



Cowman Stoddart Pty Ltd

PO Box 738

NOWRA NSW 2541

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1 June 2021

Attention: Mr. S Richardson

Dear Stephen,

**Re: Modification Application to MP06-0228 to Approved Packing Plant and other Works,
Shoalhaven Starches Expansion Project, Bolong Road, Bomaderry
Flood Compliance Report for Mod 21**

This letter has been prepared by R W Dewar BSc, MEngSci, MIEAust CPEng Member No 477618 who has over 35 years of experience of floodplain management in NSW.

1 Introduction

Under Project Approval MP06_0228 Shoalhaven Starches obtained approval to establish a new Packing Plant, container loading area and a rail spur line on the northern side of Bolong Road. These works also required the provision of an overhead bridge structure to allow product to be transferred and safe pedestrian movement across Bolong Road.

In 2019 the then Independent Planning Commission approved Mod 16 which included the construction of a Specialty Product Facility and additional Gluten Dryer. The Specialty Products Building would enable the production of an increased range of specialised products as an extension to Shoalhaven Starches existing product line.

Shoalhaven Starches have now identified that due to the increase in range of different specialised products that will now be able to be produced as a result of Mod 16; amendments will be required to the approved Packing Plant on the northern side of Bolong Road to accommodate this increased range of specialised products.

An aerial photograph of Shoalhaven Starches plant is provided on Image 1 and on Figure 1. The proposed works are shown on Figure 2 with detailed plans in Appendix A.

WMAwater Pty Ltd

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Image 1 – Google Map Aerial Photograph of Shoalhaven Starches Plant at Bomaderry with Area outlined in Red deemed the Heavily Built-up Area - refer Section 4.2.3

2 Flooding Background

The proposed works (Figure 2) 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. The land across the plant area on which the works are located is of variable ground level with areas of shallow and relatively deep inundation in a 1% AEP event. Part would be defined as High Hazard, part Floodway and part Flood Storage. Further details on the extent of flooding are provided in Section 4.2.

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 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.

3 Proposed Works Mod 21

Shoalhaven Starches have identified the following amendments (Mod 21) that will be required to the approved Packing Plant to accommodate these different products.

- Construction of sixteen smaller silos instead of the original 7 approved silos. The proposed 16 silos will each have a square footprint with dimensions of 5 metres by 5 metres, height of 30 metres and volume of 300 tonnes each. In addition seven existing product silos will be relocated adjacent to the smaller silos.

- To accommodate the change in equipment used within the Packing Plant the overall footprint of the Packing Plant building will need to be slightly reconfigured from that which was originally approved.
- Additional packer feed bins to accommodate the need for improved flexibility to enable a greater range of gluten and starch products to be packed. **This amendment is within the approved Packing Plant and thus will have no impact on flood levels and has been excluded from the subsequent analysis.**
- Additional product transfer lines and services will also need to extend from the Specialty Product Buildings across Bolong Road to the Packing Plant via the approved underground services crossing. It is also proposed to slightly relocate the transfer lines and gantry to accommodate the amended product silos. **This amendment will have no impact on flood levels and has been excluded from the subsequent analysis.**
- The change in the footprint of the Packing Plant building will necessitate a change in the layout of the approved car parking spaces. **This amendment will have no impact on flood levels and has been excluded from the subsequent analysis.**
- Reconfigure the approved car parking area to better align the revised packaging plant footprints. **This amendment will have no impact on flood levels and has been excluded from the subsequent analysis.**

In addition to the above modifications, it is also proposed to carry out the following modifications to the approved Packing Plant site:

- A third rail siding is proposed to enable storage of additional rail wagons and enable wagons to be taken offline for maintenance purposes. The level of the line has been taken as the same as the adjacent 2nd line.
- Provide a train tunnel where the noise mitigation walls surrounding the container storage area terminate at the rail line, to provide additional noise attenuation.
- Increase the height of the gantry containing the product transfer lines to the product silos to provide additional clearance above the container reach stacker. **This amendment will have no impact on flood levels and has been excluded from the subsequent analysis.**
- Provide a loader maintenance and cleaning area within the container storage area. **This amendment is within the approved container storage area and will have no impact on flood levels and has been excluded from the subsequent analysis.**

Other Modifications

In addition to the modifications associated with the approved Packing Plant, it is also proposed to undertake the following modifications to the Approved Project.

- Installation of an additional raw waste water tank within the Environmental Farm and located to the north of Bolong Road opposite the former Paper Mill site. This tank will have an effective volume of 3000 KL with dimensions of approximately 20 metres diameter and 12 metres height above ground level.
- Installation of a Nitrogen Generator and Storage Tanks located between the existing ethanol loading bay and the Bolong Road frontage of the site. This facility will comprise a Nitrogen Generator housed within a container type building. Four storage vessels comprising compressed air and mixing tanks will be sited between the Nitrogen Generator and Bolong Road. The Nitrogen that is produced will be stored in six vessels

with a height above ground level of 10 metres adjacent and to the west of the Nitrogen Generator.

- An additional two fermenters number 18 and 19 and relocation of the approved ISO container storage area.
- The relocation of the approved ISO container storage area will necessitate the relocation of 50 car parking spaces in an easterly direction. **This amendment will have no impact on flood levels and has been excluded from the subsequent analysis.**
- Establish an additional Indirect Cooking Facility to be located adjacent to the existing Glucose Plant, to the north of the internal railway and to the south of the Ethanol Distillery. This will comprise a series of vessels housed within a structure that will have a footprint of approximately 184 m² (20.5 m x 9 m) and height of 16.6 metres above ground level. The structure will include a range of processing vessels situated over three floors; and a single product feed tank. **This amendment is located within the Heavily Built-up area (Image 1) and has been excluded from the subsequent analysis (refer Section 4.2.3 for reasoning).**

This present report therefore provides an assessment of the likely flood impacts of the proposed changes compared to the works approved previously.

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 1st July 2015). As the modifications will not involve fill, or subdivision of lands, compliance with these performance criteria has not been addressed.

4.1 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.	No additional workers will be on the site as a result of the proposed works. Approximately 20 workers will be relocated from the existing plant site to the new packing plant 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	A separate structural report on the potential failure of existing buildings and stored equipment and product will be

PERFORMANCE CRITERIA	RESPONSE
structures.	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 taking into account the proposed works.
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 not increase the number of workers from Shoalhaven Starches who may be subject to flood risk as a result of the proposed works.
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. 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.

4.2 Hydraulic Impact Assessment

4.2.1 Overview of Flooding on the Northern Floodplain

Ponding of water in low lying areas on the northern floodplain of the Shoalhaven River occurs following periods of heavy and continuous rain. Some parts of the land are only 1 m above high tide and consequently are frequently inundated. This results from direct rainfall over the area and also from overflow from the creeks which flow through the area. In larger floods, both Abernethy's Drain and Bomaderry Creek will overtop their banks and inundate the area. This would have occurred in March 1978 and the other floods which occurred in the 1970's (August 1974, June 1975 and October 1976) as well as the April 1988 event. According to residents' reports none of these floods overtopped the northern river bank to any significant extent, in the vicinity of the Shoalhaven Starches plant or the former Paper Mill.

The existing and proposed works, since approximately 1990, on the northern floodplain do not increase flood levels in these "small" floods as there is no significant velocity and the area is a very large storage basin. The largest of these events occurred in March 1978 which approximated a 5% AEP flood. For the above reasons, construction of the existing works since 1990, plus the proposed works on the northern floodplain, will not cause any significant increases in flood levels for these events. These are the most frequent events that affect the area, and the above five historical events are typical examples.

However, floods larger than March 1978 will occur and they will overtop the bank, causing a significant inflow of floodwaters to the area. In these larger overtopping floods the proposed and existing works since 1990 on the northern floodplain will have an impact upon flood levels by restricting flow (conveyance) and reducing temporary floodplain storage. These are much rarer events and generally most of the northern floodplain is inundated by up to 3 m depth of water. Some parts of the Shoalhaven Starches plant are already inundated by up to 1.5 m depth of water and consequently the small increase in level caused by the existing and proposed works since 1990 is unlikely to be significant.

Hydraulic modelling of floods is undertaken to assess the impacts on the northern floodplain of all further development within the Shoalhaven Starches plant.

4.2.2 Overview of Hydraulic Modelling

The 1990 Lower Shoalhaven River Flood Study was commissioned by the NSW Government Public Works and determined design flood levels along the river and adjoining floodplain. From approximately the year 2000 to 2010 the hydraulic computer model, termed the CELLS model, established in that study was used by WMAwater, on behalf of Shoalhaven Starches, to evaluate the potential increases in flood level due to further works on the northern floodplain, including expansion of the plant itself and construction of the storage ponds.

The CELLS model of the Shoalhaven River represented the channel and floodplain as a series of interconnected cells, termed either river or floodplain cells. Since 1990 there have been significant advancements in the field of hydraulic modelling using more complex computer software 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 define the topography more accurately and in turn can more accurately represent the hydraulic effects of even a small development on a large floodplain. In 2013, Shoalhaven Starches commissioned WMAwater to update the Shoalhaven River Flood Study to current best practice using the TUFLOW 2D hydraulic modelling software.

2D hydraulic models require detailed survey data and this has only become possible with the advent of what is known as Airborne Laser Scanning survey (ALS) or Light Detecting and Ranging (LIDAR). ALS uses laser technology that is emitted from a plane to define the ground levels (height in mAHD) and co-ordinates of points on the ground or on buildings. ALS cannot penetrate deep water in the Shoalhaven River and a detailed bathymetric survey of the river is therefore also required. Ortho-rectified digital aerial photography is also required in combination with ALS to ensure that buildings and other features on the floodplain are accurately accounted for.

The construction of any works on the floodplain will cause a loss of temporary floodplain storage and a loss of hydraulic conveyance and these are simulated in the hydraulic model. The resulting increase in floodplain will depend upon the magnitude of these losses. However, generally the loss of temporary floodplain storage is of much less importance than the loss of hydraulic conveyance, as the areal extent of the existing and proposed works represents a very small proportion of the approximately 100 km² area of the Shoalhaven River floodplain.

4.2.3 Impact of Flooding within the Heavily Built-up Area of the Plant

Image 1 from Google Maps indicates the extensively built-up area of the plant (within the red polygon). Thus, the flow path of floodwaters from the Shoalhaven River over the riverbank and towards Bolong Road is already significantly impeded by this built up area. The loss of hydraulic conveyance depends on the extent of the restriction to a flowpath caused by the works. Prior to construction of the plant there would have been significant flow through the site during a flood, as there is across any riverbank.

However, since approximately 1960 the ongoing construction of the plant has effectively blocked the flow path through this heavily built-up area of the plant 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 B. In summary an agreement was reached that any future development within the intensively built-up area, as indicated on Image 2 (copy of Figure 2 taken from our October 2000 report) would not require hydraulic modelling to quantify the hydraulic impacts of any future development. The main reasons being that:

- any additional plant within this area would provide minimal additional reduction in conveyance or temporary floodplain storage due to the limited space available;
- roads and pathways act as flowpaths and will always be required within this area, thus there is a limit on the extent of possible restriction to these flow paths;
- hydraulic modelling is unable to accurately assess the hydraulic impacts of pipe networks and plant which currently exist in this area, thus the impact of additional similar works also cannot be accurately quantified.

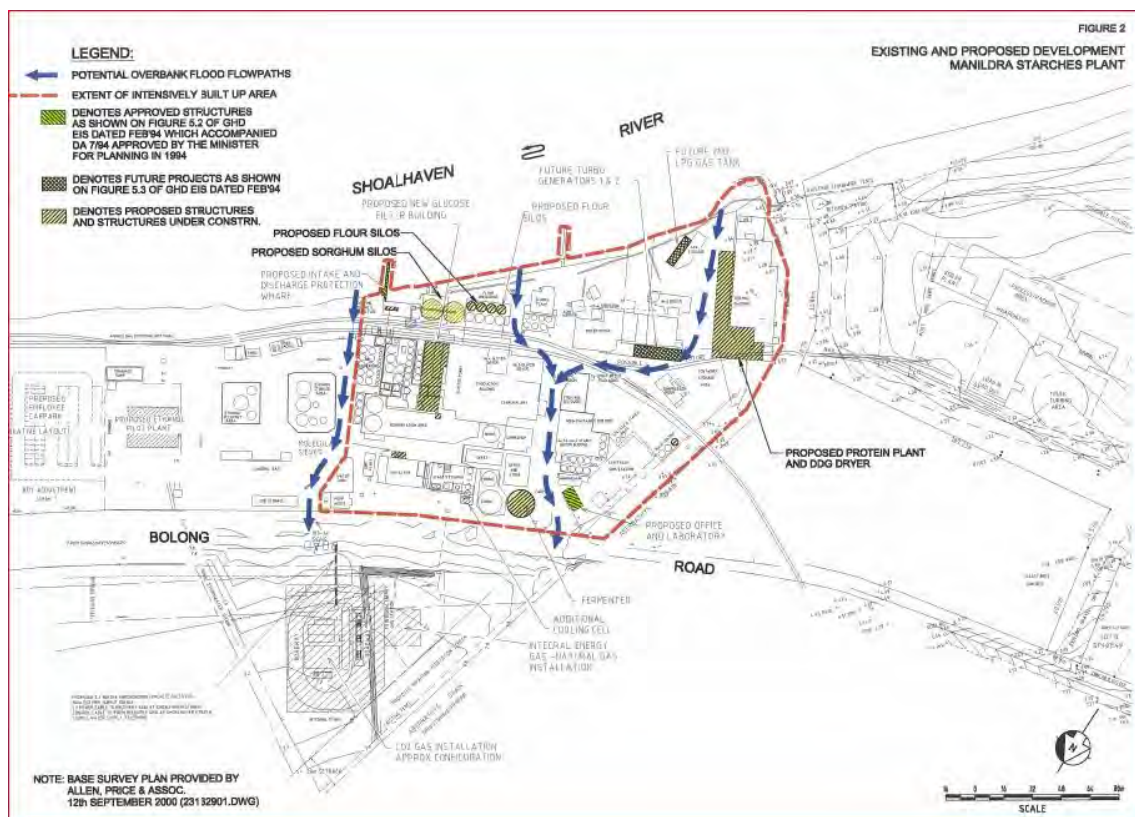


Image 2 – Google Map showing the Heavily Built-up Area of the Plant

4.2.4 Results from TUFLOW Hydraulic Modelling

The proposed works shown in Figure 2 (in detail in Appendix A) and described in Section 3 were included in the TUFLOW hydraulic model. A comparison of peak flood levels between the approved and proposed works for the 1% AEP event is provided on Figure 3 as an impact map (i.e the change in the 1% AEP flood level due to the proposed works). The results on Figure 3 indicate that the maximum increase in 1% AEP flood level outside the Shoalhaven Starches plant is up to 0.05m at the rail crossing of Bolong Road with increases in flood level generally limited to within the Shoalhaven Starches plant.

