

# Donaldson Coal – Abel Mine

EP / SMP AREA 4  
STAKEHOLDER MEETING

27 March 2014

May 5, 2014

# Agenda

- Introduction and Meeting Objectives
- Donaldson Coal Background
- The Extraction Plan (EP) / Subsidence Management Plan (SMP) Process
- Abel Mine
  - Mine Planning
  - Mining Methods
  - SMP Areas 1, 2 & 3
  - EP / SMP Area 4
- SMP Areas 1, 2 & 3 Approvals and Conditions, Management Plans, Monitoring Programs



# Agenda

- SMP Areas 1, 2 & 3 - Progress and results to date (including impacts and remediation)
- EP / SMP Area 4 Key surface features
  - Man made and Natural features potentially impacted by subsidence, including
    - Properties
    - Roads
    - Powerlines
    - Dams
    - Other infrastructure
- Abel EP / SMP Area 4 Subsidence Assessment, Predictions and Impacts
- Abel EP / SMP Area 4 Property Subsidence Management Plan (PSMP) Process
- Abel EP / SMP Area 4 Mining Schedule
- Field Visit SMP Area 1, 3 & 4

# Meeting Objectives

1. Provide interested parties with an introduction to both the Extraction Plan / Subsidence Management Planning Process, review the approval procedure, update the results of mining Areas 1, 2 & 3 to date and outline the planning and baseline studies conducted in relation to the Abel mining proposal for Abel Area 4.
2. Consult with interested parties to identify any potential issues or relevant concerns to be considered and addressed in the preparation of the Extraction Plan / Subsidence Management Plan for Abel Area 4.

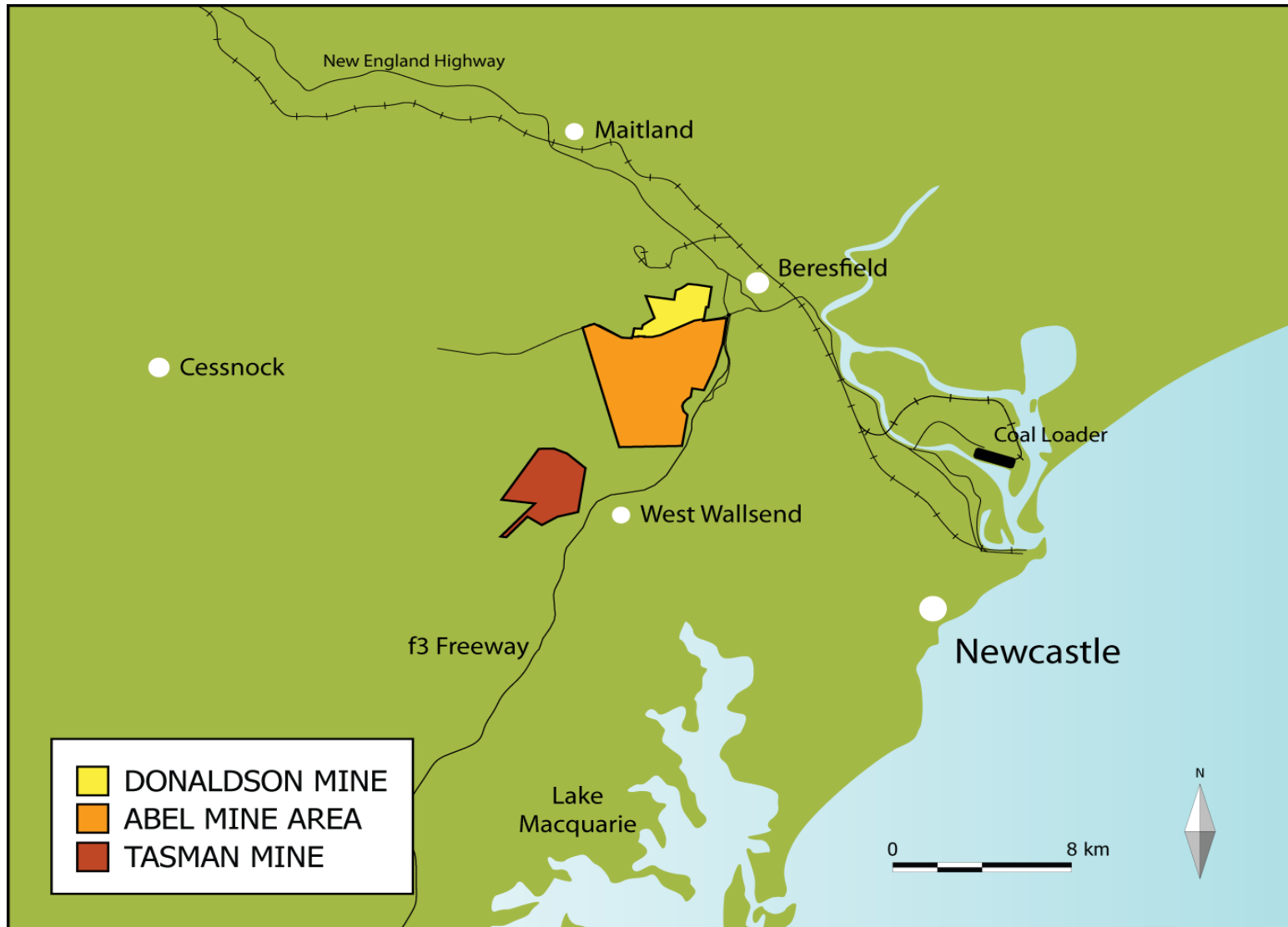


# Donaldson Coal



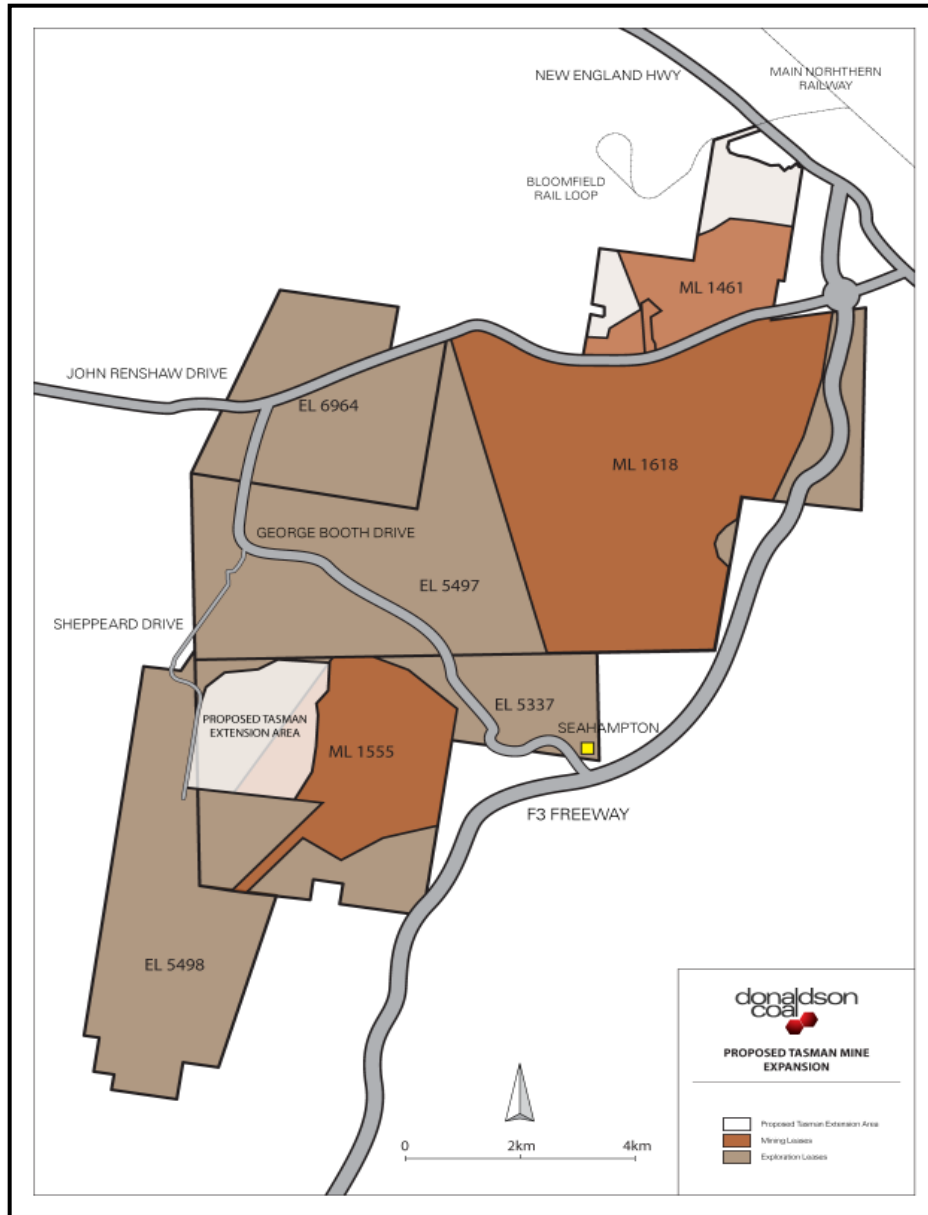
- Donaldson Coal was established in Australia in 1996.
- Donaldson Coal is owned by Yancoal Australia Group.
- Yancoal Australia Ltd is a coal mining and mining technology company.
- Yancoal was incorporated in Australia in November 2004.
- Subsidiary of Yanzhou Coal Mining Company Limited (Yanzhou) in the People's Republic of China.
- Yanzhou is publicly listed on the Shanghai, Hong Kong and New York Stock Exchange.

