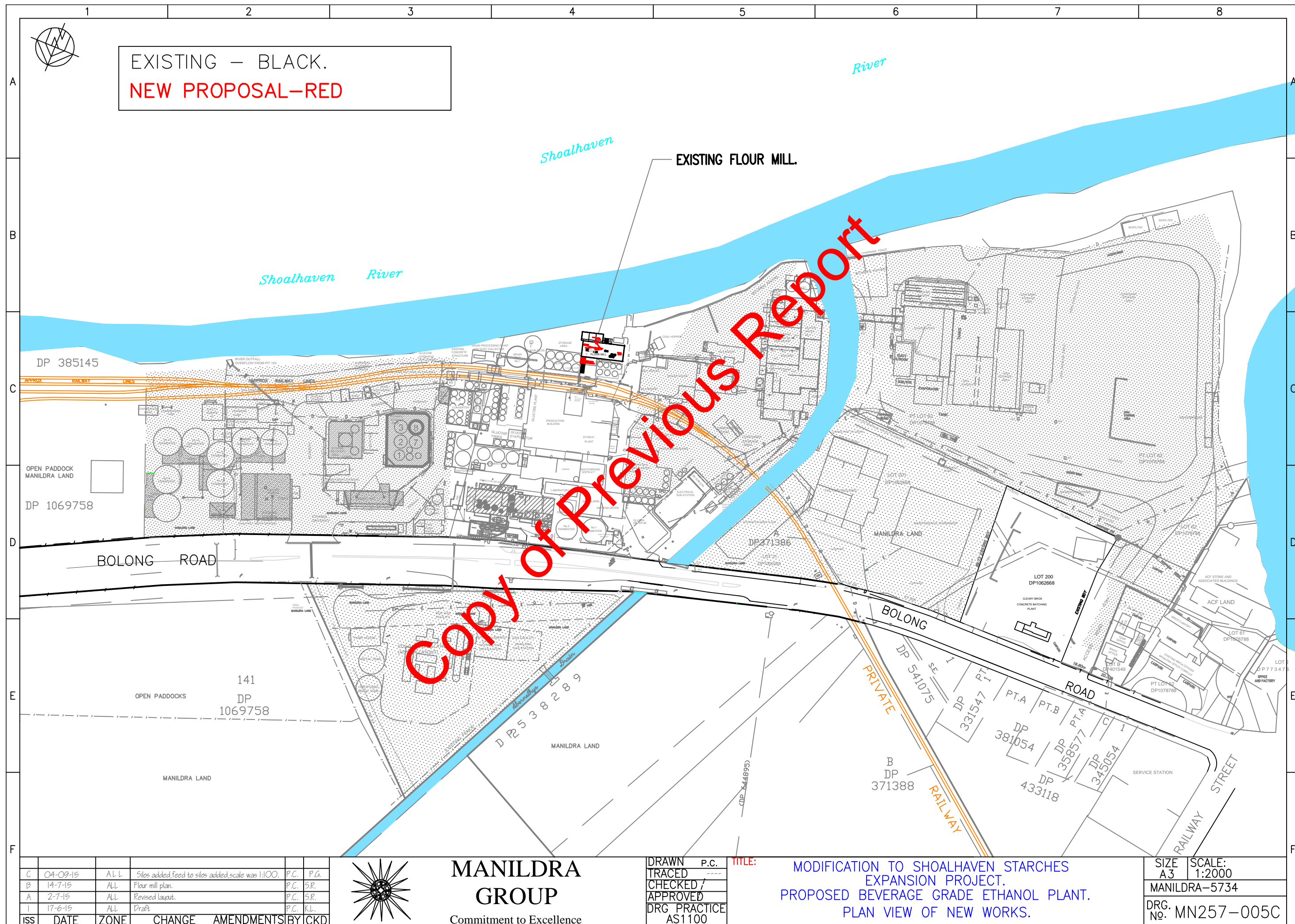
Yours Sincerely,  
WMAwater



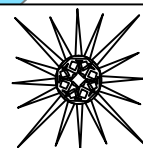
R W Dewar  
Director

Copy of Previous Report





ISS	DATE	ZONE	CHANGE	AMENDMENTS	BY	CKD
C	04-09-15	ALL	Silos added, feed to silos added, scale was 1:100.	P.C.	P.G.	
B	14-7-15	ALL	Flour mill plan.	P.C.	S.R.	
A	2-7-15	ALL	Revised layout.	P.C.	S.R.	
I	17-6-15	ALL	Draft	P.C.	K.L.	