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 black ink, appearing to read "R W Dewar", enclosed within a light grey rectangular box.

R W Dewar
Director

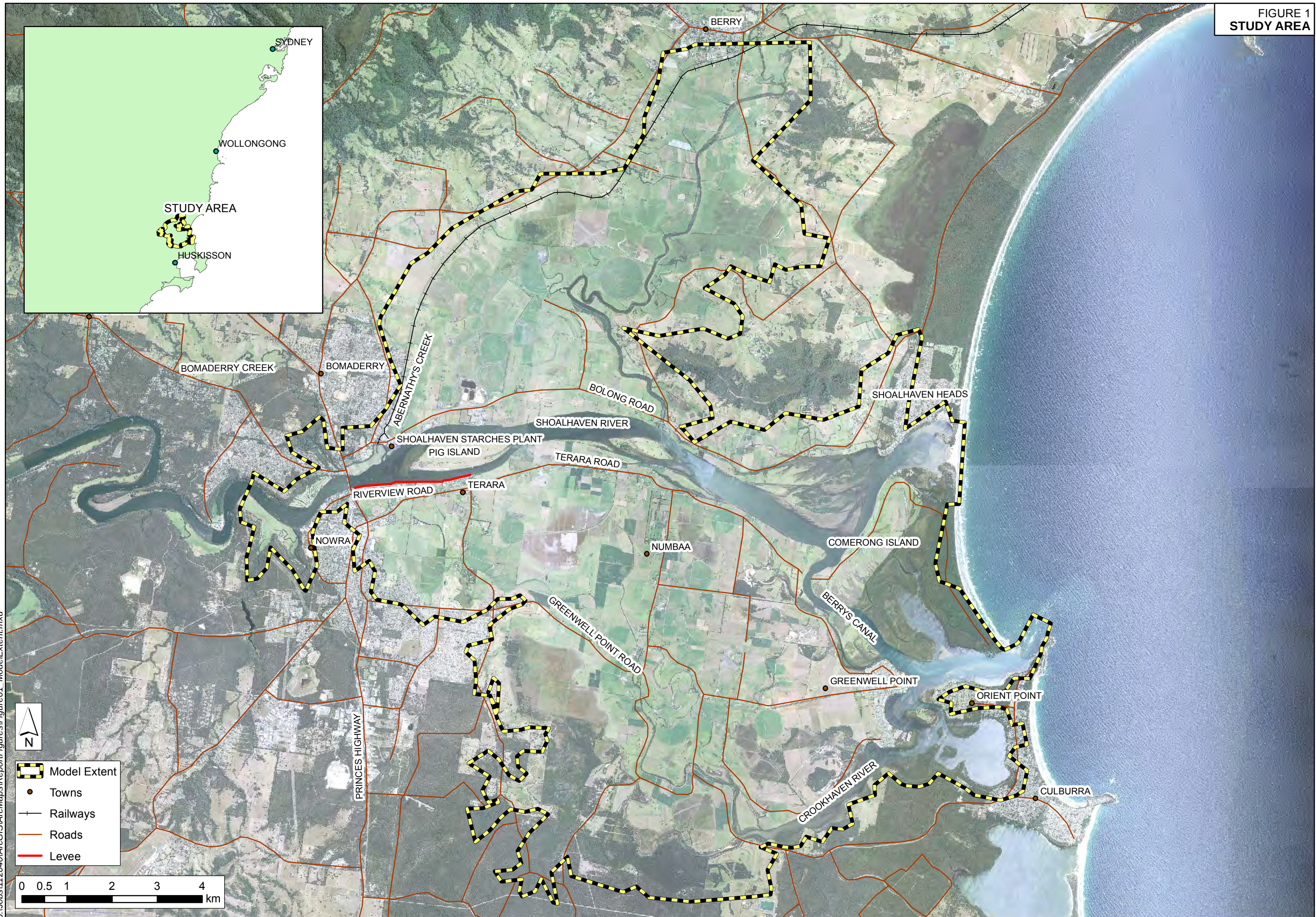
LIST OF FIGURES

- Figure 1: Study Area
- Figure 2: Proposed Works
- Figure 3: Peak Flood Level Impact – 1% AEP Flood



Figures

FIGURE 1
STUDY AREA



EXISTING APPROVED PLANT, MOD 21.
APPROVED PLANT YET TO BE CONSTRUCTED.

FIGURE 2A
PROPOSED WORKS

PACKER ADDITIONS
 MN7323-002

PROPOSED BUFFER TANK
 SEE DRAWING MN6851-001

POND 5

POND 6

BOLONG ROAD

PAPER MILL SITE

SHOALHAVEN RIVER

MANILDRAS

MANILDRAS COMPLEX

10.5M SETBACK

3x5 TO BOUNDARY

MANILDRAS SHOALHAVEN STORAGE PTY LTD
MANILDRAS PLANT
BUFFER TANK ADDITION, MOD 21
OVER ALL SITE PLAN, MOD 21

FIGURE 2A
PROPOSED WORKS

PROPOSED
BUFFER TANK
SEE DRAWING
MN685T-001

1.5m
SETBACK

365 To
EQU DEPT

PACKER
ADDITIONS
MN7323-DD2

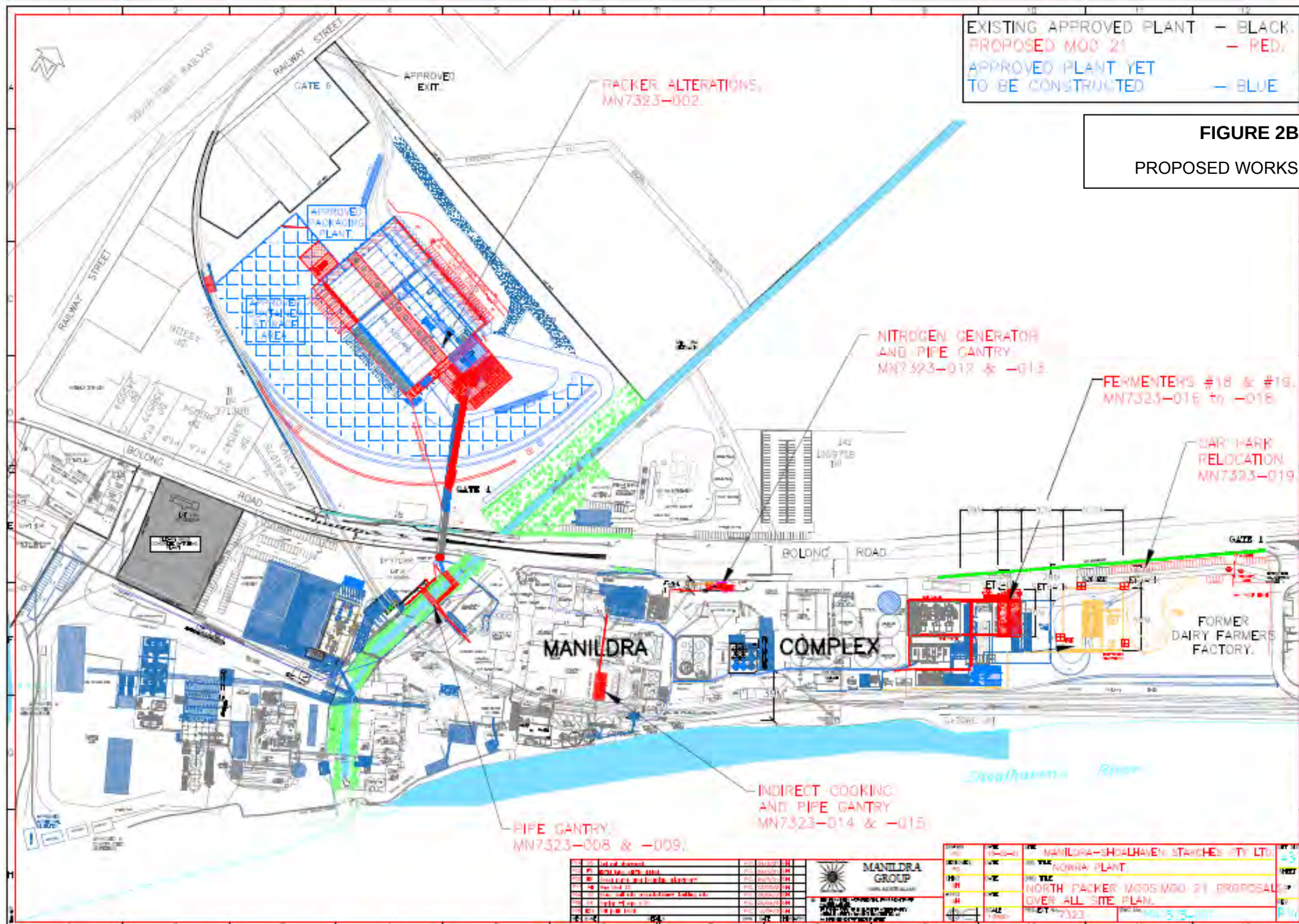
MANILDRA
COMPLEX.

BOLONG ROAD

PAPER MILL
SITE.

1.10	all	new milk 2%
1.11	all	extra milk at post-harvest
1.12	all	Post-harvest = 100% milk = 100%
1.13	all	new milk 2%
1.14	all	100% milk = 100%
1.15	all	100% milk = 100%
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2.12	all	100% milk = 100%

[illegible]



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FIGURE 3



Appendix A: Plans of Proposed Works

Appendix A

EXISTING APPROVED PLANT.
MOD 21.
APPROVED PLANT YET
TO BE CONSTRUCTED.

PACKER
ADDITIONS
MN7323-002.

PROPOSED
BUFFER TANK
SEE DRAWING
MN6851-001.

MANILDRA
COMPLEX.

SHOALHAVEN
RIVER

PAPER MILL
SITE.

BOLONG ROAD

HANIGANS
LANE

POND 6

BVF

app. irrigation.

185M
SETBACK.

385M TO
BOUNDARY.

REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
P09	All	Was MOD 21.	P.C.	05-5-21	BH	
P08	All	Noise wall at packer amended.	P.C.	26-4-21	GH	
P07	All	Fermenters & car park ratio added.	P.C.	12-4-21	BH	
P06	All	Now MOD 22.	P.C.	18-3-21	JS	
P05	All	MOD 21 wording, setbacks & packing plant additions added.	P.C.	10-2-21	JS	
P04	CNO	BVF was pond 7.	P.C.	08-2-21	JS	
P03	A.L.L.	Rail extension & other additions removed.	P.C.	08-12-20	BH	

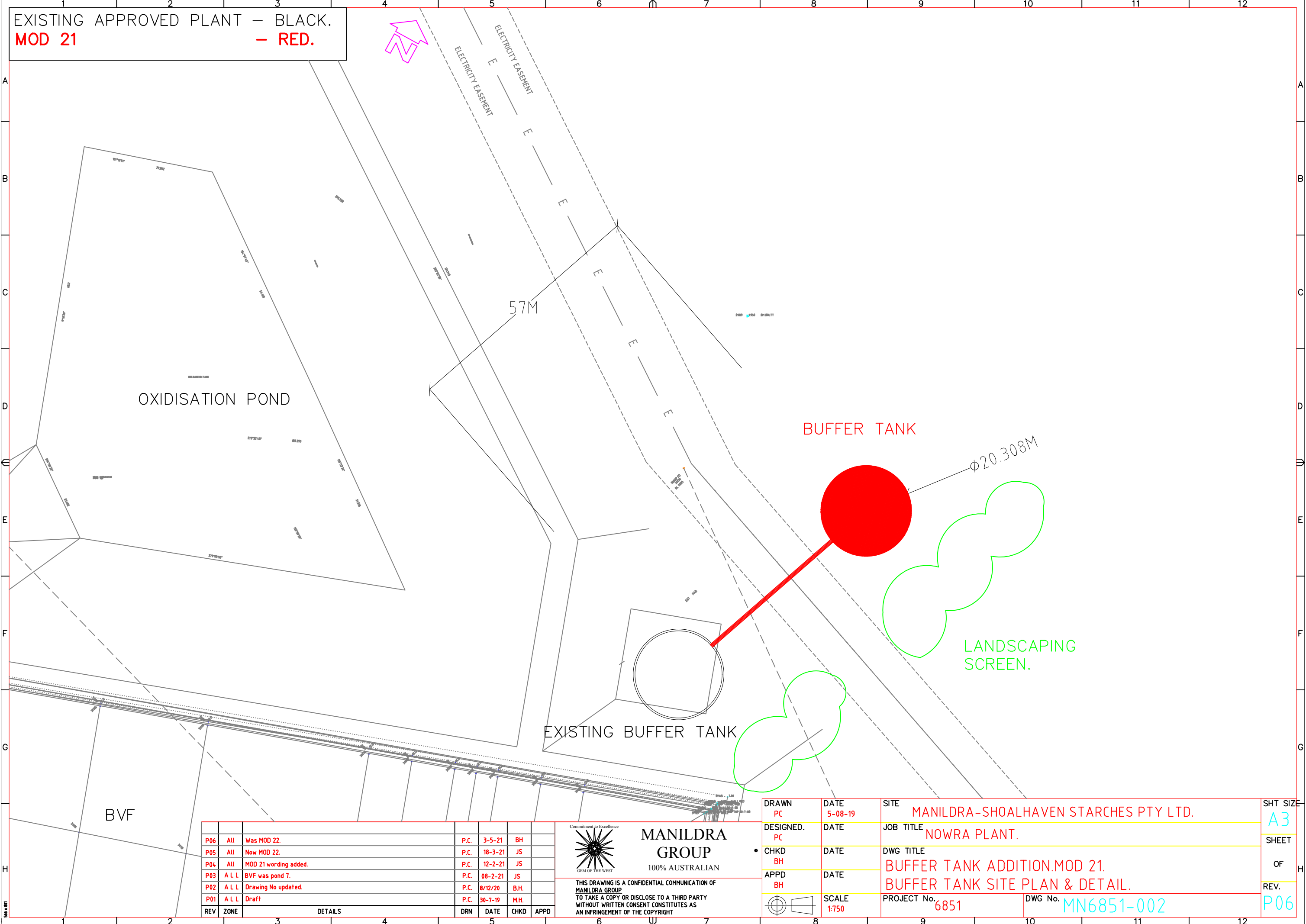


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DRAWN PC	DATE 5-08-19	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD.	SHT SIZE A3
DESIGNED. PC	DATE	JOB TITLE NOWRA PLANT.	SHEET OF
CHKD BH	DATE	DWG TITLE BUFFER TANK ADDITION.MOD 21.	REV. P09
APPD BH	DATE	PROJECT No. 6851	
SCALE 1:7500		DWG No. MN6851-001	

EXISTING APPROVED PLANT — BLACK.
MOD 21 — RED.