# Location of Donaldson Coal Operations



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# Donaldson Coal Tenements

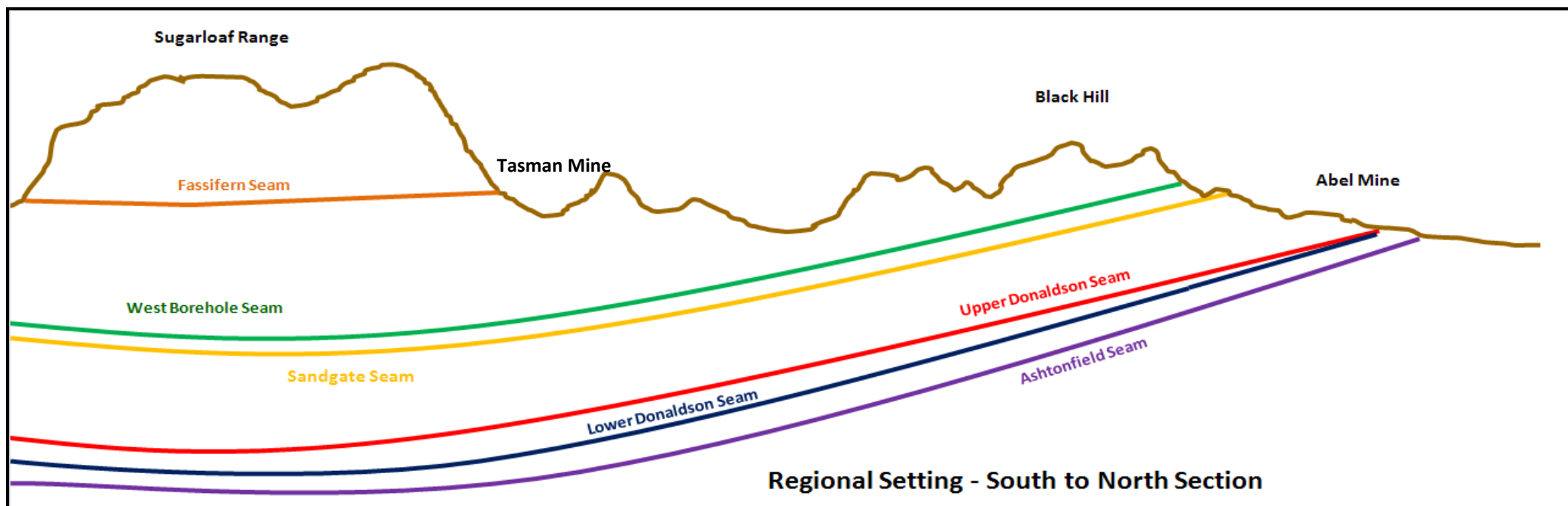


- **Current Leases:**
  - ML 1461 (Donaldson O/C) 533ha
  - ML 1618 (Abel U/G) 2,755ha
  - ML 1555 (Tasman U/G) 961ha
  - **Subtotal** **4,249ha**
  
- **Current Exploration Areas:**
  - EL 5337 (Tasman) 1,418ha
  - EL 5498 (Tasman) 1,475ha
  - EL 5497 (Abel) 4,990ha
  - EL 6964 (Abel) 1,255ha
  - **Sub Total** **9,138 ha**
  
- **Total Area** **13,387ha**

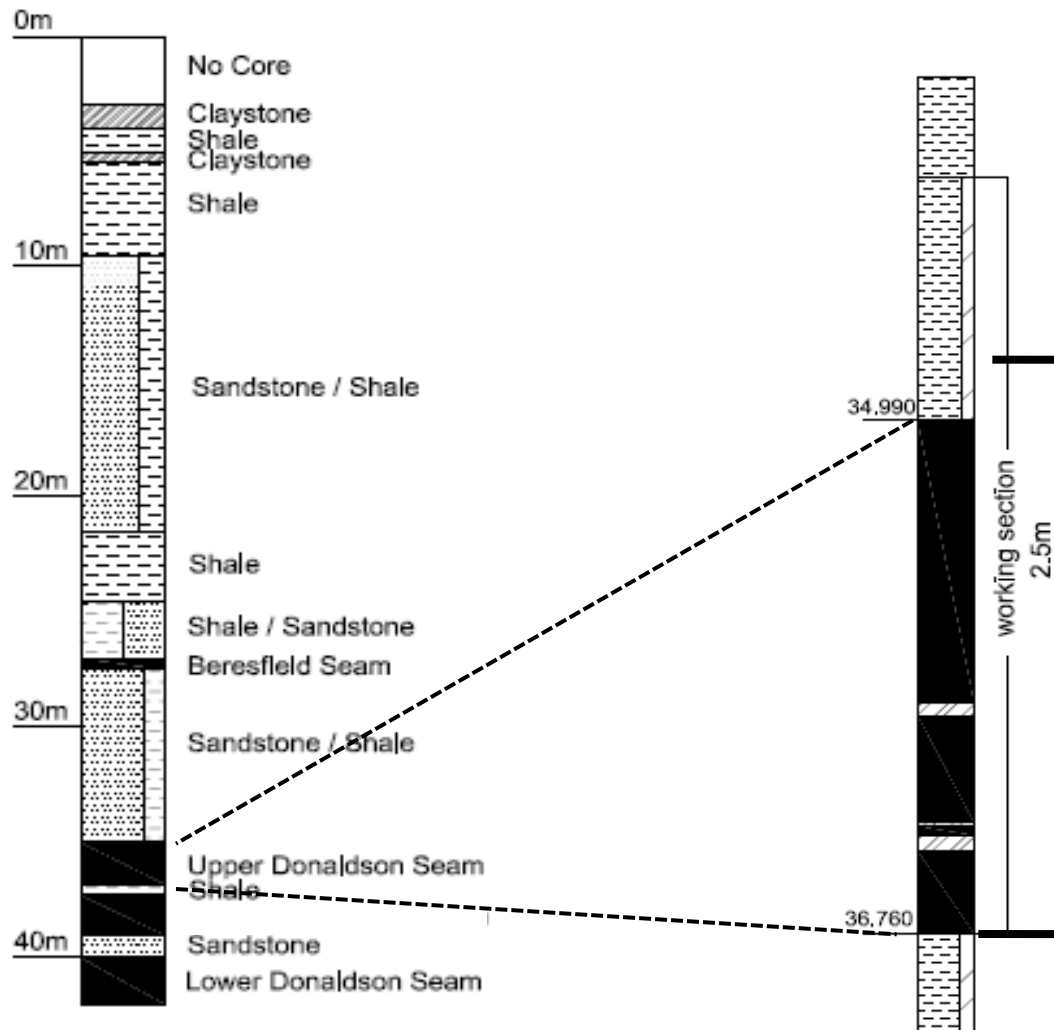


# Geological & Mining Setting

- Target seams are part of the East Maitland/Tomago and Newcastle Coal Measures



# Abel Mine Typical Stratigraphic column



Strata overlying the Donaldson Seam comprises finely bedded shales and sandstones. This typically caves readily leading to full subsidence occurring in a short time after mining.



# Abel Mine

- Environmental Assessment lodged 2006
- Project approval granted June 2007
- Mining Lease ML1618 granted May 2008
- Abel commenced underground production from highwall in May 2008
- SMP Area 1 approved May 2010
- SMP Area 2 approved Dec 2011
- SMP Area 3 approved July 2013
- Mod 3 approved Dec 2013 (requires an Extraction Plan application to Department of Planning and Infrastructure (DoPI) for all secondary workings)





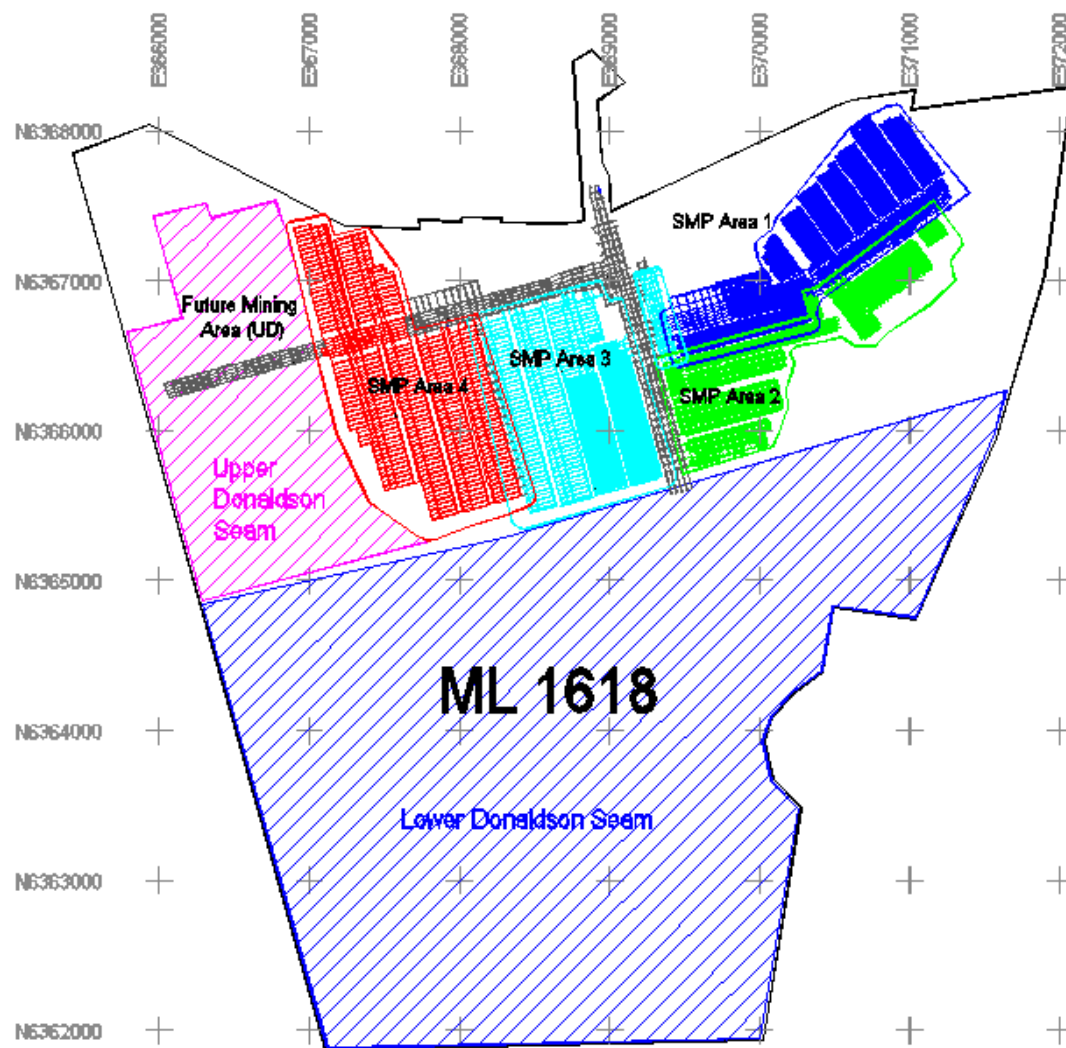
# Abel Mine

- Pillar extraction commenced July 2010
- 16 Panels completed to date.
- EP / SMP Area 4 = 198ha (ML1618 area = 2,755ha)
- Depth of cover in EP / SMP Area 4 - 55m to 260m
- Current workforce 360 including contractors
- CY 2014 planned ROM production 2.7mt.