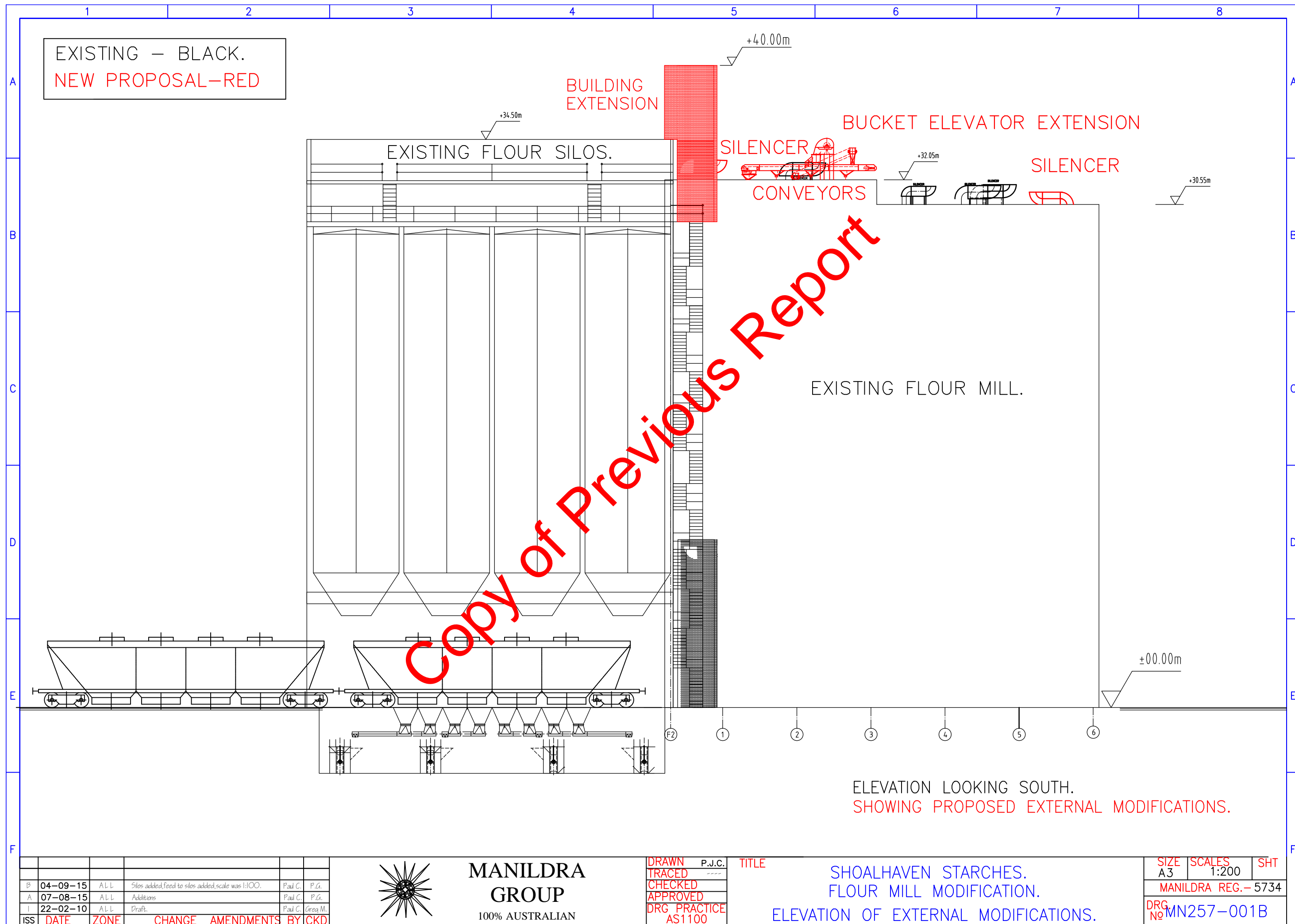


**MANILDRA  
GROUP**  
Commitment to Excellence

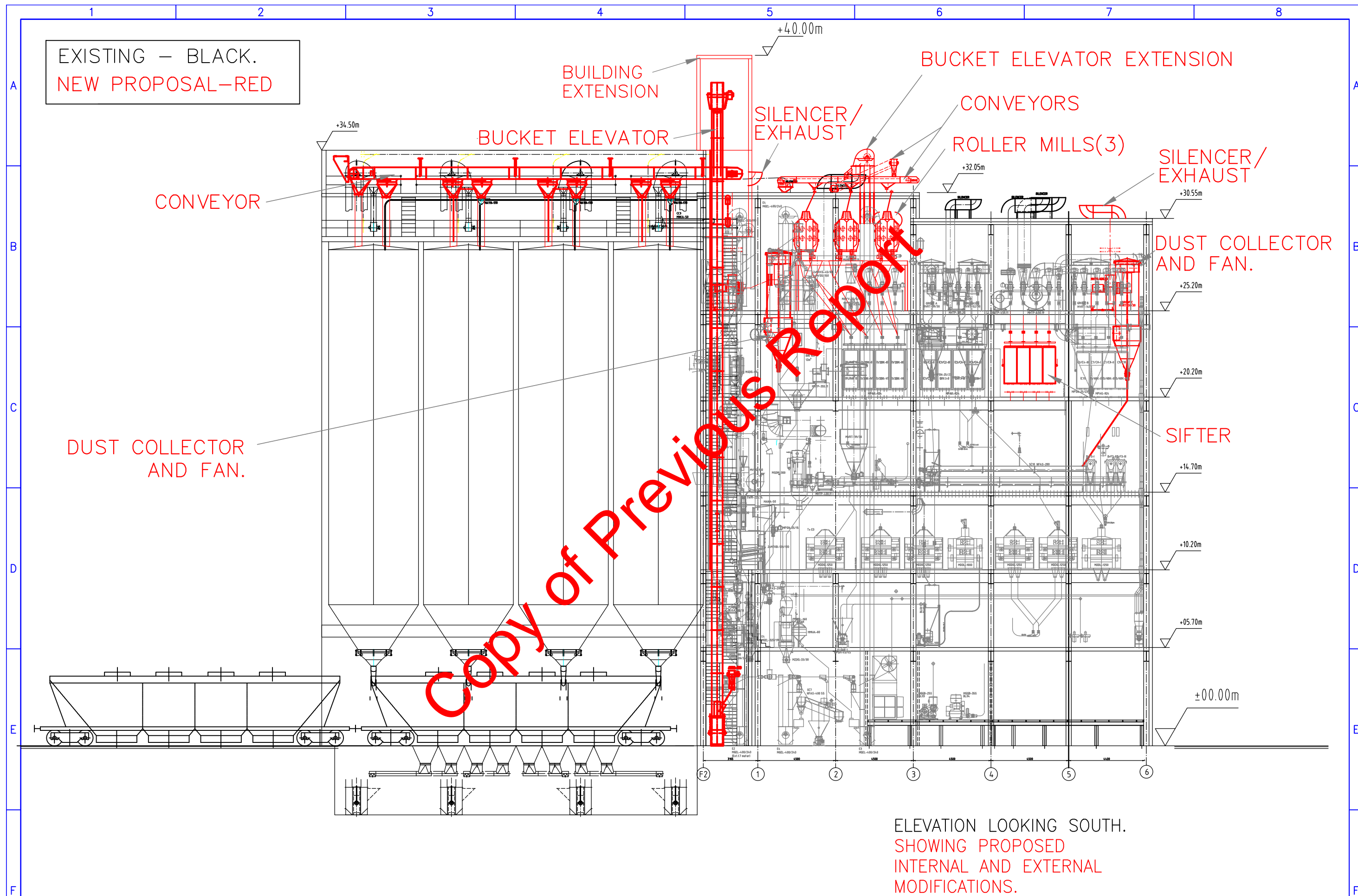
DRAWN P.C.  
TRACED  
CHECKED /  
APPROVED  
DRG PRACTICE  
AS1100

TITLE: MODIFICATION TO SHOALHAVEN STARCHES  
EXPANSION PROJECT.  
PROPOSED BEVERAGE GRADE ETHANOL PLANT.  
PLAN VIEW OF NEW WORKS.