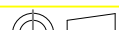
P06	All	Was MOD 22.	P.C.	3-5-21	BH	
P05	All	Now MOD 22.	P.C.	18-3-21	JS	
P04	All	MOD 21 wording added.	P.C.	12-2-21	JS	
P03	A L L	BVF was pond 7.	P.C.	08-2-21	JS	
P02	A L L	Drawing No updated.	P.C.	8/12/20	B.H.	
P01	A L L	Draft	P.C.	30-7-19	M.H.	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD

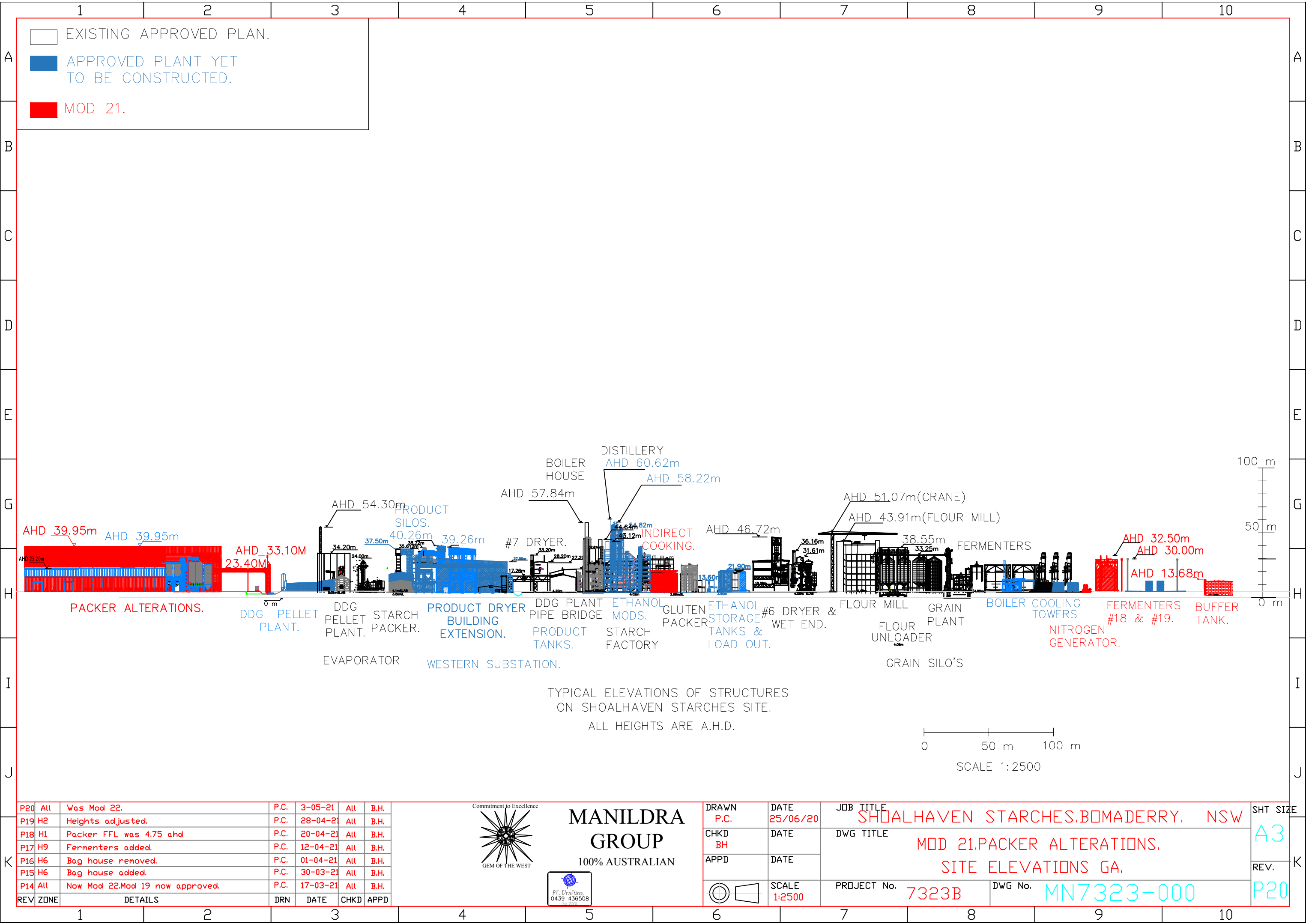


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DRAWN PC	DATE 5-08-19	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD.	SHT SIZE A3
DESIGNED. PC	DATE	JOB TITLE NOWRA PLANT.	SHEET
CHKD BH	DATE	DWG TITLE BUFFER TANK ADDITION.MOD 21.	OF
APPD BH	DATE	BUFFER TANK SITE PLAN & DETAIL.	REV.
SCALE 1:750	PROJECT No. 6851	DWG No. MN6851-002	P06

DRAWN PC	DATE 5-08-19	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD.		SHT SIZE A3
DESIGNED. PC	DATE	JOB TITLE NOWRA PLANT.		SHEET
• CHKD BH	DATE	DWG TITLE BUFFER TANK ADDITION.MOD 21.		OF
APPD BH	DATE	BUFFER TANK DETAIL.		REV.
	SCALE 1:200	PROJECT No. 6828	DWG No. MN6851-003	P04



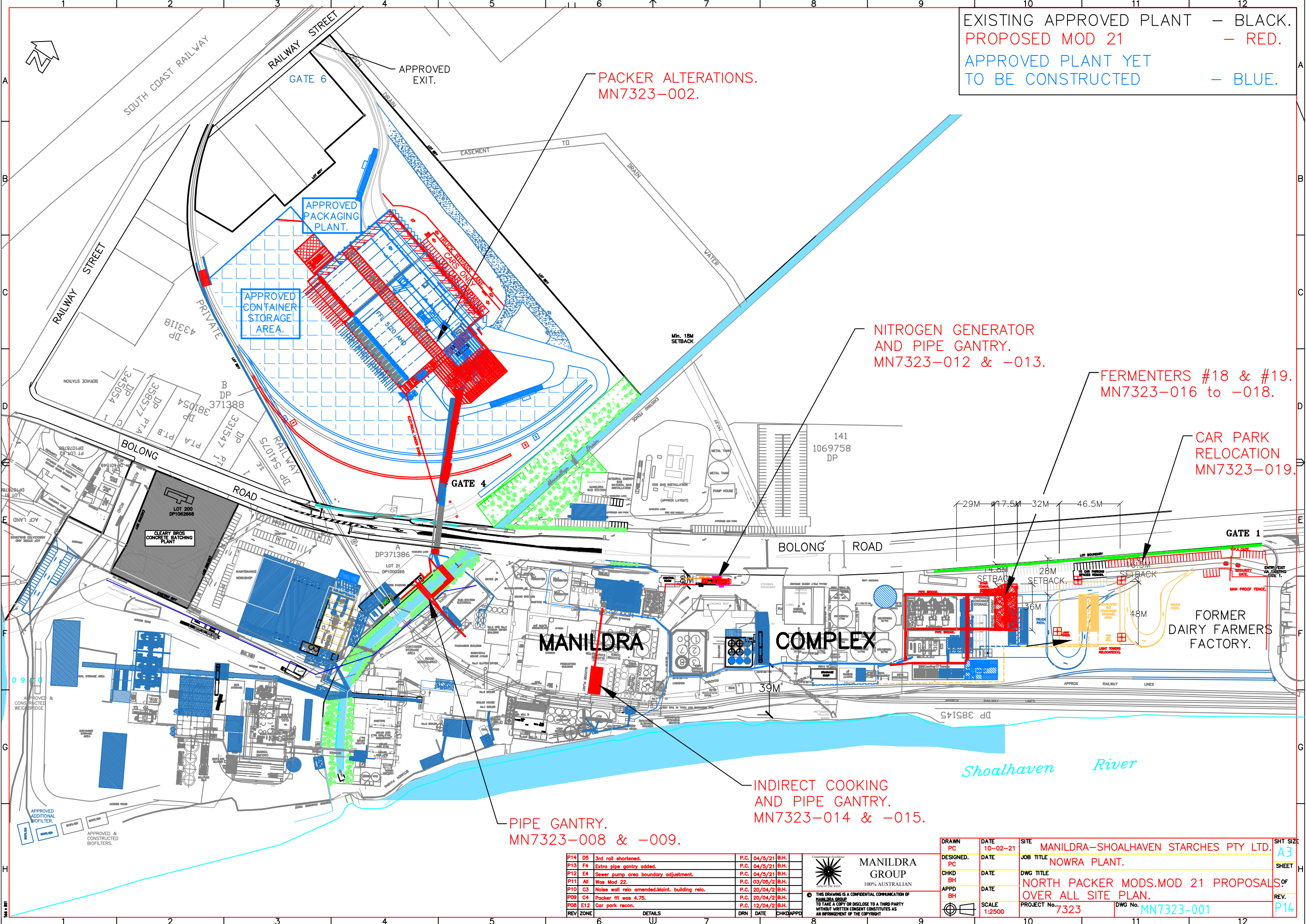
P20	All	Was Mod 22.	P.C.	3-05-21	All	B.H.
P19	H2	Heights adjusted.	P.C.	28-04-21	All	B.H.
P18	H1	Packer FFL was 4.75 ahd	P.C.	20-04-21	All	B.H.
P17	H9	Fermenters added.	P.C.	12-04-21	All	B.H.
P16	H6	Bag house removed.	P.C.	01-04-21	All	B.H.
P15	H6	Bag house added.	P.C.	30-03-21	All	B.H.
P14	All	Now Mod 22.Mod 19 now approved.	P.C.	17-03-21	All	B.H.
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



MANILDRA GROUP
100% AUSTRALIAN



DRAWN	DATE	JOB TITLE	SHT SIZE
P.C.	25/06/20	SHOALHAVEN STARCHES.BOMADERRY, NSW	A3
CHKD	DATE	DWG TITLE	REV.
BH		MOD 21.PACKER ALTERATIONS, SITE ELEVATIONS GA.	
APPD	DATE	PROJECT No. 7323B	
	SCALE 1:2500	DWG No. MN7323-000	P20



EXISTING APPROVED PLANT — BLACK.
PROPOSED MOD 21 — RED.
APPROVED PLANT YET TO BE CONSTRUCTED — BLUE.

PACKER ALTERATIONS.
MN7323-002.

NITROGEN GENERATOR
AND PIPE GANTRY.
MN7323-012 & -013.

FERMENTERS #18 & #19.
MN7323-016 to -018.

CAR PARK
RELOCATION
MN7323-019.

MANILDRA COMPLEX

INDIRECT COOKING
AND PIPE GANTRY.
MN7323-014 & -015.

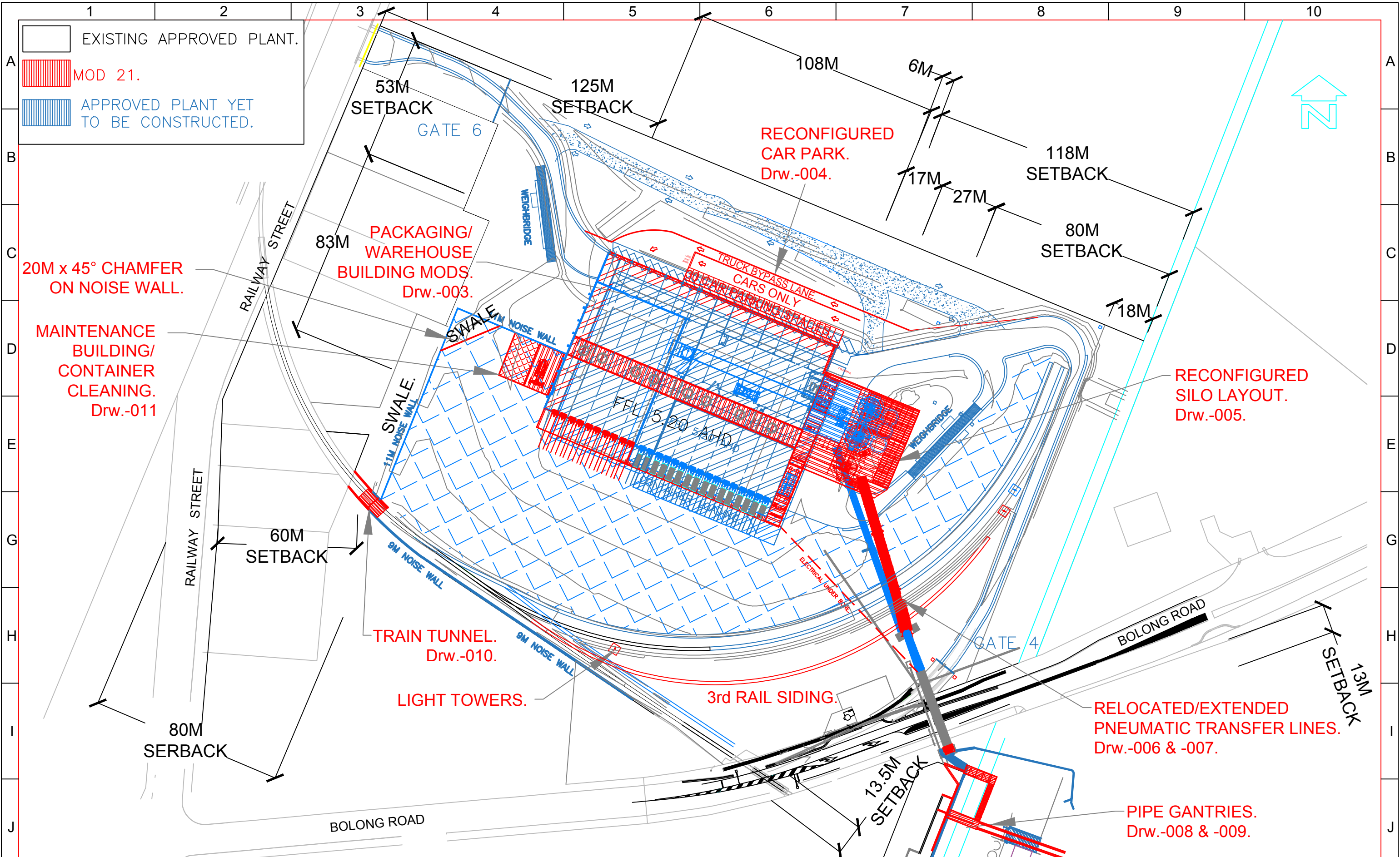
PIPE GANTRY.
MN7323-008 & -009.