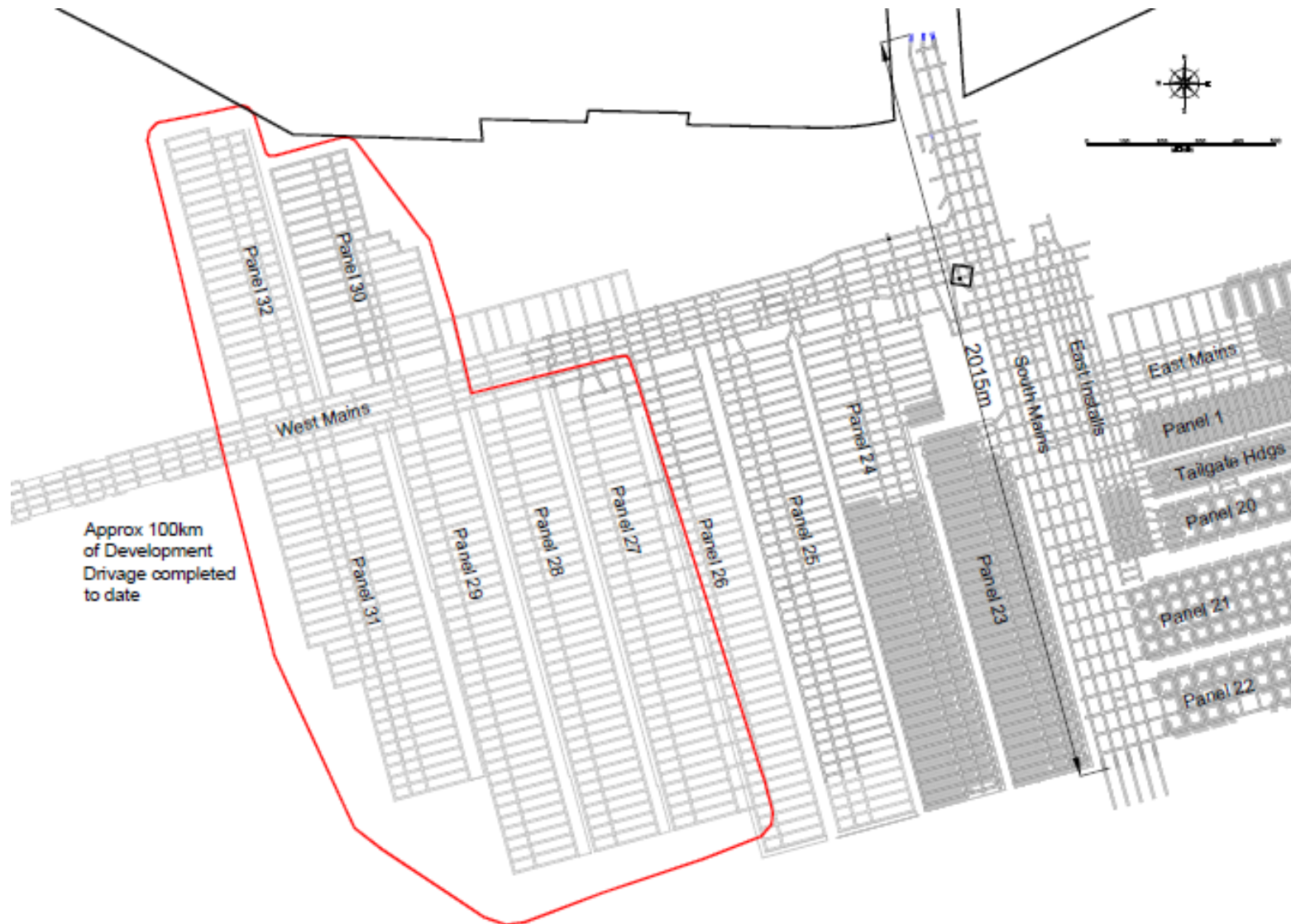


# Abel Mining Lease ML1618

- ML1618 area = 2,755 ha
- SMP Area 4 = 198ha



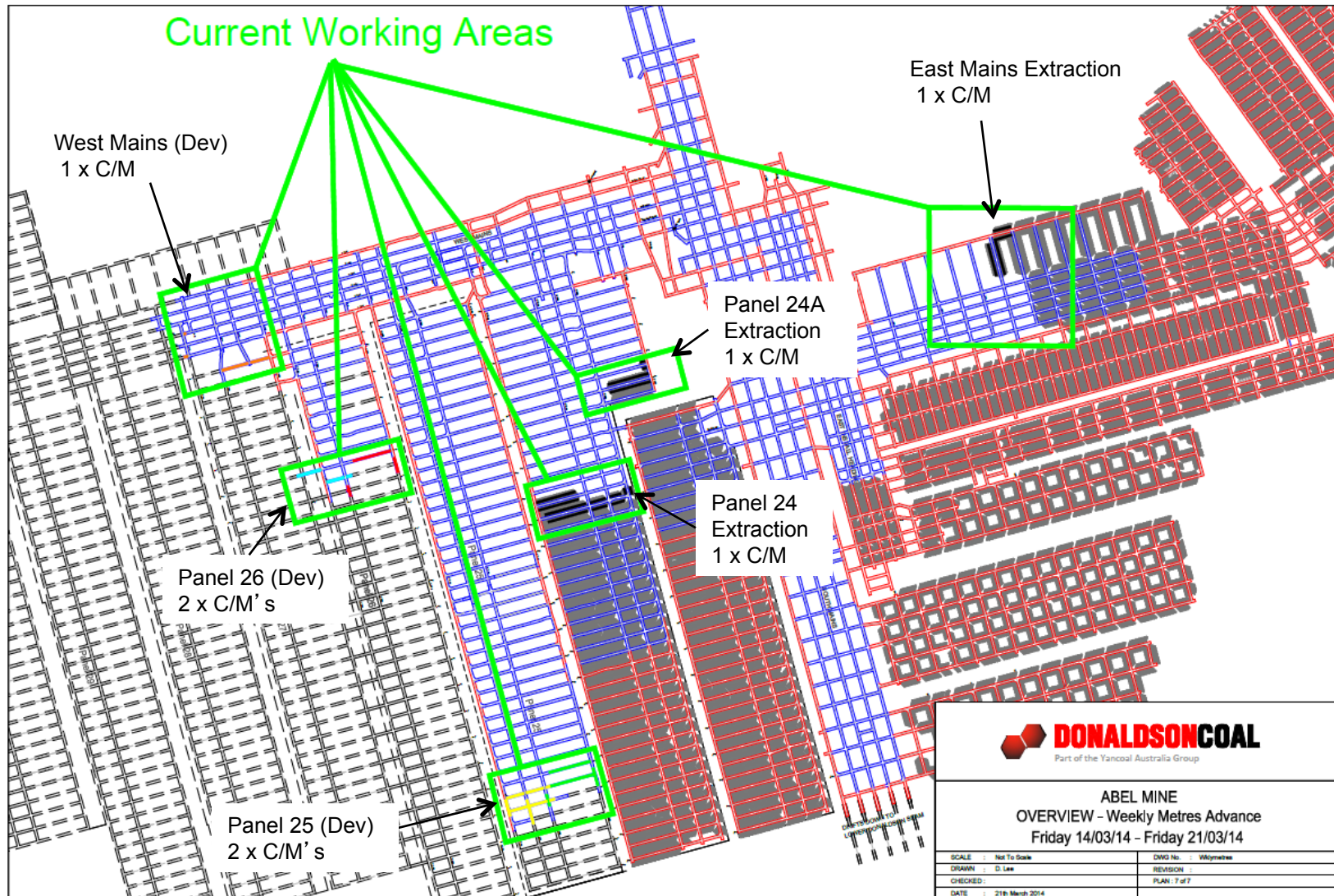
# Abel Mine Plan



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# Abel Current Mining Areas



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# EP / SMP Application Process

- Approval process introduced in March 2004 for the management of coal mining subsidence (*New Approval Process for Management of Coal Mining Subsidence – NSW*)
- Condition of Abel's Mining Lease 1618 that the leaseholder shall prepare a Subsidence Management Plan prior to commencing underground mining operations which will potentially lead to subsidence of the land surface