SIZE A3  
SCALE: 1:2000  
MANILDRA-5734  
DRG. No. MN257-005C

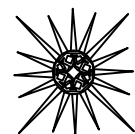






ELEVATION LOOKING SOUTH.  
SHOWING PROPOSED  
INTERNAL AND EXTERNAL  
MODIFICATIONS.

ISS	DATE	ZONE	CHANGE	AMENDMENTS	BY	CKD
B	04-09-15	ALL	Silos added, feed to silos added, scale was 1:100.	Paul C.	P.G.	
A	07-08-15	ALL	Additions	Paul C.	P.G.	
I	22-02-10	ALL	Draft.	Paul C.	Graig M.	



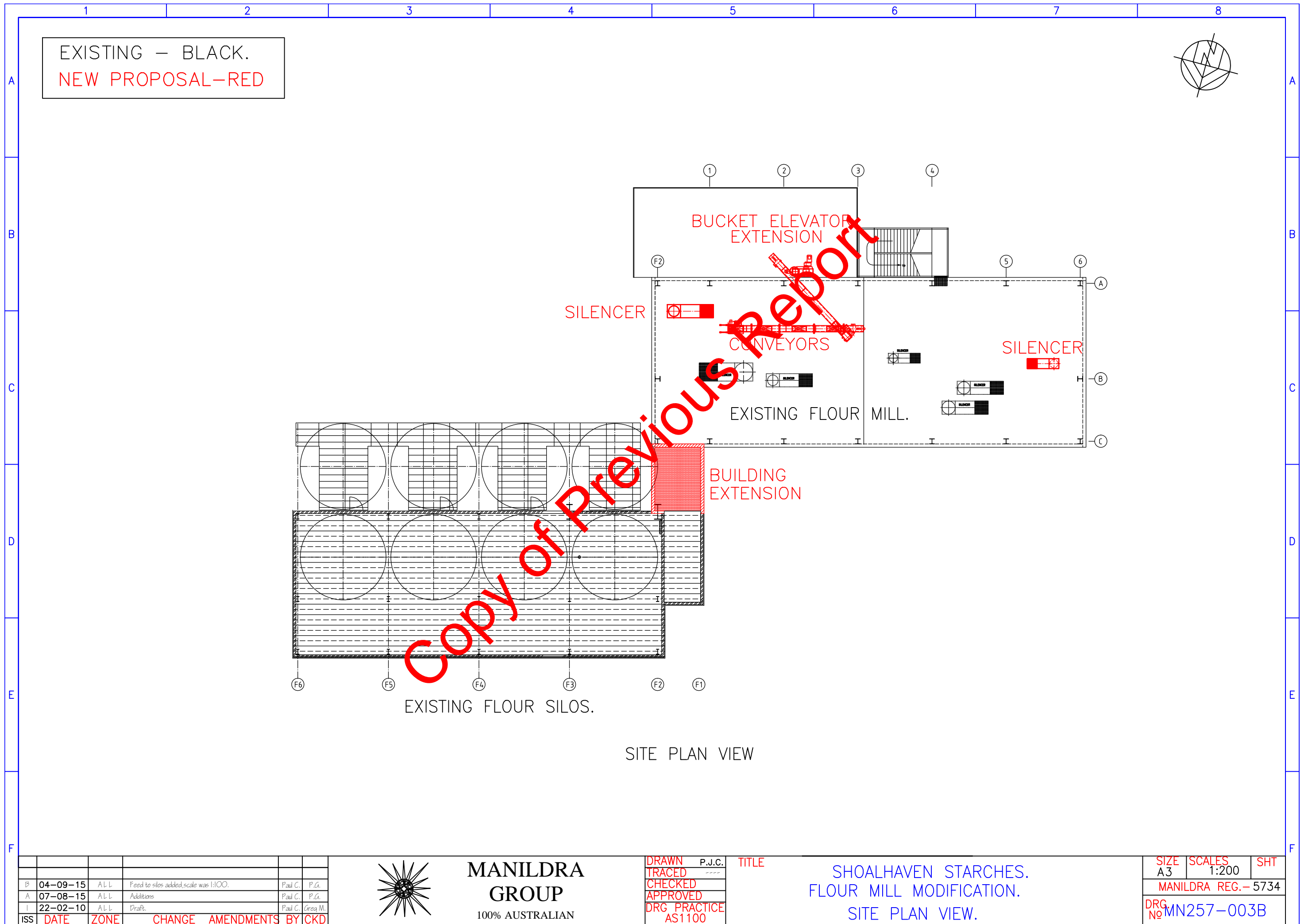
**MANILDRA  
GROUP**  
100% AUSTRALIAN

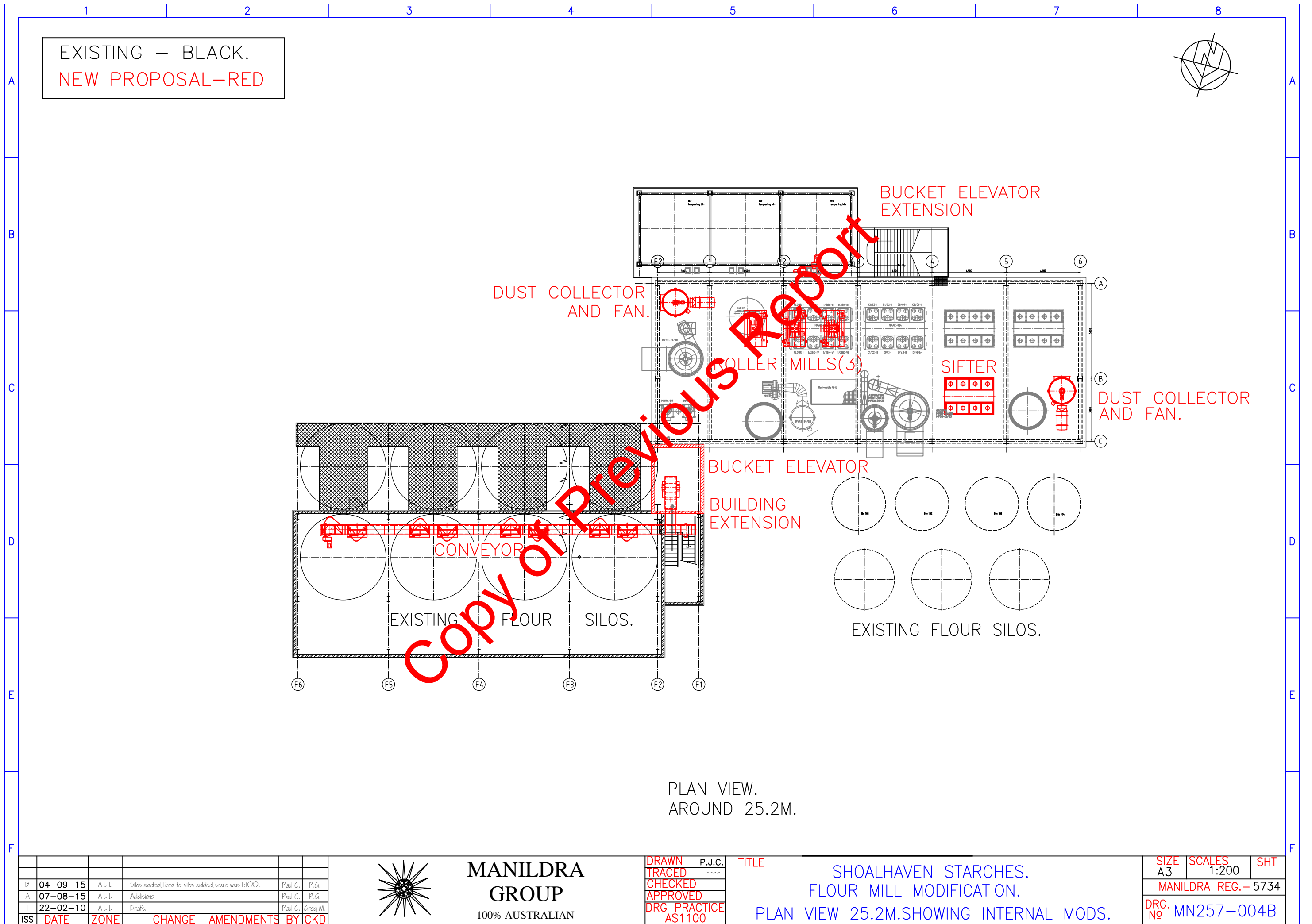
DRAWN P.J.C.  
TRACED  
CHECKED  
APPROVED  
DRG. PRACTICE  
AS1100