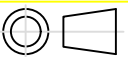
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
P14	D5	3rd rail shortened.	P.C.	04/5/21	B.H.	
P13	F4	Extra pipe gantry added.	P.C.	04/5/21	B.H.	
P12	E4	Sewer pump area boundary adjustment.	P.C.	04/5/21	B.H.	
P11	A1	Was Mod 22.	P.C.	03/05/21	B.H.	
P10	C3	Noise wall reo amended.Maint. building reo.	P.C.	20/04/21	B.H.	
P09	C4	Packer rfi was 4.75.	P.C.	20/04/21	B.H.	
P08	E12	Car park recon.	P.C.	12/04/21	B.H.	

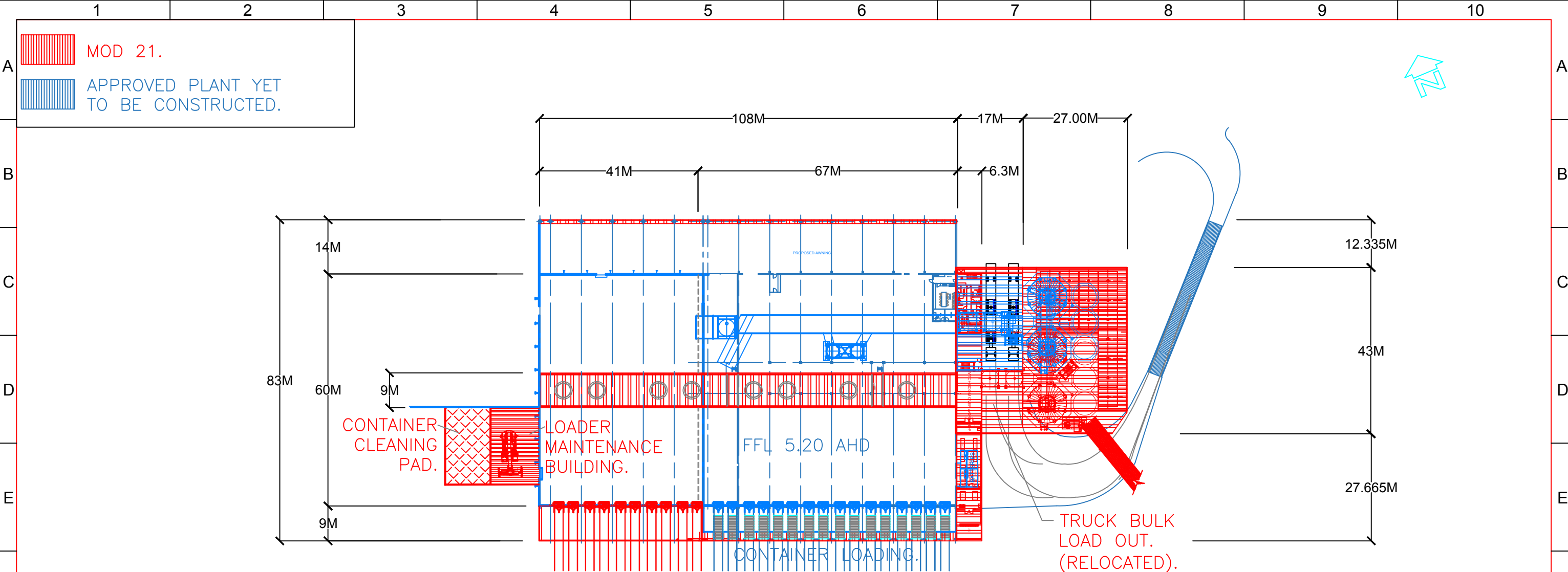
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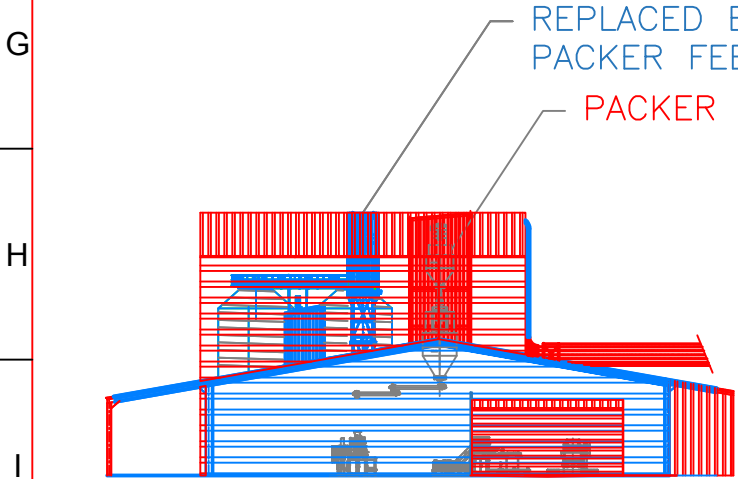
DRAWN PC	DATE 10-02-21	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD.	SHT SIZE A3
DESIGNED PC	DATE	JOB TITLE NOWRA PLANT.	SHEET
CHKD BH	DATE	DWG TITLE NORTH PACKER MODS.MOD 21 PROPOSALS	OF
APPD BH	DATE	PROJECT No. 7323	REV. P14
SCALE 1:2500		DWG No. MN7323-001	



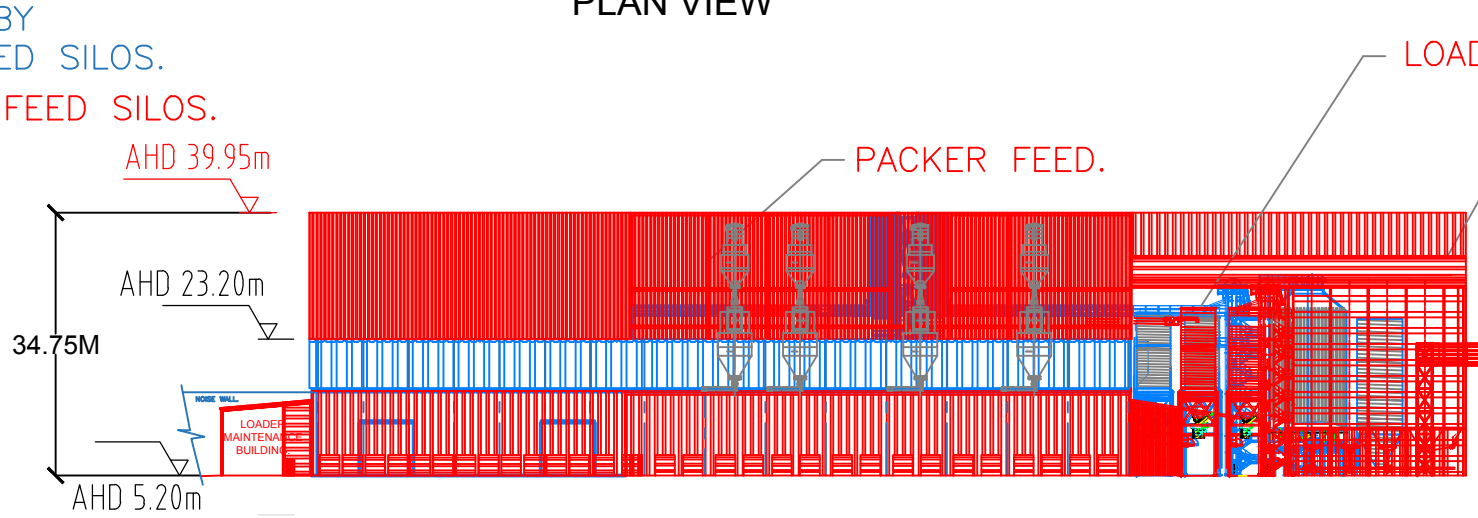
K	P16	G8	3rd rail shortened.	P.C.	04/5/21	G.M.	Commitment to Excellence  GEM OF THE WEST MANILDRA GROUP 100% AUSTRALIAN 	P.C.		SHOALHAVEN STARCHES.		SHT SIZE							
	P15	J8	Extra pipe gantry added.	P.C.	04/5/21	B.H.		CHKD	DATE	DWG TITLE	A3								
	P14	I7	Sewer pump area boundary adjustment.	P.C.	04/5/21	B.H.		GM	10/02/21										
	P13	ALL	Was Mod 22.	P.C.	03/5/21	B.H.		APPD	DATE	NORTH PACKER MOD 21. SITE PLAN .	REV.								
	P12	ALL	Proposed wall relo deleted,wall chamfer added.Maint. build relo.	P.C.	22/4/21	B.H.													
	P11	ALL	Finished floor level was 4.75 AHD.	P.C.	20/4/21	B.H.			SCALE	PROJECT No.	DWG No.	P16							
	P10	ALL	Car park reconfigured.Now Mod 22.	P.C.	17/3/21	B.H.		1:1500	7117WAE	MN7323-002									
	REV	ZONE	DETAILS	DRN	DATE	CHKD		APPD											
1		2		3		4		5		6		7		8		9		10	



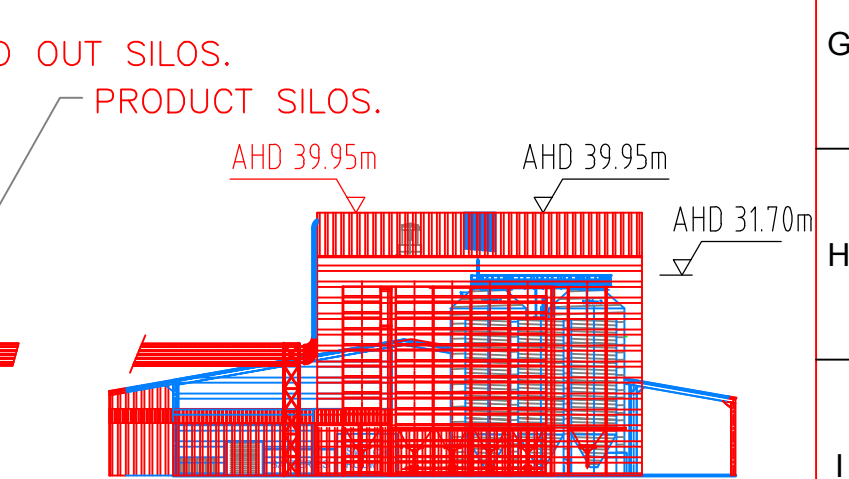
PLAN VIEW



WESTERN ELEVATION



SOUTHERN ELEVATION



EASTERN ELEVATION

P12

ALL

Was Mod 22.

P11

ALL

Maintenance building added to this drawing.

P10

ALL

Finished floor level was 4.75 AHD.

PO9

ALL

Was Mod 21.

PO8

ALL

FFL 4.75 AHD added.

PO7

ALL

Silos shown.

PO6

ALL

Now Mod 21.

REV

ZONE

DETAILS

P.C.

03/5/21

B.H.

P.C.

26/4/21

B.H.

P.C.

20/4/21

B.H.

P.C.

17/3/21

B.H.

P.C.

19/2/21

B.H.

P.C.

16/2/21

B.H.

P.C.

10/2/21

B.H.

DRN

DATE

CHKD

APPD

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2020

P.C.

CHKD

GM

APPD

DATE

25/08/20

DATE

SCALE

1:1000



SHOALHAVEN STARCHES.

NORTH PACKER MOD 21.

PACKAGING/WAREHOUSE BUILDING.

PROJECT No.

7117WAE

DWG No.

MN7323-003

REV.