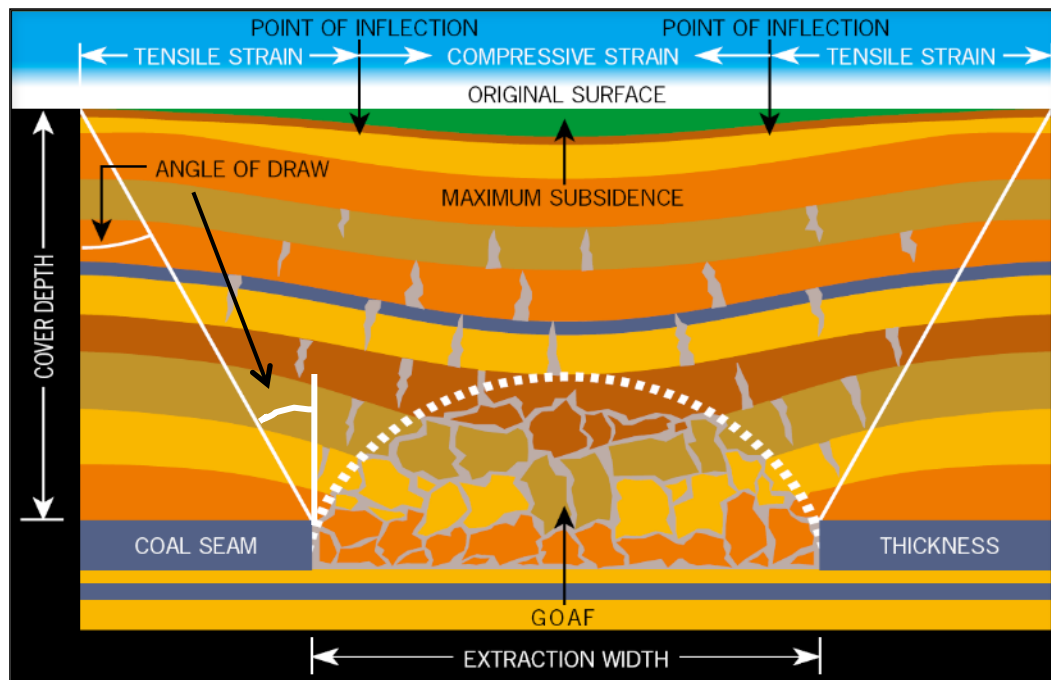
# EP / SMP Application Process

- Condition of Abel's Mod 3 states “ the proponent shall implement an Extraction Plan for all second workings on site to the satisfaction of the Director-General”.
- Extraction Plan process administered through the Department of Planning and Infrastructure.





# Definitions



- **Subsidence**- Vertical movement of the land surface caused by underground coal mining. For the purposes of the EP / SMP approval process, subsidence is defined as mining-induced movements and deformations at the ground surface where the vertical downward surface movements are greater than 20mm
- **EP** – Extraction Plan
- **SMP** – Subsidence Management Plan
- **Goaf** - The mined-out area into which the immediate roof strata breaks.
- **Angle of Draw** – The angle between the vertical line joining the edge of the mining void with the limit of vertical subsidence (usually taken as 20mm) at the surface
- **Cover Depth** – The depth of the coal seam from the ground surface (metres)
- **Effective subsidence** – 95% of predicted subsidence has occurred.
- **SCZ** – Subsidence Control Zone

# Definitions

- **First workings-** Roadways driven to form pillars. Development of main headings and panel roads to establish access to the coal in the Pillar Extraction panels.
- **Second workings** – Extraction of coal from pillars formed during development.
- **Full extraction** - Systematic mining of all safely accessible coal within the formed pillars
- **DoPI** - Department of Planning and Infrastructure
- **DTIRIS** – Department of Trade & Investment, Regional Infrastructure and Services
- **Statement of Commitments** - The commitments by Donaldson Coal Pty Limited set out in Appendix 3 of the Abel Project Approval.
- **Principal Residence** - A Principal Residence is defined as an existing building (at the date of Project Approval) capable of being occupied as a separate domicile and used for such purpose. Basically the main residential building on a property.
- **Future Principal Residence** – If there is no existing residence on a landholding and a residence is planned to be built, the site for this future principal residence will be protected in the same way as above (applies to a max of one future principal residence per landholding).

# Definitions

- **Public Safety Management Plan** - prepared in consultation with DTIRIS to ensure public safety in any surface area that may be affected by subsidence arising from pillar extraction
- **Property Subsidence Management Plan** – Developed by Donaldson Coal in consultation with the property owner and Mine Subsidence Board to address the management / mitigation of any subsidence impacts
- **Mitigation Measures** – Subsidence management measures which aim to reduce subsidence impacts, usually implemented prior to or during mining.
- **Remediation Measures** – Subsidence management measures which aim to repair any adverse effects of subsidence, usually implemented after mining.
- **Safe, serviceable & repairable** - Safe means no danger to users, serviceable means available for its intended use, and repairable means damaged components can be repaired

# EP / SMP Requirements

## ■ EP / SMP Area 4 Application:

The purpose of an Extraction Plan is to manage subsidence associated with underground coal mining.

The Extraction Plan describes how approved mining operations are to be undertaken, managed, monitored, reported and remediated.

The structure of the Extraction Plan should be as follows:

- **Overview** - mine planning and design, including:
  - description of the surface area, proposed mine workings, mining method, resource recovery, extraction schedule
  - expected subsidence and its potential impacts on public safety, the environment, community, land use, surface improvements and infrastructure

- Performance objectives of relevant conditions from Project Approval, Leases, Licences, Approvals
- Subsidence management strategies and measures including remediation of all predicted subsidence impacts and / or environmental consequences, monitoring of subsidence effects / impacts and contingency plans to remediate unpredicted impacts or environmental consequences.



# EP / SMP Requirements

- **Development** - process of development of the Extraction Plan:
  - This section will address consultation undertaken by the mine with affected agencies and other key stakeholders
  - The level of consultation will reflect the level of significance of predicted impacts
  - Include results of Risk Assessments carried out for the EP / SMP Application
  - Details of ongoing community consultation process
  - Describe the process of reviewing and updating the predictions of subsidence effects, subsidence impacts and environmental consequences from previous applications

# EP / SMP Requirements

- **Body** - comprises a set of six key component plans:
  - **Water Management Plan** - including groundwater and surface water management
  - **Land Management Plan** - including property subsidence management
  - **Biodiversity Management Plan** - including flora and fauna management
  - **Built Features Management Plan** - including public roads, telecommunications, electricity assets and dam management
  - **Heritage Management Plan** - including aboriginal heritage management
  - **Public Safety Management Plan** - must address all potential safety hazards to the public
- The component plans will be followed by a comprehensive **Monitoring Program Summary**

# EP / SMP Requirements

■ **Implementation** – addresses all key elements of how the plan is going to be implemented, including reporting , regular review and key responsibilities

- **Reporting Framework** – incident, subsidence and environmental reporting
- **Review of the Extraction Plan** – reviews should take place as required under consent conditions and where unpredicted subsidence impacts and/or environmental consequences have required the implementation of contingency plans.
- **Review of other Management Plans** - e.g. Revisions to the Mine Rehabilitation Management Plan
- **Key Responsibilities** – identifies who has the key responsibilities for ensuring the implementation of the overall Extraction Plan

■ **Attachments** – All other material necessary to support the Extraction Plan. For example the Coal Resource Recovery Plan, SMP Plans, subsidence monitoring program and consultant reports.



# EP / SMP Preparation Stages

## ■ Stage 1 – Information Collection and Review

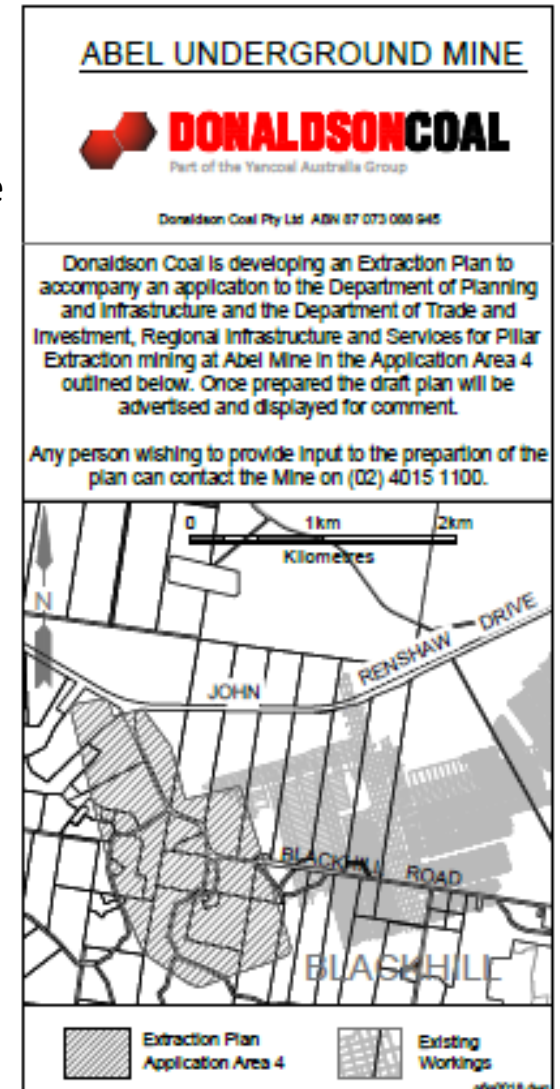
- Initial Consultation and Advertisement (1/3/14)
- Review of Statutes, Baseline Monitoring, Subsidence Prediction, Mine planning and initial Mine layout

## ■ Stage 2 – EP / SMP Development

- Assessment and consideration of community input (Stakeholder Meeting, CCC)
- Risk Assessment (3/4/14), monitoring program, mitigation / rehabilitation planning
- Finalise Mine plan
- Preparation of EP / SMP written report and Subsidence Management Plans