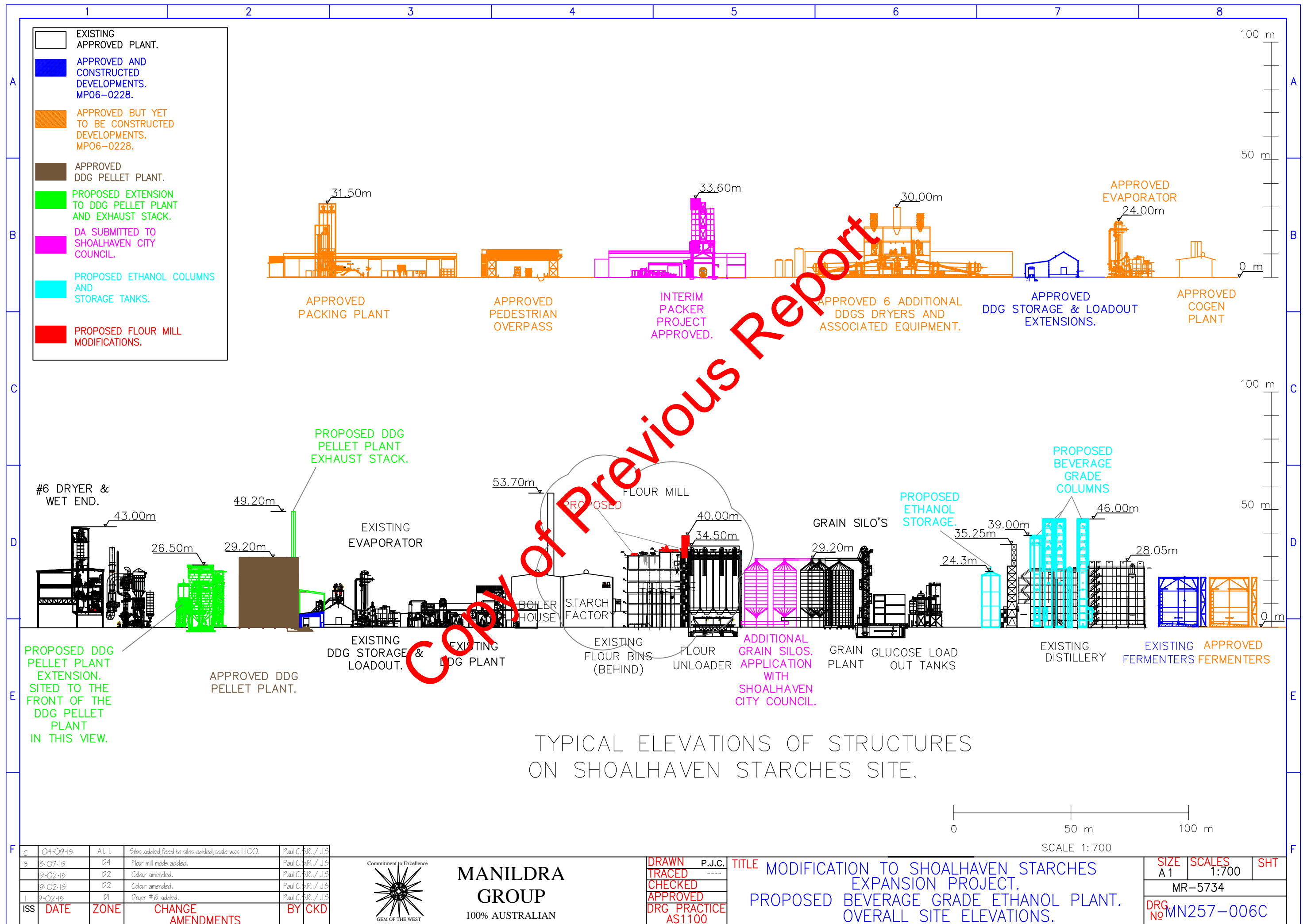
TITLE

SHOALHAVEN STARCHES.  
FLOUR MILL MODIFICATION.  
ELEVATION OF INTERNAL MODIFICATIONS.