P12

SHT SIZE

A3

1

2

3

4

5

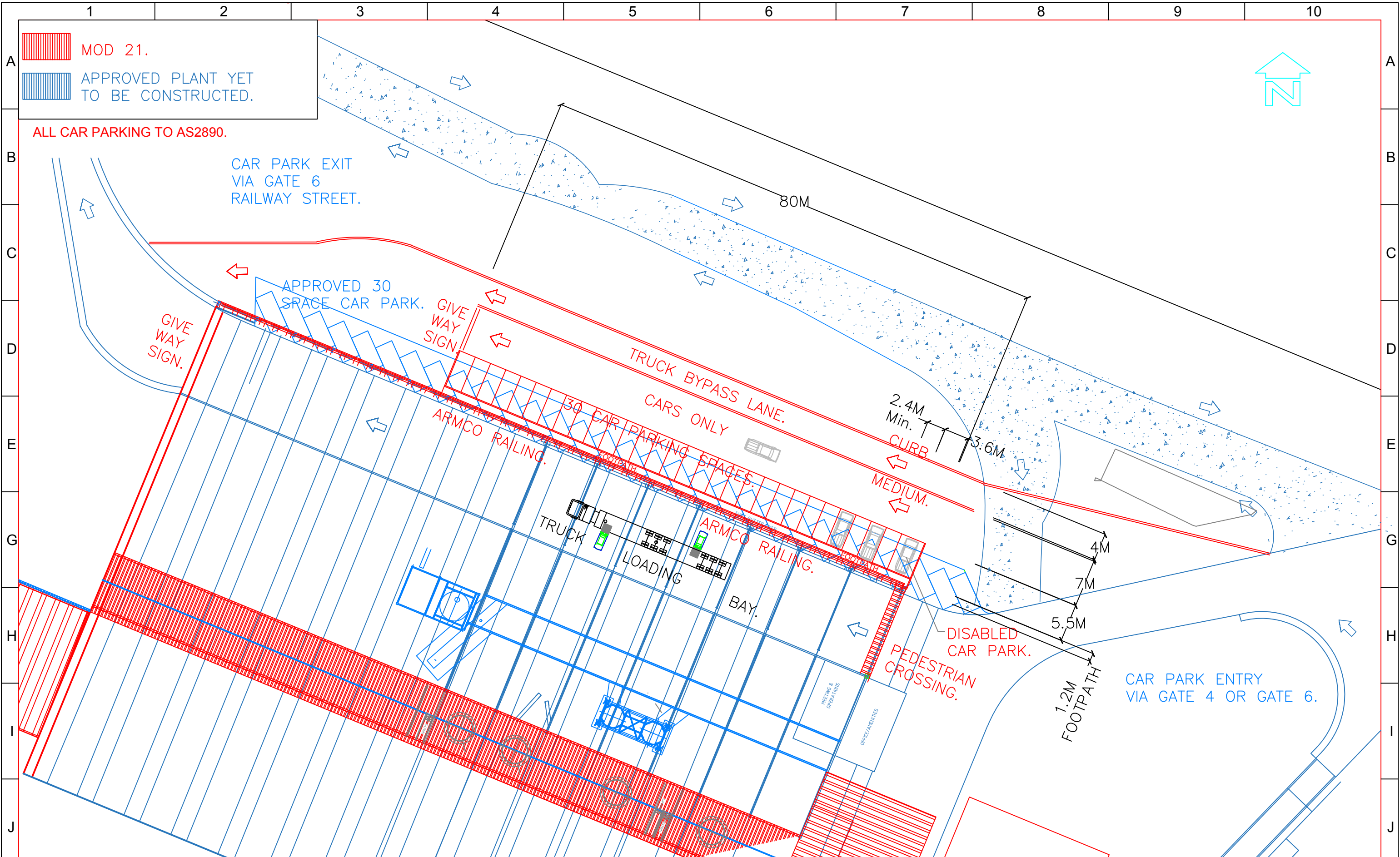
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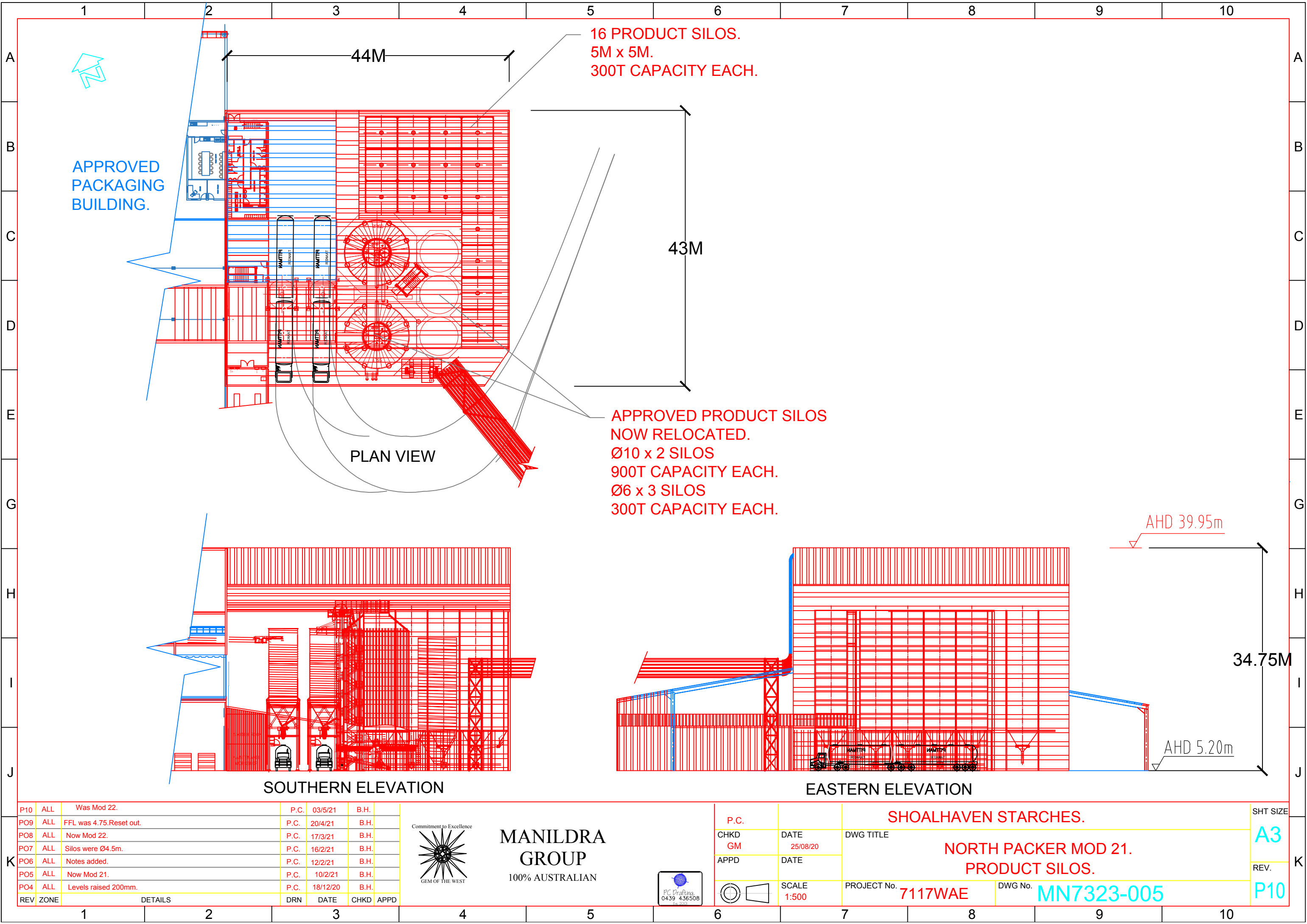
8

9

10



K	P10	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	Commitment to Excellence  MANILDRA GROUP 100% AUSTRALIAN 	P.C.		SHOALHAVEN STARCHES.				SHT SIZE
	PO9	ALL	Car park reconfigured.Was Mod 21.	P.C.	17/3/21	KRIS		CHKD	DATE	NORTH PACKER MOD 21.				A3
	PO8	ALL	Dimensions added.	P.C.	19/2/21	SR		GM	25/08/20	RECONFIGURED CAR PARK SITE PLAN.				REV.
	PO7	ALL	2nd Car park exit removed.	P.C.	16/2/21	B.H.		APPD	DATE					
	PO6	ALL	Dimensions,notes & exit added.	P.C.	12/2/21	B.H.				SCALE		PROJECT No.		
	PO5	ALL	Now Mod 21.	P.C.	10/2/21	B.H.				1:500		7117WAE		
	PO4	ALL	Replaced app were green.	P.C.	9/2/21	B.H.				DWG No.		MN7323-004		
REV	ZONE	DETAILS		DRN	DATE	CHKD	APPD							
		1	2	3		4	5	6	7	8	9	10		



P10	ALL	Was Mod 22.	P.C.	03/5/21	B.H.
PO9	ALL	FFL was 4.75.Reset out.	P.C.	20/4/21	B.H.
PO8	ALL	Now Mod 22.	P.C.	17/3/21	B.H.
PO7	ALL	Silos were Ø4.5m.	P.C.	16/2/21	B.H.
PO6	ALL	Notes added.	P.C.	12/2/21	B.H.
PO5	ALL	Now Mod 21.	P.C.	10/2/21	B.H.
PO4	ALL	Levels raised 200mm.	P.C.	18/12/20	B.H.
REV	ZONE	DETAILS	DRN	DATE	CHKD APPD

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P.C.

CHKD GM

APPD

DATE 25/08/20

DATE

SCALE 1:500

SHOALHAVEN STARCHES.

NORTH PACKER MOD 21.

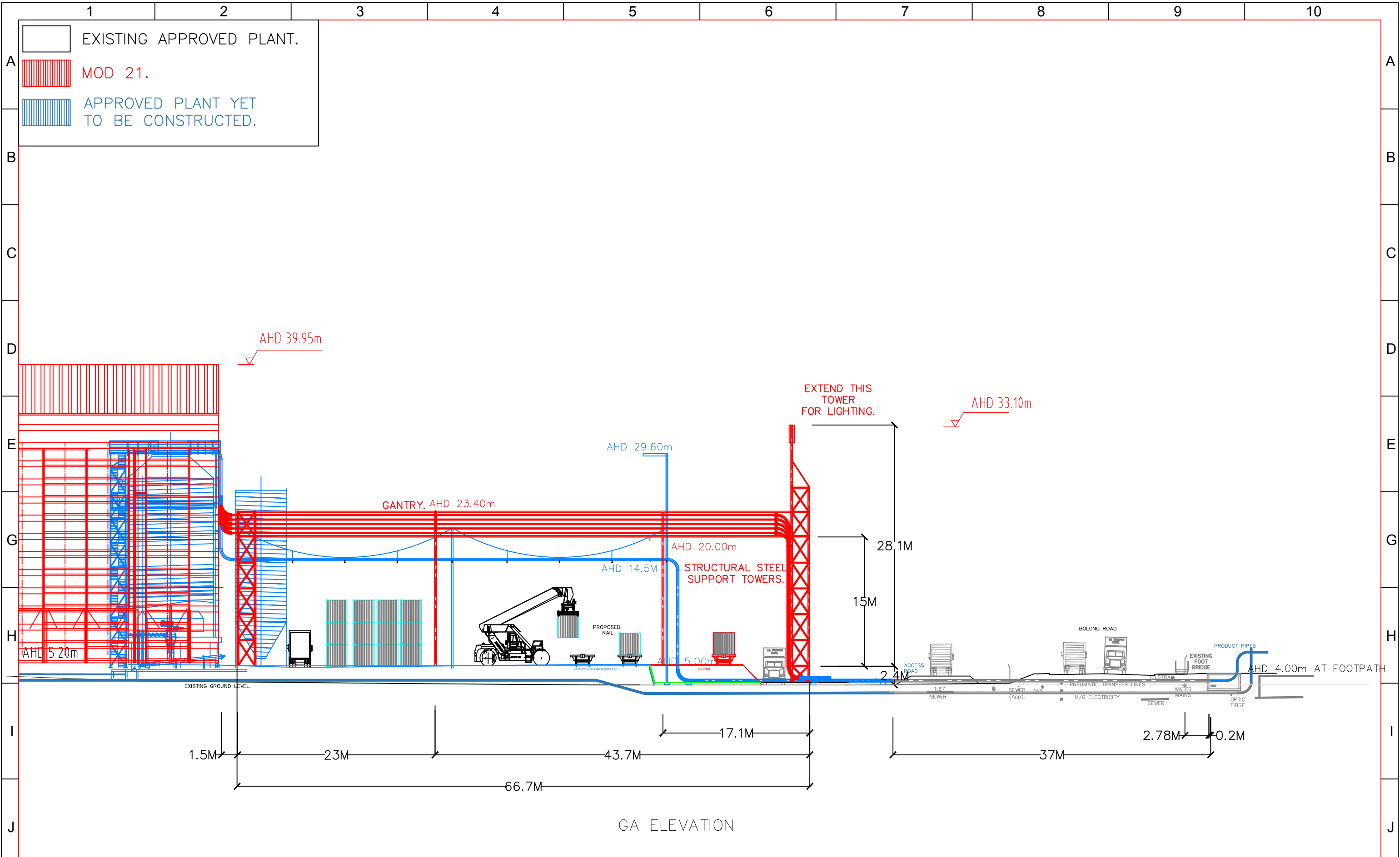
PRODUCT SILOS.

PROJECT No. 7117WAE

DWG No. MN7323-005

SHT SIZE A3

REV. P10



GA ELEVATION

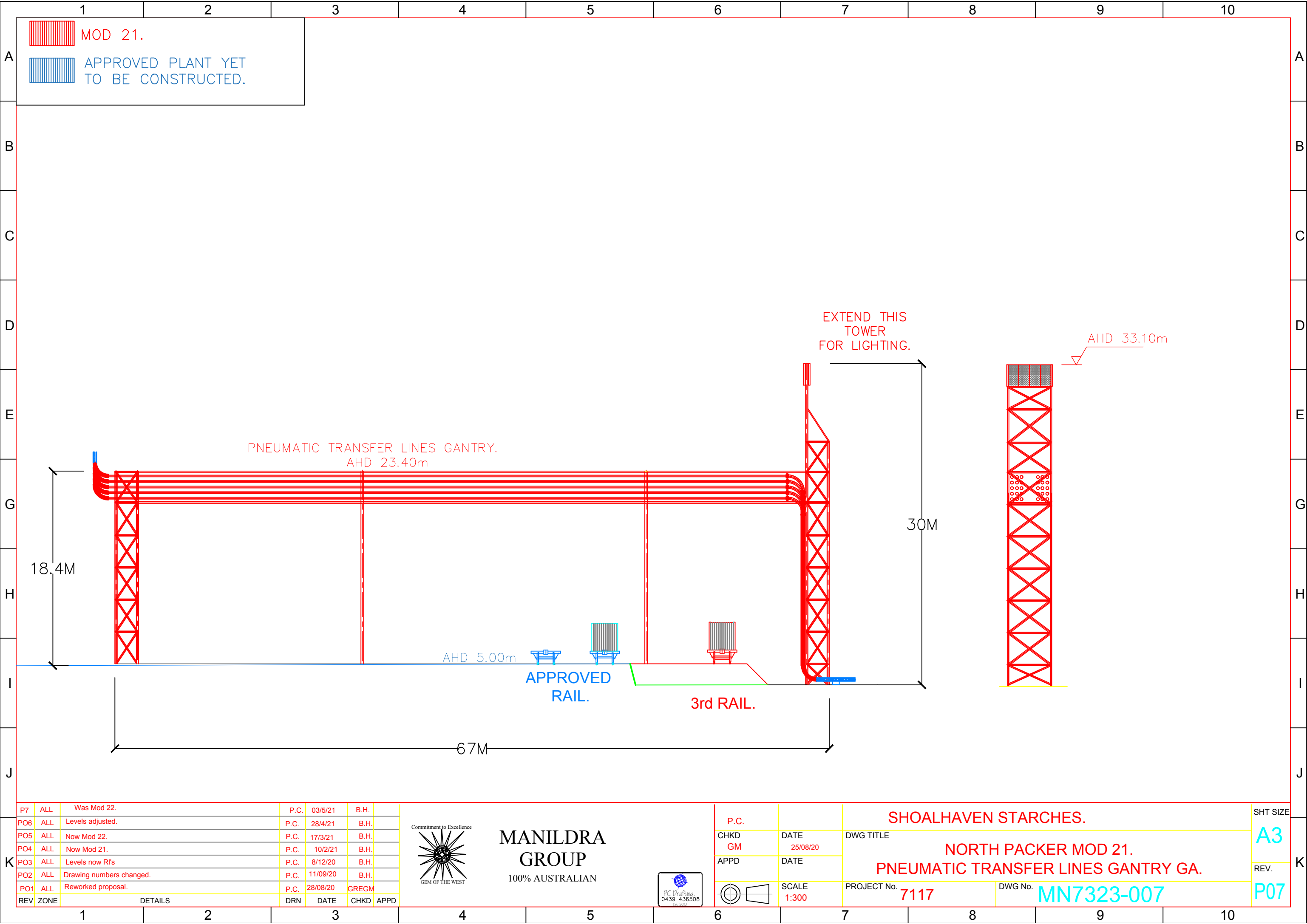
P10	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
P09	ALL	Levels adjusted.	P.C.	28/4/21	B.H.	
P08	ALL	ALPacker FFL was 4.75.Reset out.	P.C.	20/4/21	B.H.	
P07	ALL	Now Mod 22.	P.C.	17/3/21	B.H.	
P06	ALL	Now Mod 21.	P.C.	10/2/21	B.H.	
P05	ALL	Replaced app were green.	P.C.	9/2/21	B.H.	
P04	ALL	Levels raised 200mm.	P.C.	18/12/20	B.H.	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