## ■ Stage 3 – Assessment

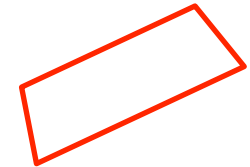
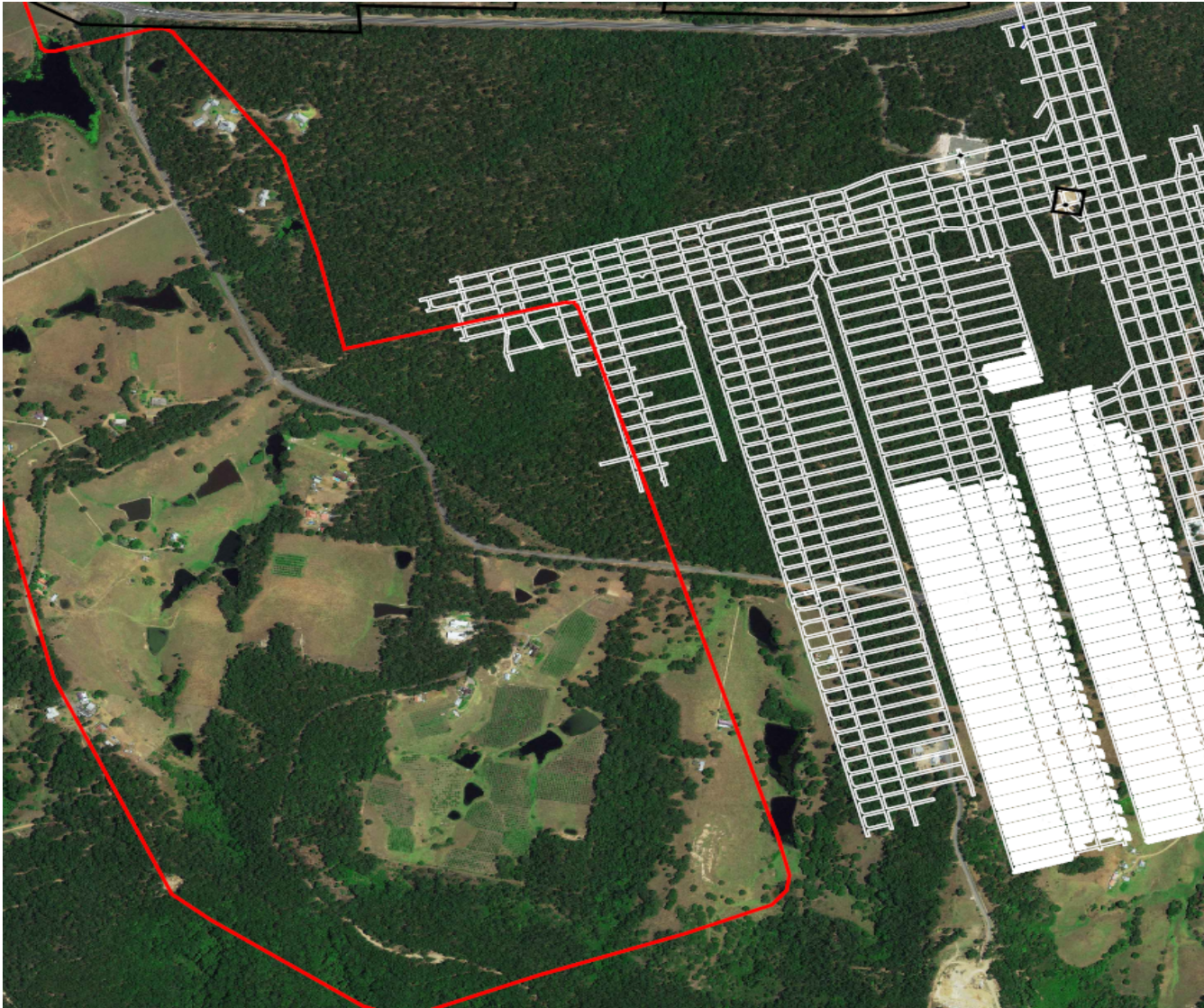
- Submission of application to DoPI & DTIRIS
- Advertise and public display – opportunity for comment and submission
- SMP Inter Agency review committee and DTIRIS assessment



# EP / SMP Preparation Stages

- **Stage 4 – Implementation if Approval Granted**
  - Implement EP / SMP subject to Approval Conditions
  
- **Stage 5 – Reporting, Review and Ongoing Consultation**
  - Review monitoring results in relation to predictions
  - Review impacts in relation to predictions
  - Report monitoring results, impacts and compliance with EP / SMP through AEMR, reporting as required by Approval Conditions (e.g. Status reports) and through Community Consultation Process (e.g. CCC)

# Abel Mine EP / SMP Area 4



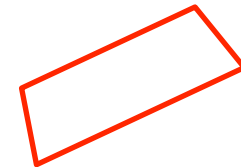
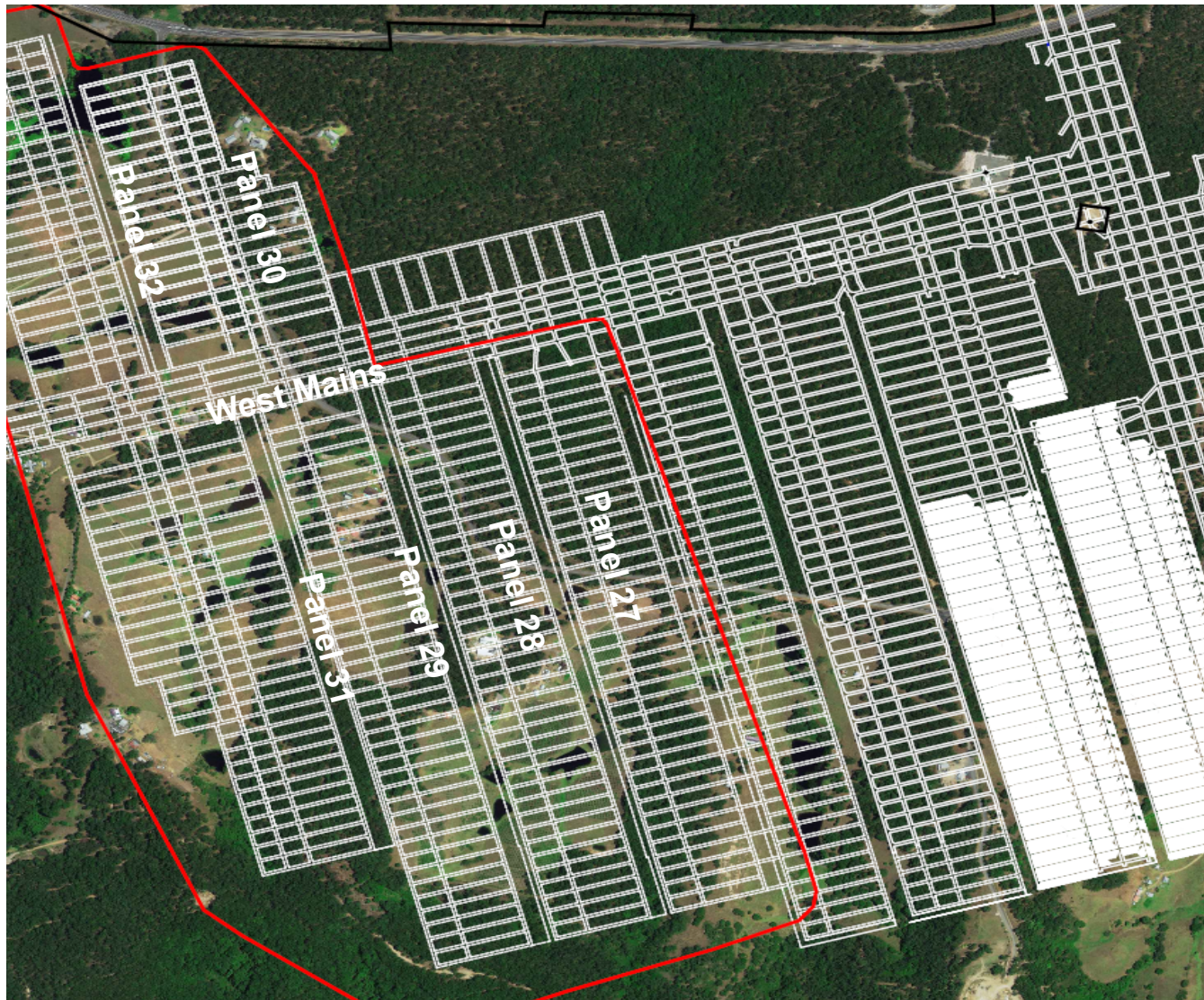
## EP / SMP Area 4