SIZE	SCALES	SHT
A3	1:200	
MANILDRA REG.- 5448		
DRG. NO. MN257-002B		







Copy of Previous Report





**City Administrative Centre**

Bridge Road, Nowra NSW Australia 2541

Phone: (02) 4429 3111 • Fax: (02) 4422 3168

**Address all correspondence to**

The General Manager, PO Box 42, Nowra NSW 2541 Australia

COUNCIL REFERENCE: 28112E (D15/11422)

CONTACT PERSON: Kate Britton

DATE: 23 September 2015

Stephen Richardson  
PO BOX 738  
Nowra NSW 2541

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:** 05 Jan 2015

**Reason for Enquiry** New Construction

**Contact Details**

Phone: 02 422 61998

Email: [steve@cowmanstoddart.com.au](mailto:steve@cowmanstoddart.com.au)

Postal: PO BOX 738 Nowra

**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)* this property, 160 Bolong Rd, BOMADERRY - Lot 1 DP 838753, **is affected by the 1% AEP flood event.**

### FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level	Not applicable	6.1m AHD	6.1m AHD

Hazard Category	High	High	High
Hydraulic Category	Floodway	Floodway	Floodway

Probable Maximum Flood Level	7.8m AHD	7.8m AHD	7.8m AHD
1% AEP Flood Level	5.6m AHD	5.6m AHD	5.6m AHD
2% AEP Flood Level	5.1m AHD	5.1m AHD	5.1m AHD
5% AEP Flood Level	4.6m AHD	4.6m AHD	4.6m AHD
10% AEP Flood Level	4.5m AHD	4.5m AHD	4.5m AHD

Velocity (1% AEP flood event)	3.6m/s	3.0m/s	3.0m/s
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### 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.

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.

On Tuesday 10th February 2015 Council's Policy & Resources Committee resolved 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".

These benchmarks vary from the benchmarks used in the flood information provided above (400mm and 900mm for the 2050 and 2100 horizon's respectively). The new benchmarks will be incorporated into the flood information in future. Until studies incorporating the new benchmarks are undertaken, however, Council will continue to use our best available information.

2. 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 affecting this property please contact Council's Natural Resource and Floodplain Unit.

## 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 been 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. Floodways 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.  $FPL = 1\% \text{ AEP flood level} + \text{freeboard (0.5m)}$ ). 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.

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**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 additional risks, not considered during the flood study.





COUNCIL REFERENCE: 28112E (244348)  
CONTACT PERSON: Kate Britton  
DATE: 16 August 2016

Stephen Richardson  
PO BOX 738  
Nowra NSW 2541

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:

<b>Name of Inquirer</b>	Stephen Richardson	<b>Date Requested:</b> 01 Aug 2016
<b>Reason for Enquiry</b>	New Construction	
<b>Contact Details</b>	Phone: 02 4423 6198 Email: <a href="mailto:steve@cowmanstoddart.com.au">steve@cowmanstoddart.com.au</a> Postal: PO BOX 738 Nowra	
<b>Preferred Response</b>	Email	
<b>Notes</b>		
<b>Survey Detail</b>	Not Provided	
<b>Flood Safety Tip</b>	<b>Causeways can kill! Never drive through flood waters! Wait and be safe!</b>	
<b>General Flood Information</b>	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.	

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### FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level	Not applicable	6.1m AHD	6.1m AHD

Hazard Category	High	High	High
Hydraulic Category	Floodway	Floodway	Floodway

Probable Maximum Flood Level	7.8m AHD	7.8m AHD	7.8m AHD
1% AEP Flood Level	5.6m AHD	5.6m AHD	5.6m AHD
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5% AEP Flood Level	4.6m AHD	4.6m AHD	4.6m AHD
10% AEP Flood Level	4.5m AHD	4.5m AHD	4.5m AHD

Velocity (1% AEP flood event)	3.0m/s*	3.0m/s*	3.0m/s*
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\*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.

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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.

2. 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.

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**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 additional 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