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P.C.		SHOALHAVEN STARCHES.		SHT SIZE
CHKD	DATE	DWG TITLE		A3
GM	25/08/20	NORTH PACKER MOD 21.		REV.
APPD	DATE	PNEUMATIC TRANSFER LINES GANTRY.		P10
	SCALE	PROJECT No.	DWG No.	
	1:400	7117	MN7323-006	



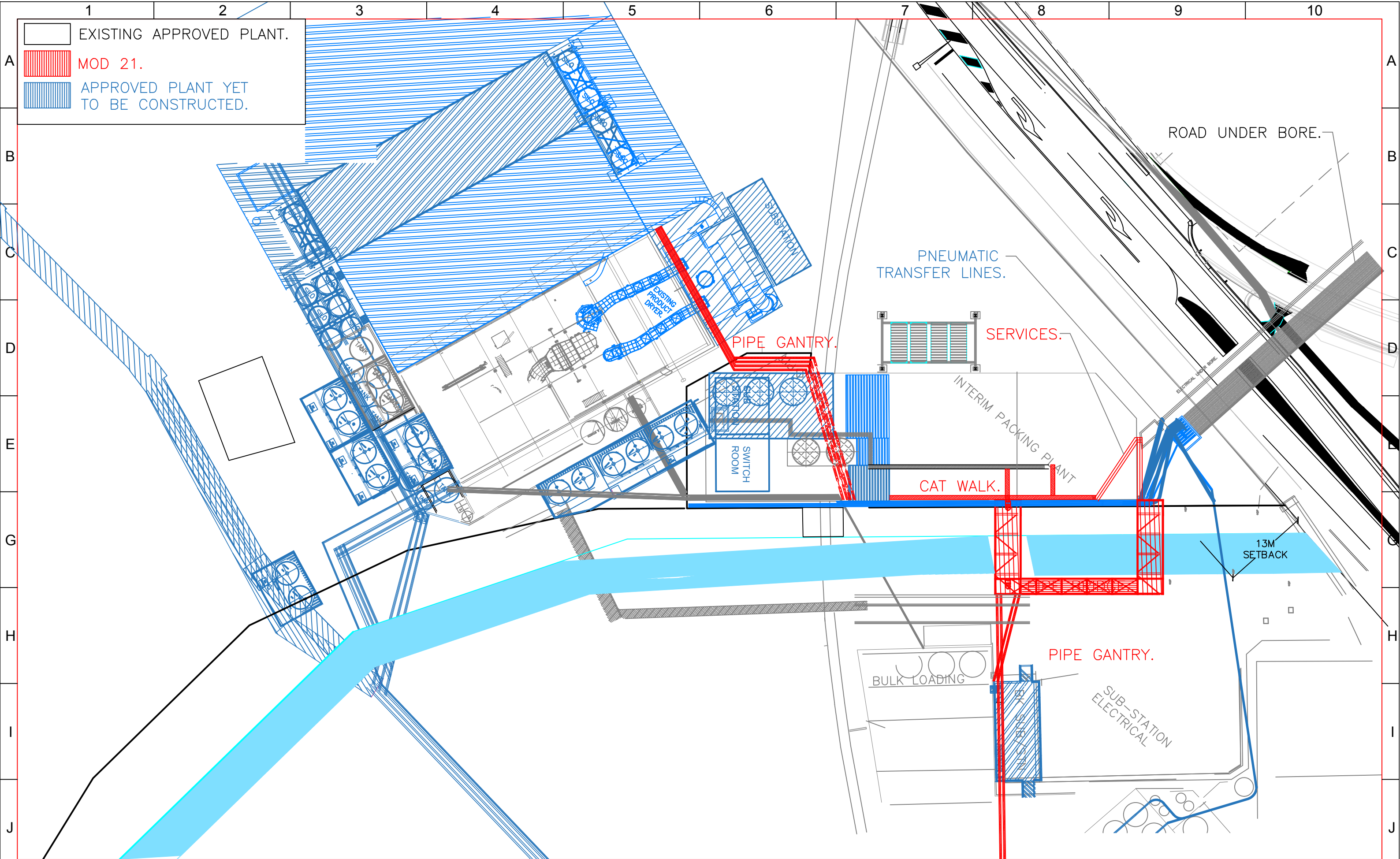
P7	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
PO6	ALL	Levels adjusted.	P.C.	28/4/21	B.H.	
PO5	ALL	Now Mod 22.	P.C.	17/3/21	B.H.	
PO4	ALL	Now Mod 21.	P.C.	10/2/21	B.H.	
PO3	ALL	Levels now RI's	P.C.	8/12/20	B.H.	
PO2	ALL	Drawing numbers changed.	P.C.	11/09/20	B.H.	
PO1	ALL	Reworked proposal.	P.C.	28/08/20	GREGM	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



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P.C.		SHOALHAVEN STARCHES.		SHT SIZE
CHKD	GM	DATE	25/08/20	A3
APPD		DATE		
		SCALE	1:300	REV.
		PROJECT No.	7117	P07
		DWG No.	MN7323-007	



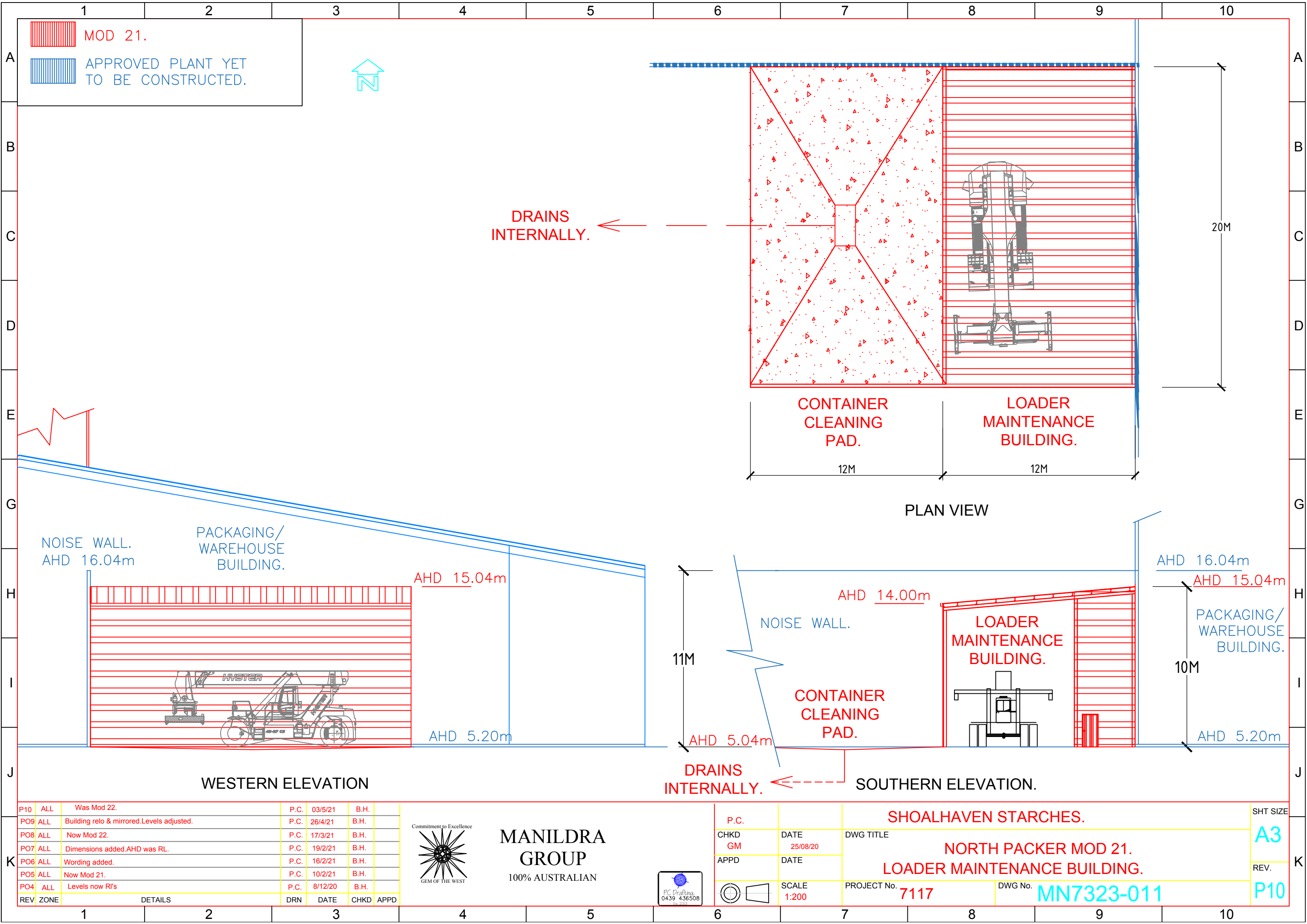
P10	ALL	Extra pipe bridge added.	P.C.	04/5/21	B.H.	
PO9	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
PO8	ALL	Was Mod 21.Mod 19 now approved.	P.C.	17/3/21	B.H.	
PO7	ALL	Noting added.	P.C.	16/2/21	B.H.	
PO6	ALL	Pneumatic transfer lines noting added.	P.C.	12/2/21	B.H.	
PO5	ALL	Now Mod 21.	P.C.	10/2/21	B.H.	
PO4	ALL	Tanks as per mod 19.	P.C.	8/2/21	JS	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



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P.C.	DATE	SHOALHAVEN STARCHES.		SHT SIZE
CHKD GM	25/08/20	NORTH PACKER MOD 21. PIPE GANTRIES SITE PLAN.		A3
APPD	DATE			REV.
SCALE 1:500	PROJECT No. 7117	DWG No. MN7323-009		P10



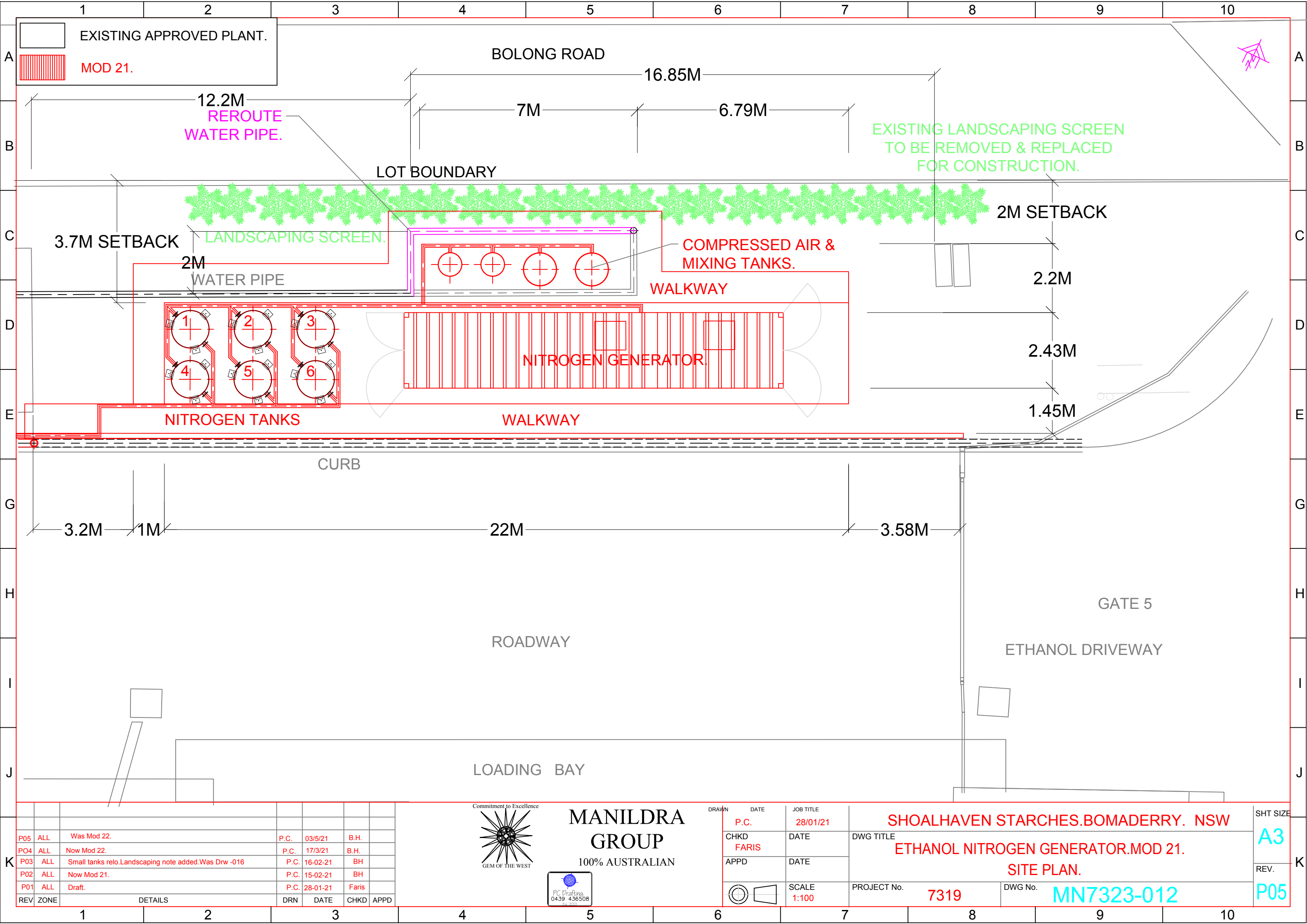
P10	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
PO9	ALL	Building relo & mirrored.Levels adjusted.	P.C.	26/4/21	B.H.	
PO8	ALL	Now Mod 22.	P.C.	17/3/21	B.H.	
PO7	ALL	Dimensions added.AHD was RL.	P.C.	19/2/21	B.H.	
PO6	ALL	Wording added.	P.C.	16/2/21	B.H.	
PO5	ALL	Now Mod 21.	P.C.	10/2/21	B.H.	
PO4	ALL	Levels now RI's	P.C.	8/12/20	B.H.	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



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P.C.	DATE	SHOALHAVEN STARCHES.		SHT SIZE
CHKD GM	25/08/20	DWG TITLE		A3
APPD	DATE	NORTH PACKER MOD 21.		REV.
		LOADER MAINTENANCE BUILDING.		P10
	SCALE 1:200	PROJECT No. 7117	DWG No. MN7323-011	



EXISTING APPROVED PLANT.