- Panels 27 - 32
- Part West Mains Hdgs

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# Abel Mine EP / SMP Area 4



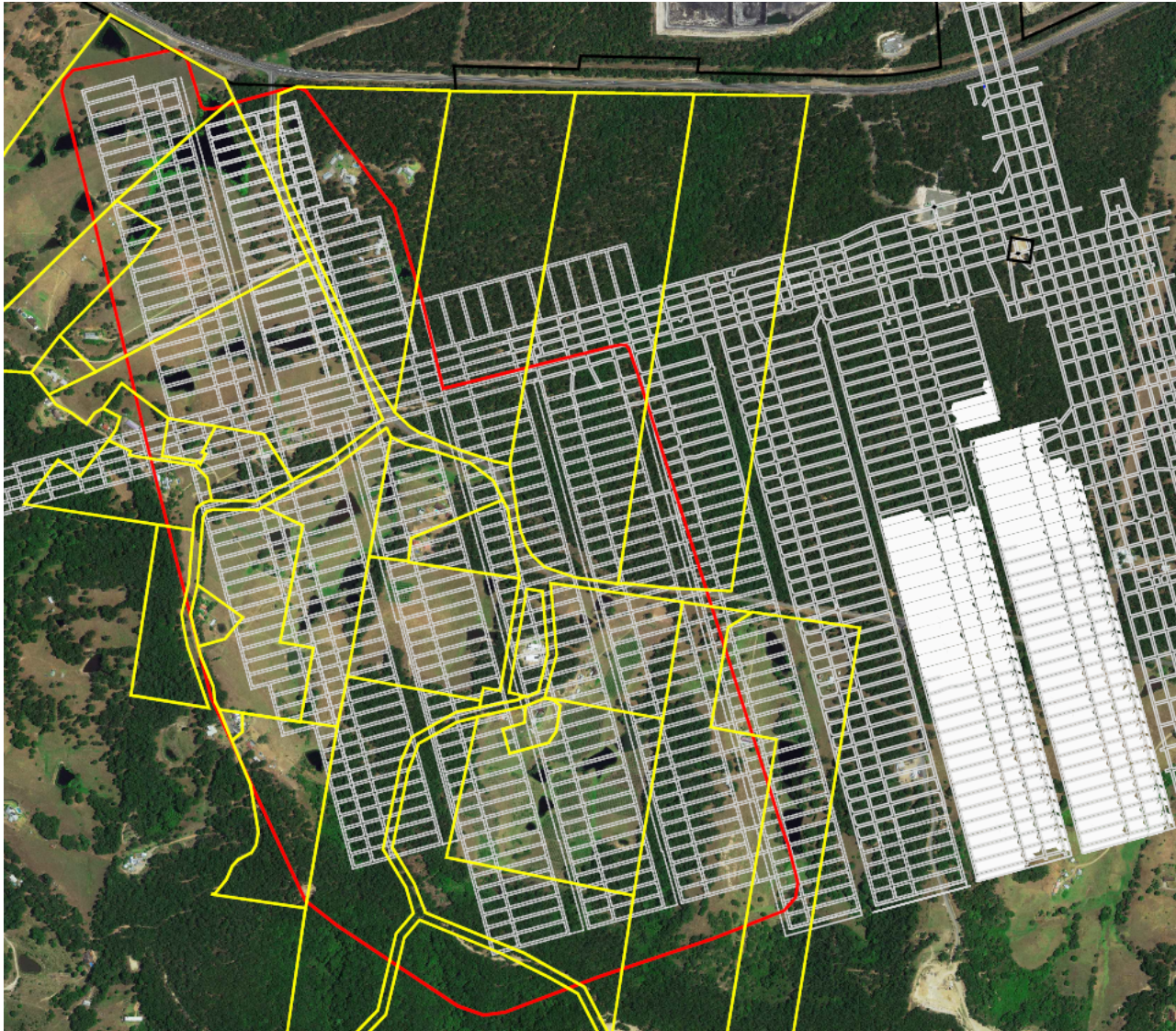
## EP / SMP Area 4

- Panels 27 - 32
- Part West Mains Hdgs

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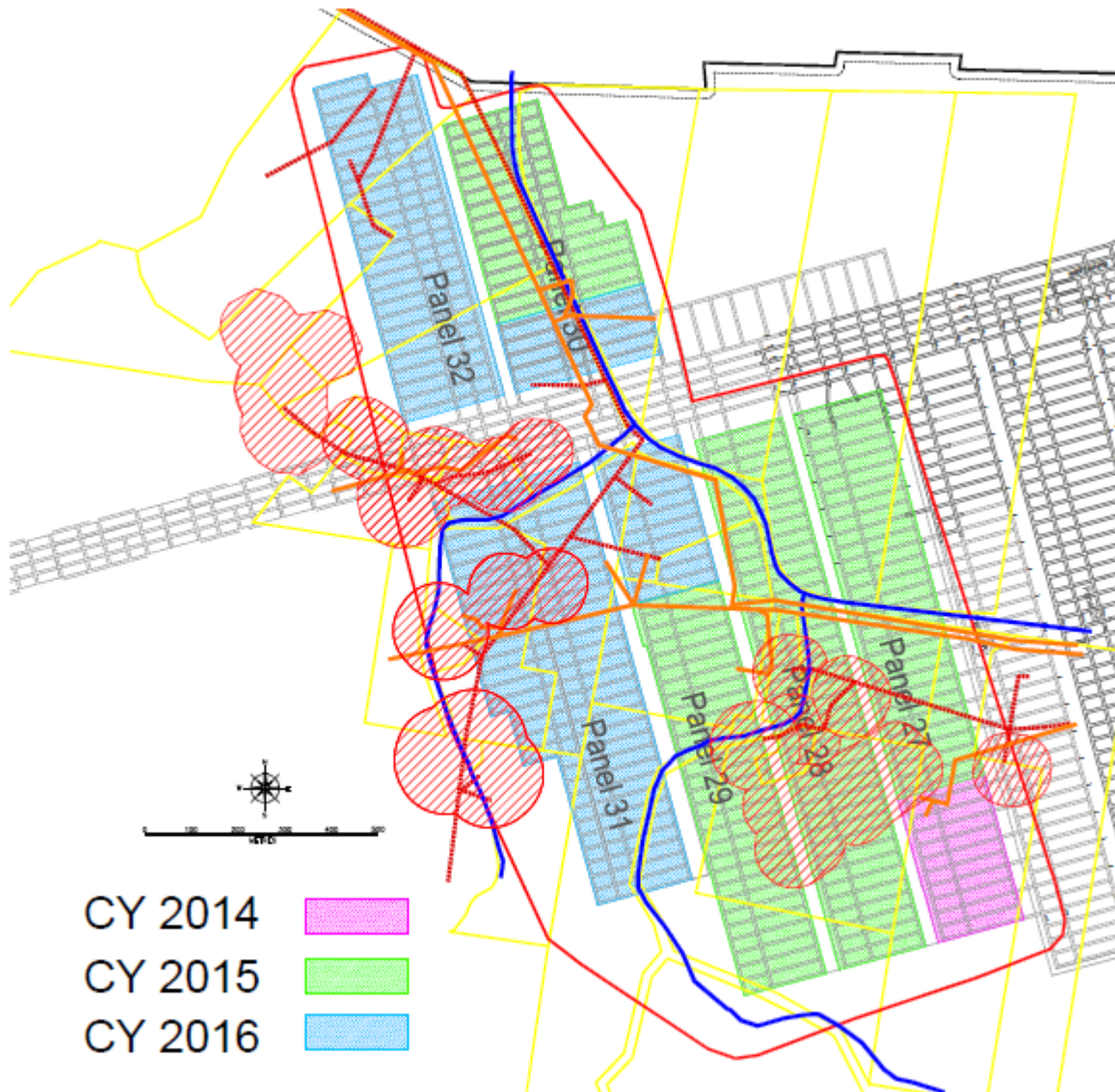
# Abel Mine EP / SMP Area 4 – Land Title



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# EP / SMP Area 4 – Key surface features