MOD 21.

REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
P05	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
PO4	ALL	Now Mod 22.	P.C.	17/3/21	B.H.	
P03	ALL	Small tanks relo.Landscaping note added.Was Drw -016	P.C.	16-02-21	BH	
P02	ALL	Now Mod 21.	P.C.	15-02-21	BH	
P01	ALL	Draft.	P.C.	28-01-21	Faris	

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Est. 2002

DRAWN

DATE

JOB TITLE

P.C.

28/01/21

CHKD

DATE

DWG TITLE

FARIS

SHOALHAVEN STARCHES.BOMADERRY. NSW

APPD

DATE

PROJECT No.

7319

SCALE

DWG No.

1:100

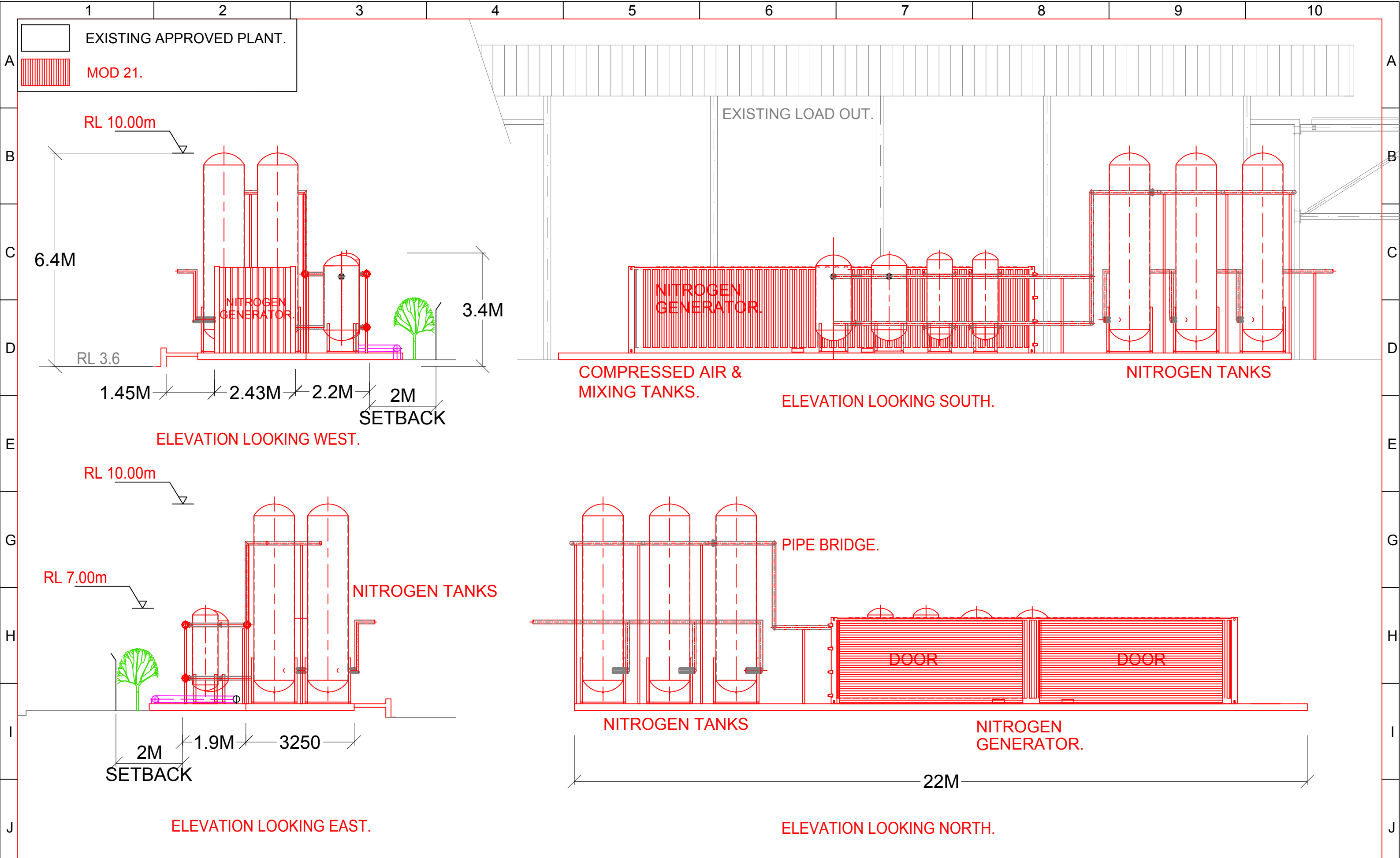
MN7323-012

SHT SIZE

REV.

A3

P05



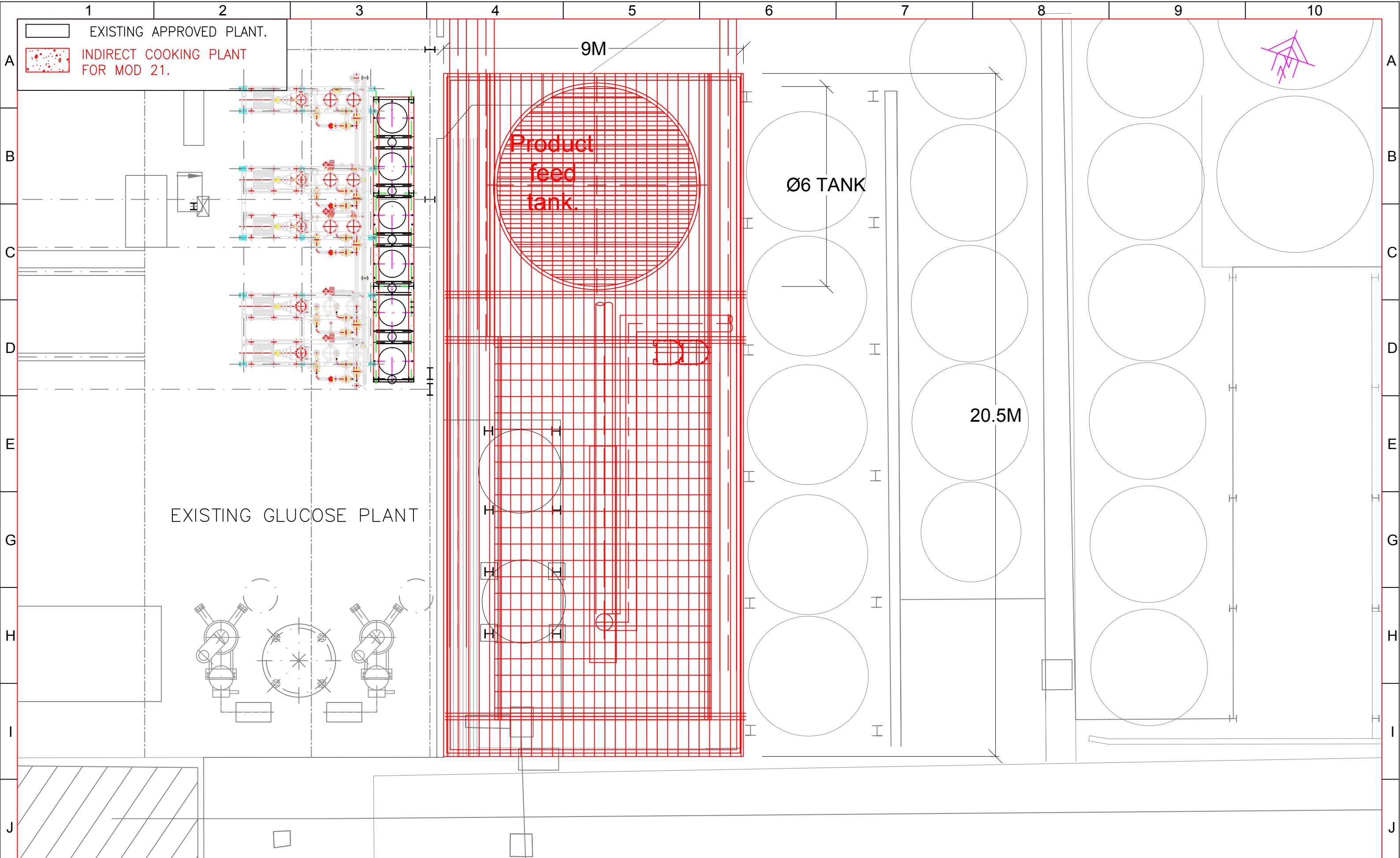
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
P05	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
PO4	ALL	Now Mod 22.	P.C.	17/3/21	B.H.	
P03	ALL	Small tanks relo.Was Drw -017	P.C.	16-02-21	BH	
P02	ALL	Now Mod 21.	P.C.	15-02-21	BH	
P01	ALL	Draft.	P.C.	28-01-21	Faris	



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DRAWN	DATE	JOB TITLE	PROJECT No.	DWG No.	SHT SIZE
P.C.	28/01/21	SHOALHAVEN STARCHES.BOMADERRY. NSW	7319	MN7323-013	A3
CHKD	DATE	DWG TITLE			REV.
FARIS		ETHANOL NITROGEN GENERATOR.MOD 21. ELEVATIONS.			P05
APPD	DATE				
SCALE					
1:100					



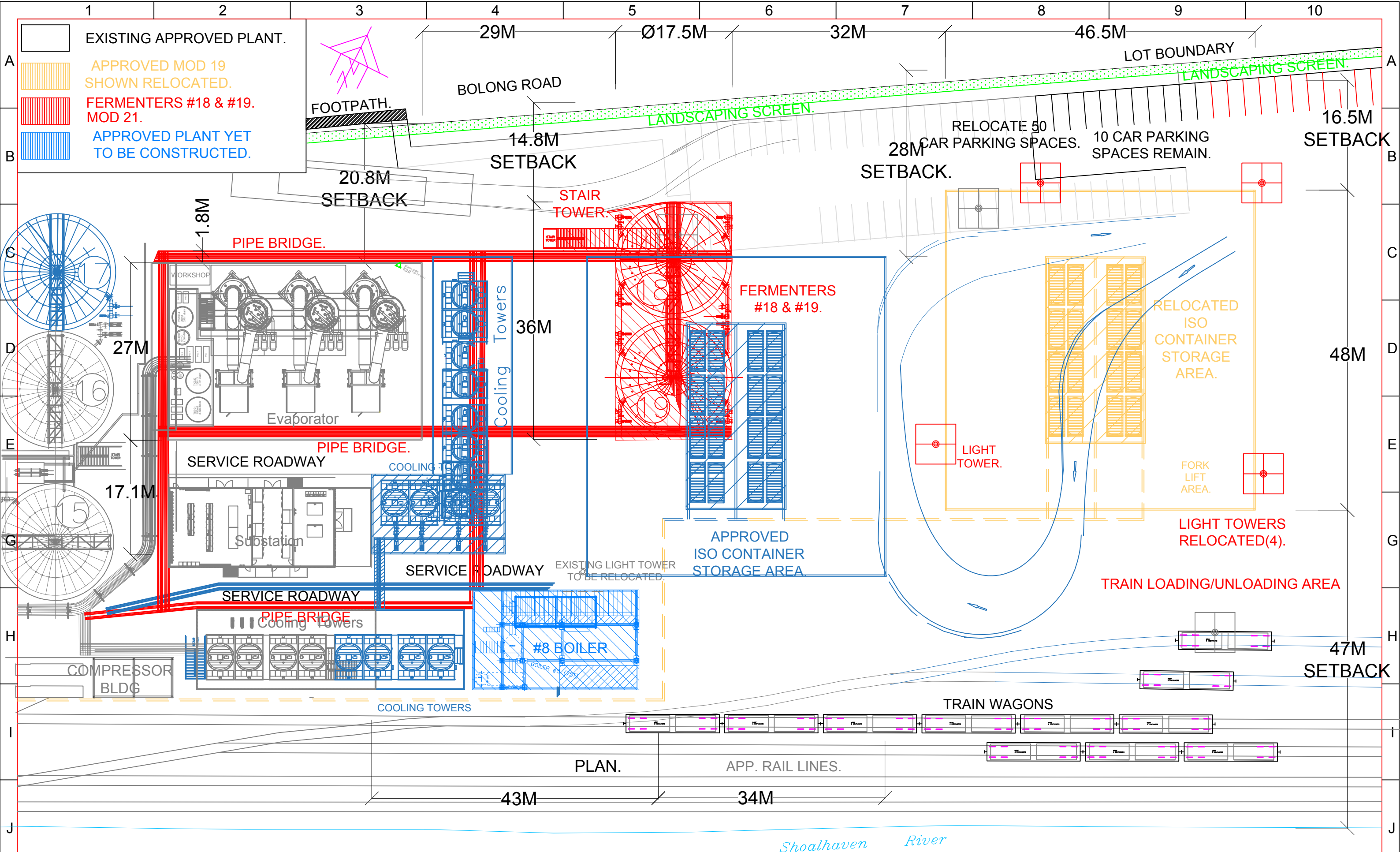
P08	ALL	Was Mod 22.	P.C.	3/5/21	B.H.	
P07	ALL	Now Mod 22.	P.C.	17/3/21	B.H.	
P06	ALL	Notes added.	P.C.	12-02-21	K.L.	
P05	ALL	MOD 21.	P.C.	10-02-21	K.L.	
P04	ALL	Proposal finalised.	P.C.	05-02-21	K.L.	
P03	ALL	Original layout.	P.C.	04-02-21	K.L.	
P02	ALL	Footprint narrowed and heightened.	P.C.	04-02-21	K.L.	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