Private Properties



SCZ around Principal Residences



Telstra cables



Public Roads



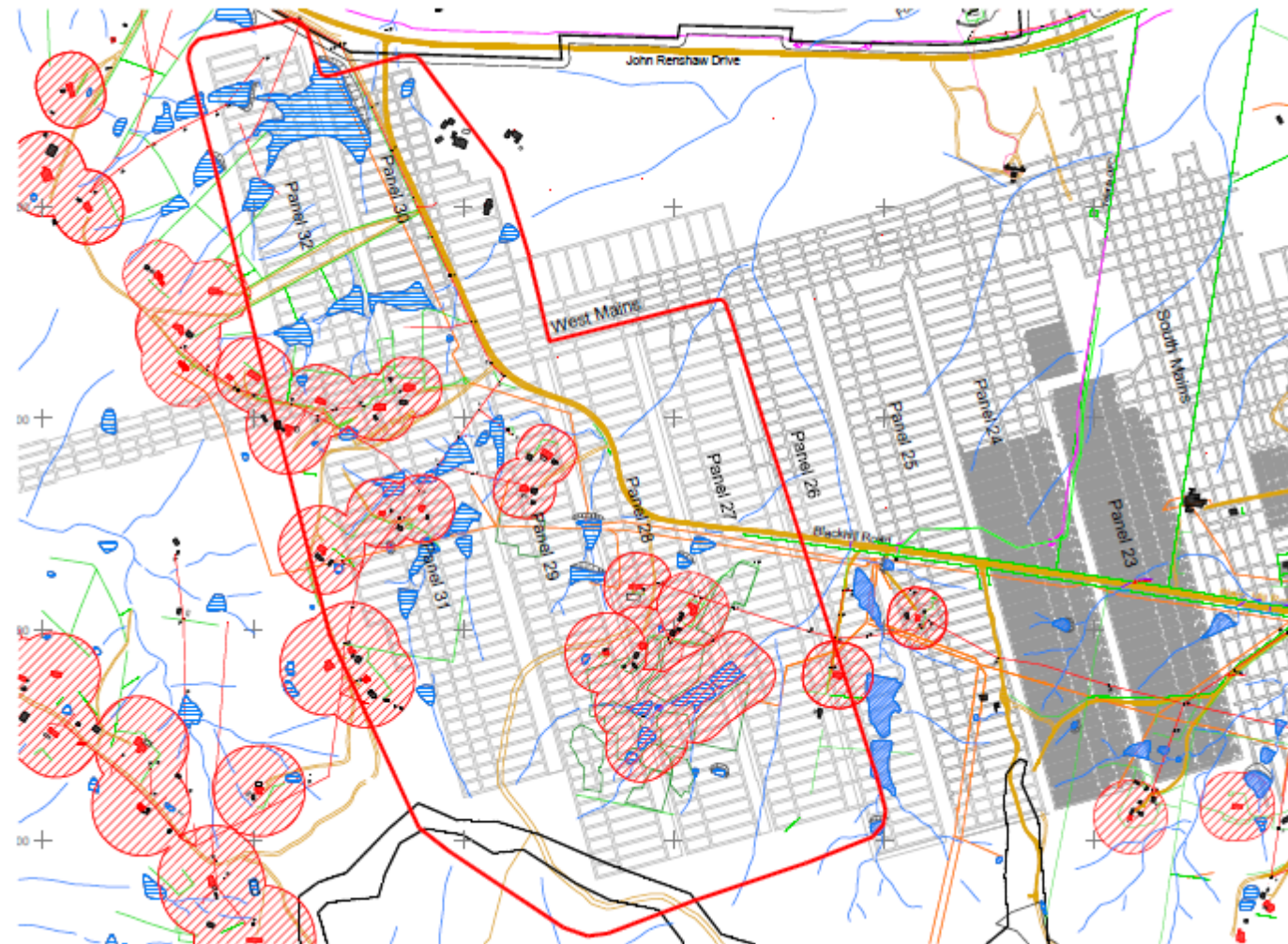
Ausgrid 11kV Power Lines



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# SMP Application Area 4



Total area = 198 ha

Contains 7m tonnes of insitu coal

Contains 4.6m tonnes of recoverable coal

Is divided into 6 Panels + Part West Mains Headings

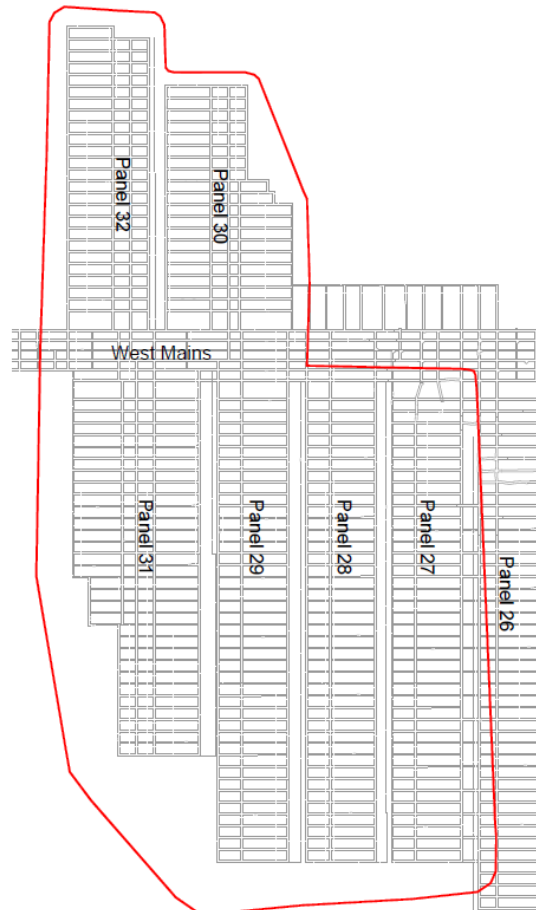
Has an operating life of ~3 years

Depth of cover ranges from 55m to 260m

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# EP / SMP Area 4 Panel dimensions/ tonnages

Panel	Panel Length (m)	Development Metres	Development Tonnes	Extraction Tonnes	Total Tonnes
27	1220	10,686	212,798	573,768	786,566
28	1220	10,220	208,677	569,016	777,693
29	1220	10,220	196,802	638,346	835,148
30	620	7,845	160,798	336,428	497,226
31	950	9,907	199,087	736,092	935,179
32	770	7,864	169,537	368,264	537,801
WM	580	3,618	75,641	179,631	255,272
					4,624,885



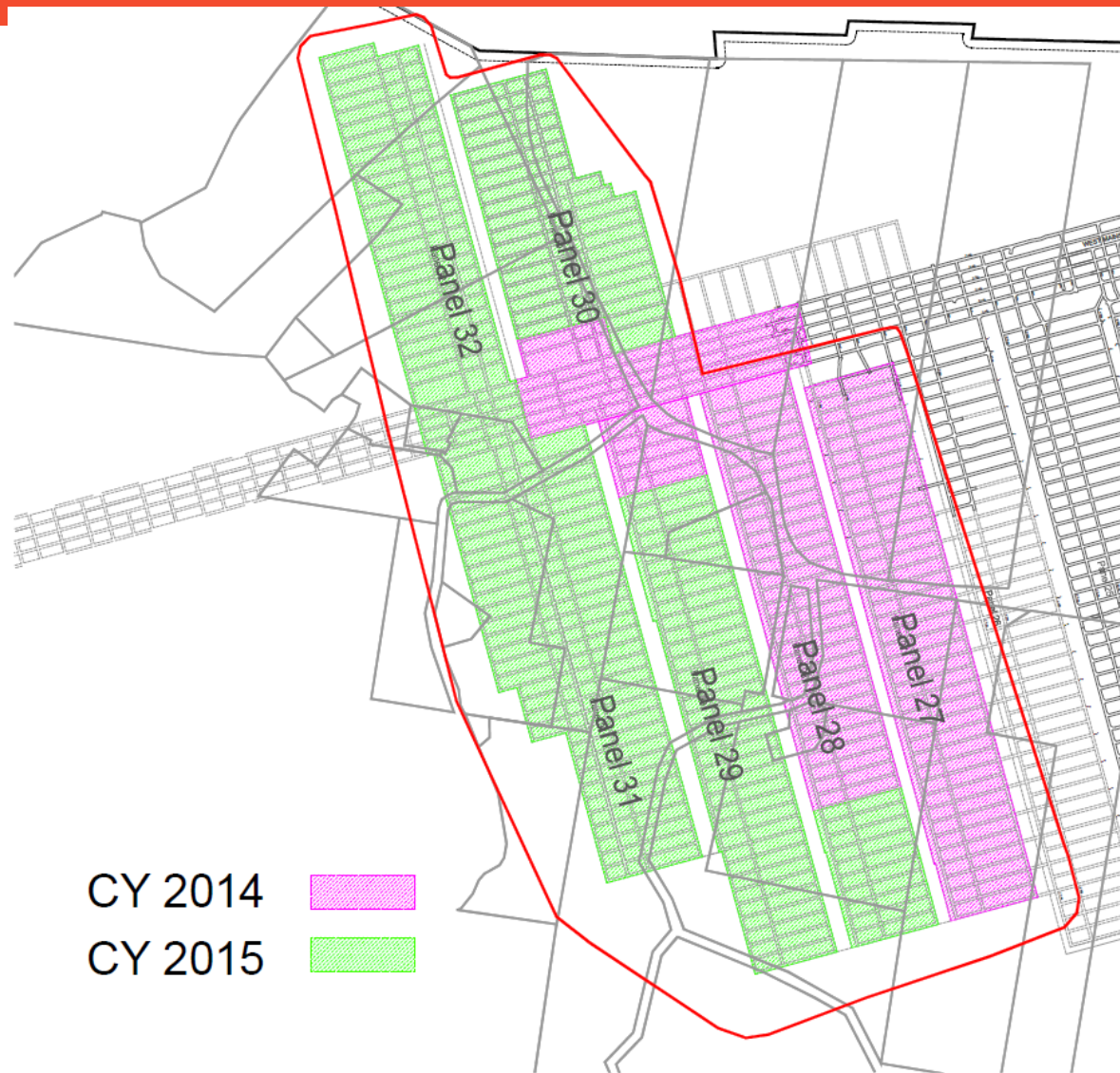
# EP / SMP Area 4 Typical Panel Layout - Panel 27



Panel 27	Metres/tonnes	Time taken
1 <sup>st</sup> workings (metres)	10, 686m	~30 weeks
2 <sup>nd</sup> workings (tonnes)	573,768t	~36 weeks
		~66 weeks

Inter Panel Barrier Pillar 25m

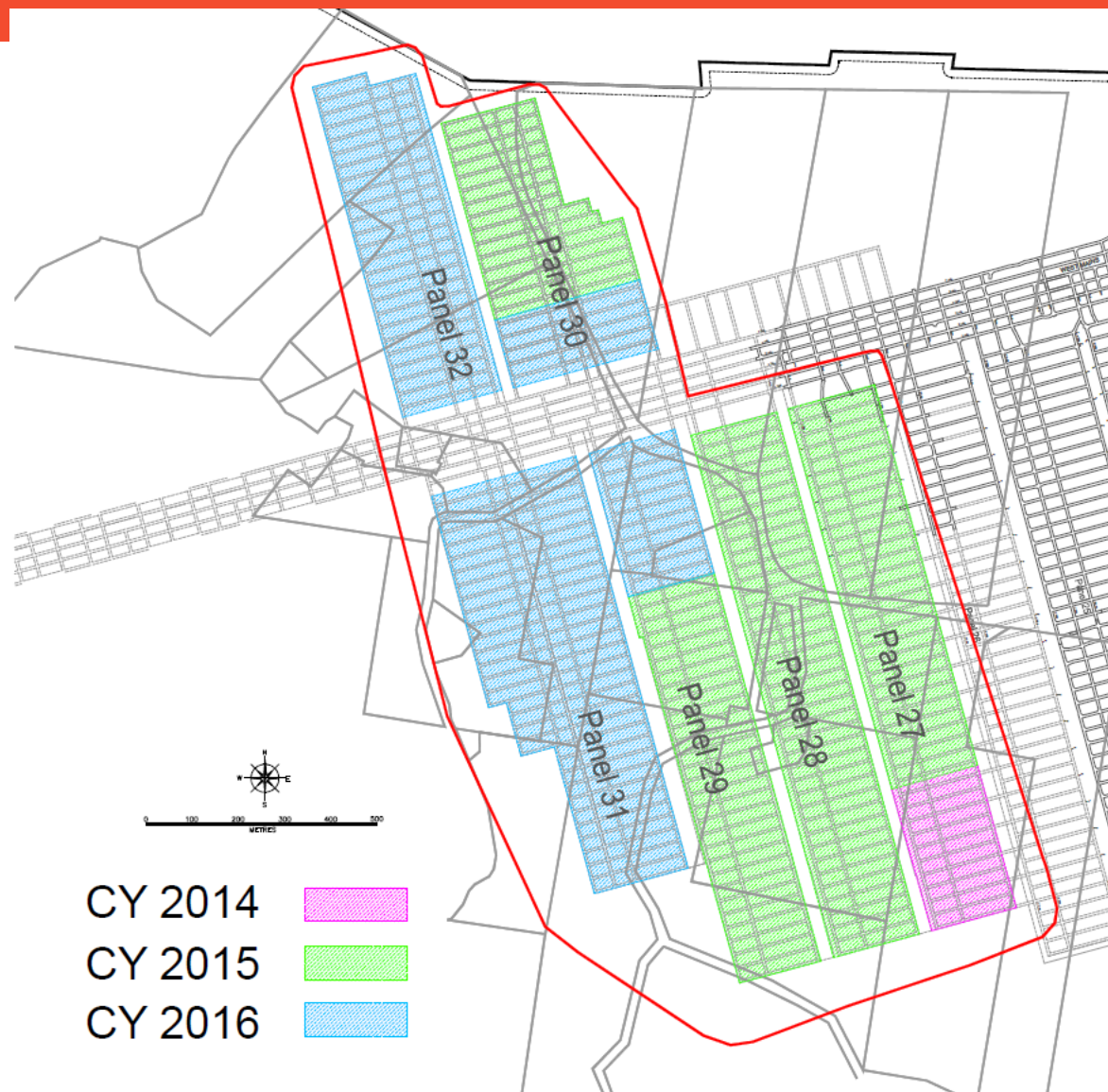
# EP / SMP Area 4 Mining Schedule (1<sup>st</sup> Workings)