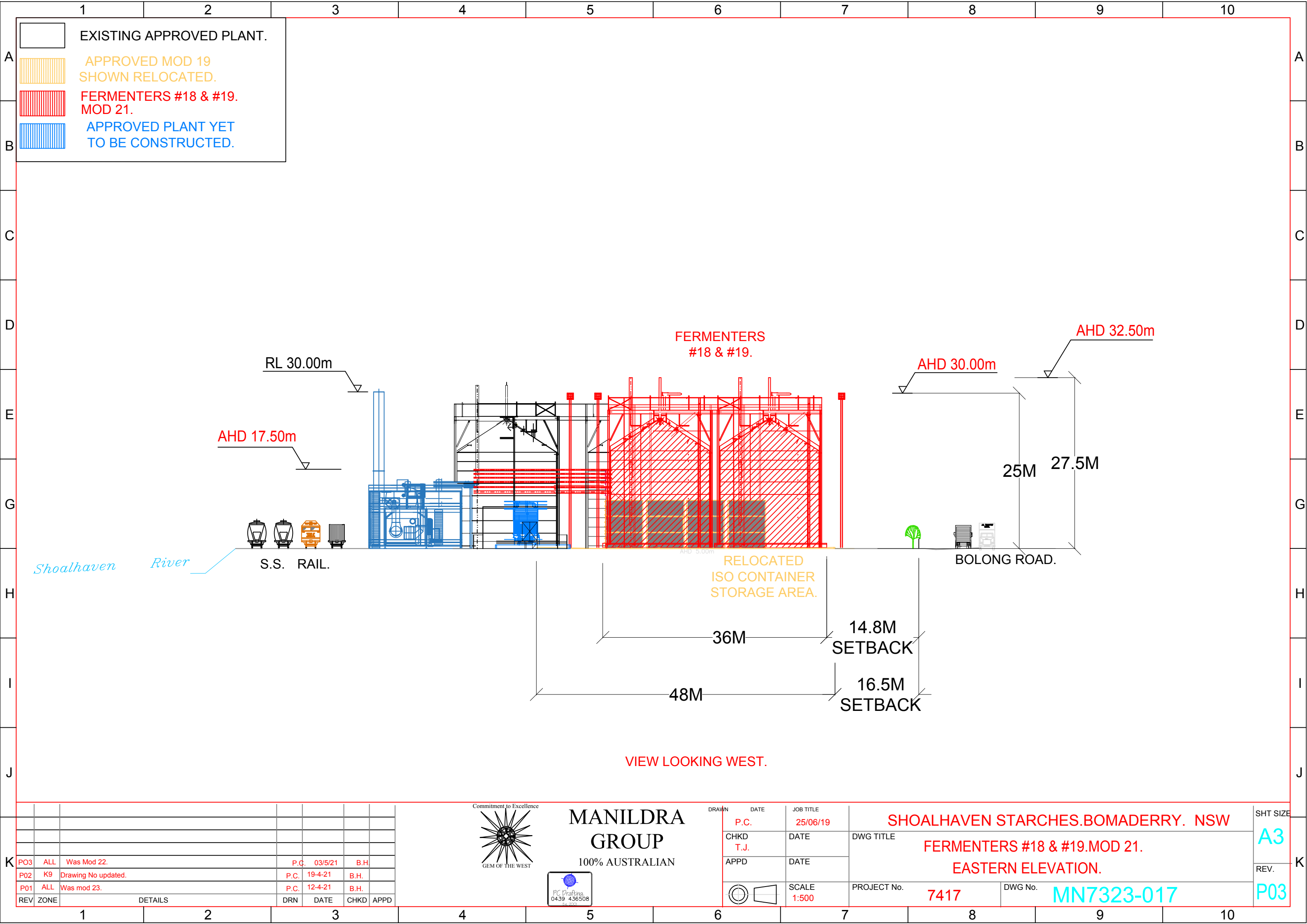
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DRAWN	DATE	JOB TITLE	SHT SIZE		
P.C.	28/01/21	SHOALHAVEN STARCHES.BOMADERRY. NSW	A3		
CHKD	DATE	DWG TITLE	REV.		
AT		INDIRECT COOKING MOD 21.	P08		
APPD	DATE	PROJECT No.			
		7320			
	SCALE	DWG No.			
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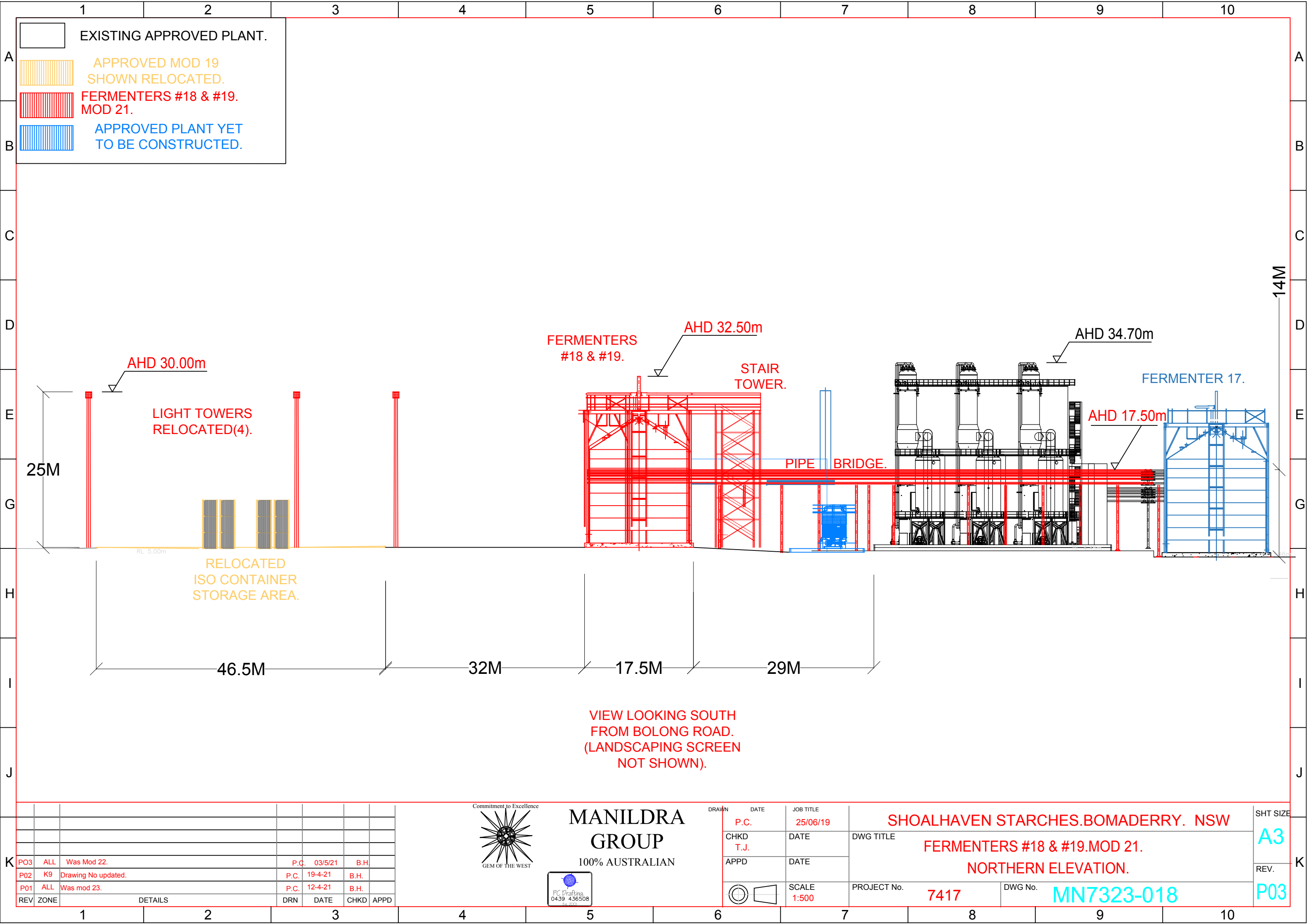
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
PO3	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
PO2	K9	Drawing No updated.	P.C.	19-4-21	B.H.	
PO1	ALL	Was mod 23.	P.C.	12-4-21	B.H.	



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DRAWN	DATE	JOB TITLE	PROJECT No.	DWG No.	SHT SIZE
P.C.	25/06/19	SHOALHAVEN STARCHES.BOMADERRY. NSW	7417	MN7323-017	A3
CHKD	DATE	DWG TITLE			REV.
T.J.		FERMENTERS #18 & #19.MOD 21.			
APPD	DATE	EASTERN ELEVATION.			P03
	SCALE				
	1:500				



PO3	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
P02	K9	Drawing No updated.	P.C.	19-4-21	B.H.	
P01	ALL	Was mod 23.	P.C.	12-4-21	B.H.	
REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD



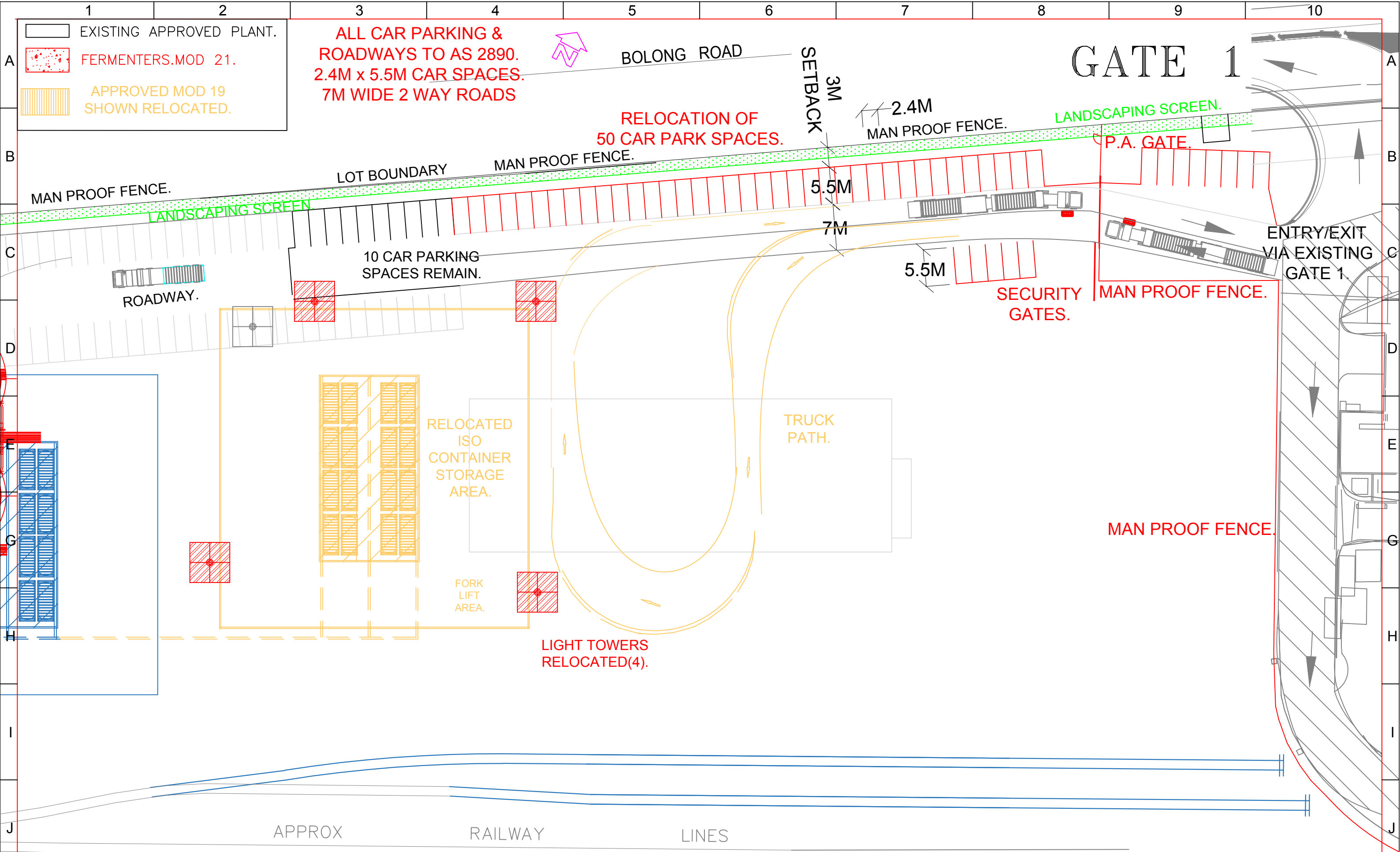
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DRAWN	DATE	JOB TITLE
P.C.	25/06/19	
CHKD	DATE	
T.J.		
APPD	DATE	
	SCALE	
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SHOALHAVEN STARCHES.BOMADERRY. NSW		SHT SIZE
FERMENTERS #18 & #19.MOD 21.		A3
NORTHERN ELEVATION.		REV.
PROJECT No.	7417	DWG No.
		MN7323-018

SHT SIZE
A3
REV.
P03



REV	ZONE	DETAILS	DRN	DATE	CHKD	APPD
PO4	ALL	Was Mod 22.	P.C.	03/5/21	B.H.	
P03	ALL	Car park re-spaced. Drawing No updated.	P.C.	15-4-21	B.H.	
P02	ALL	PA gate added.	P.C.	12-4-21	B.H.	
P01	ALL	Was Mod 23.	P.C.	12-4-21	B.H.	

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Est. 2002

P.C.	01/12/20	SHOALHAVEN STARCHES.BOMADERRY. NSW		SHT SIZE
CHKD BH	DATE	DWG TITLE		A3
APPD	DATE	FERMENTERS.MOD 21.		REV.
		CAR PARK SITE PLAN VIEW.		P04
SCALE 1:500	PROJECT No. 7417	DWG No. MN7323-019		

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