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# EP / SMP Area 4 Mining Schedule (2nd Workings



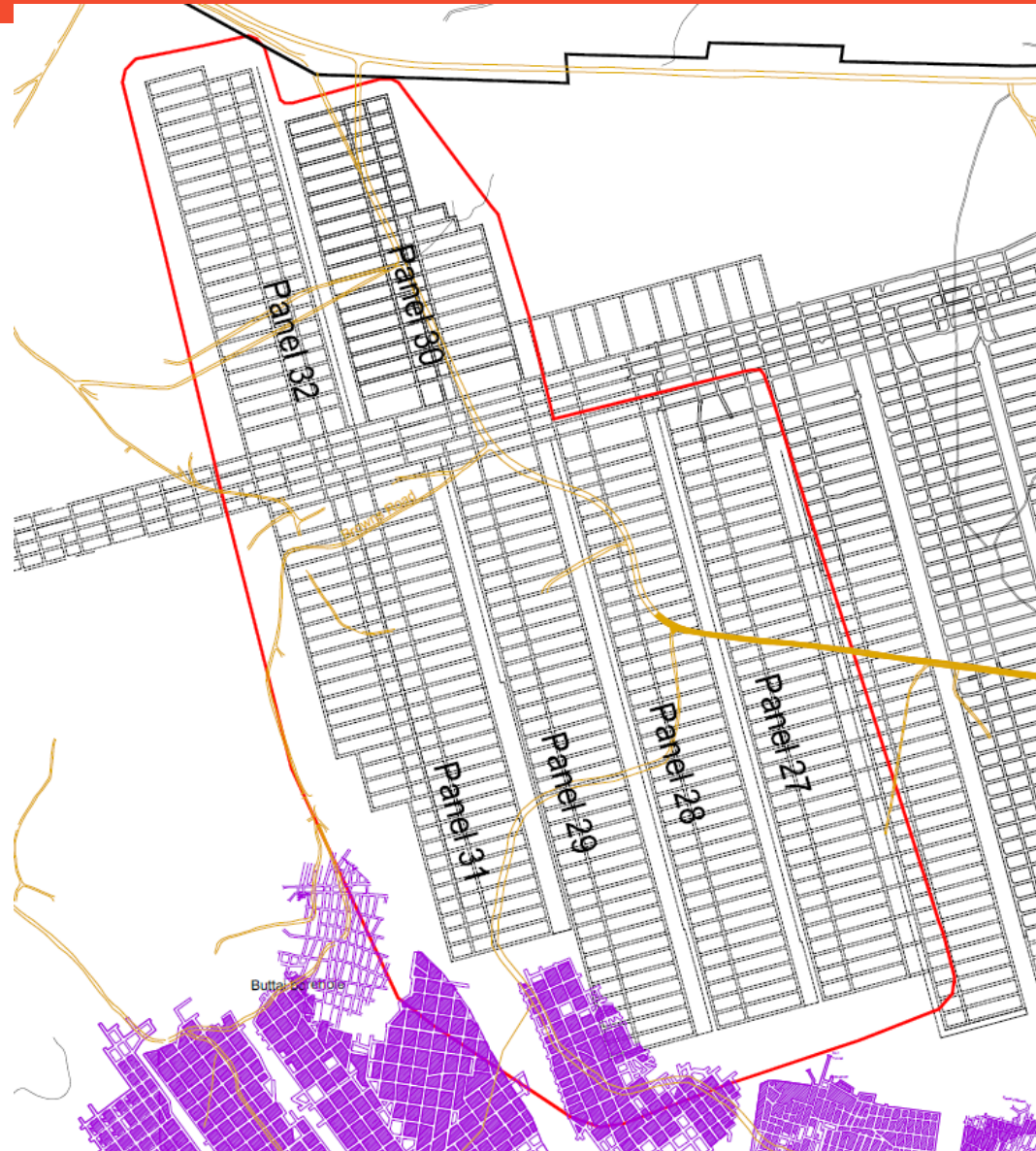
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# Mine Planning – EP / SMP Area 4

- Full extraction panels with the flexibility to retain long-term stable pillars for the protection of surface features
- Full extraction represents up to 85% reserve recovery within a mining panel
- Subsidence protection by either first workings or partial extraction
- No Pillar extraction below 50m depth of cover
- Sink hole subsidence not expected due to full extraction and depth of cover
- Panel widths range from 190-325m with appropriately designed barrier pillars



# Historical Mine Workings Borehole Seam



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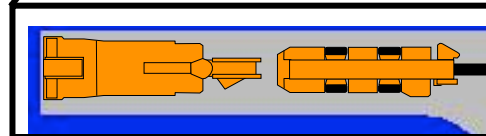
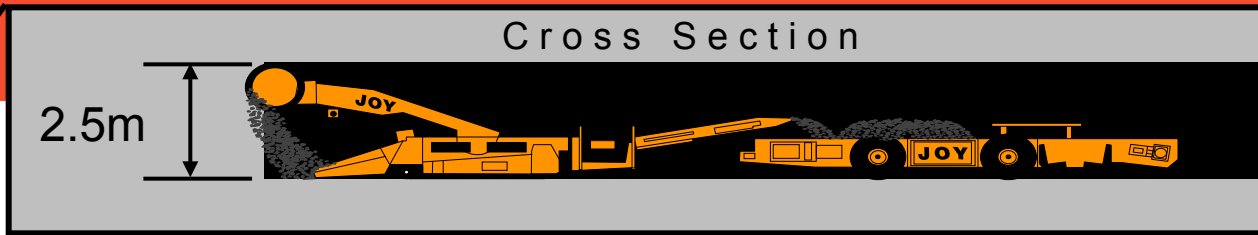
# Abel Mining Method

- Continuous miner based bord and pillar system
- Layout designed to minimise impact on sensitive surface areas while minimising resource sterilisation
- Panels range in width from 190 - 325m wide
  - 3 heading layout
- 1st workings (Roadway development)
  - 12CM30 single pass Continuous Miners (CM's)
  - Kopex shuttle cars (10t capacity)
  - Dual CM Unit (35- 45m/shift)
- 2nd workings (Pillar extraction)
  - 1,000 tonnes per shift
  - 3 x Joy 12CM12 CM's
  - 9 x Breaker Line Supports (BLS's)
  - 3 panel 6 day roster working 2 x 10hr production shifts
  - Maintenance & partial production Mon-Fri on D/S

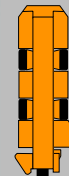
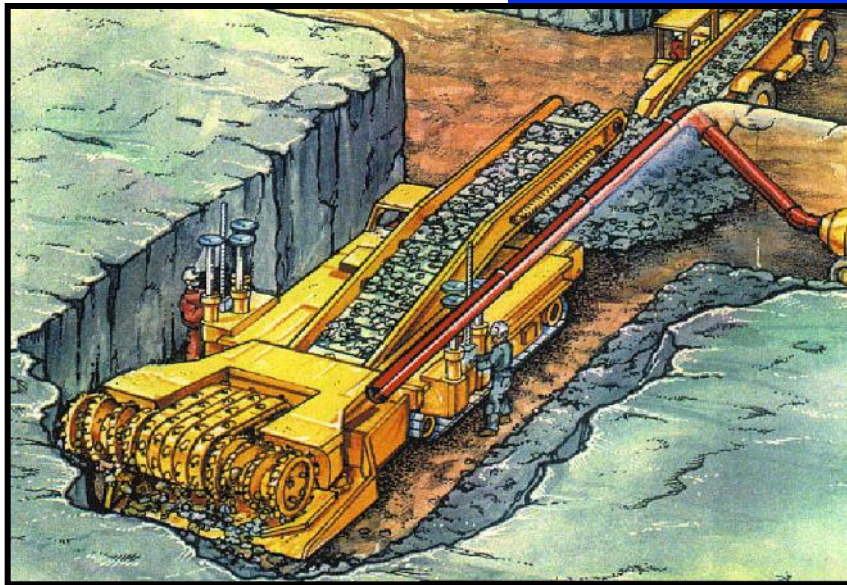




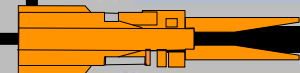
# Bord & Pillar Mining at Abel



Continuous Miner



Shuttle Car

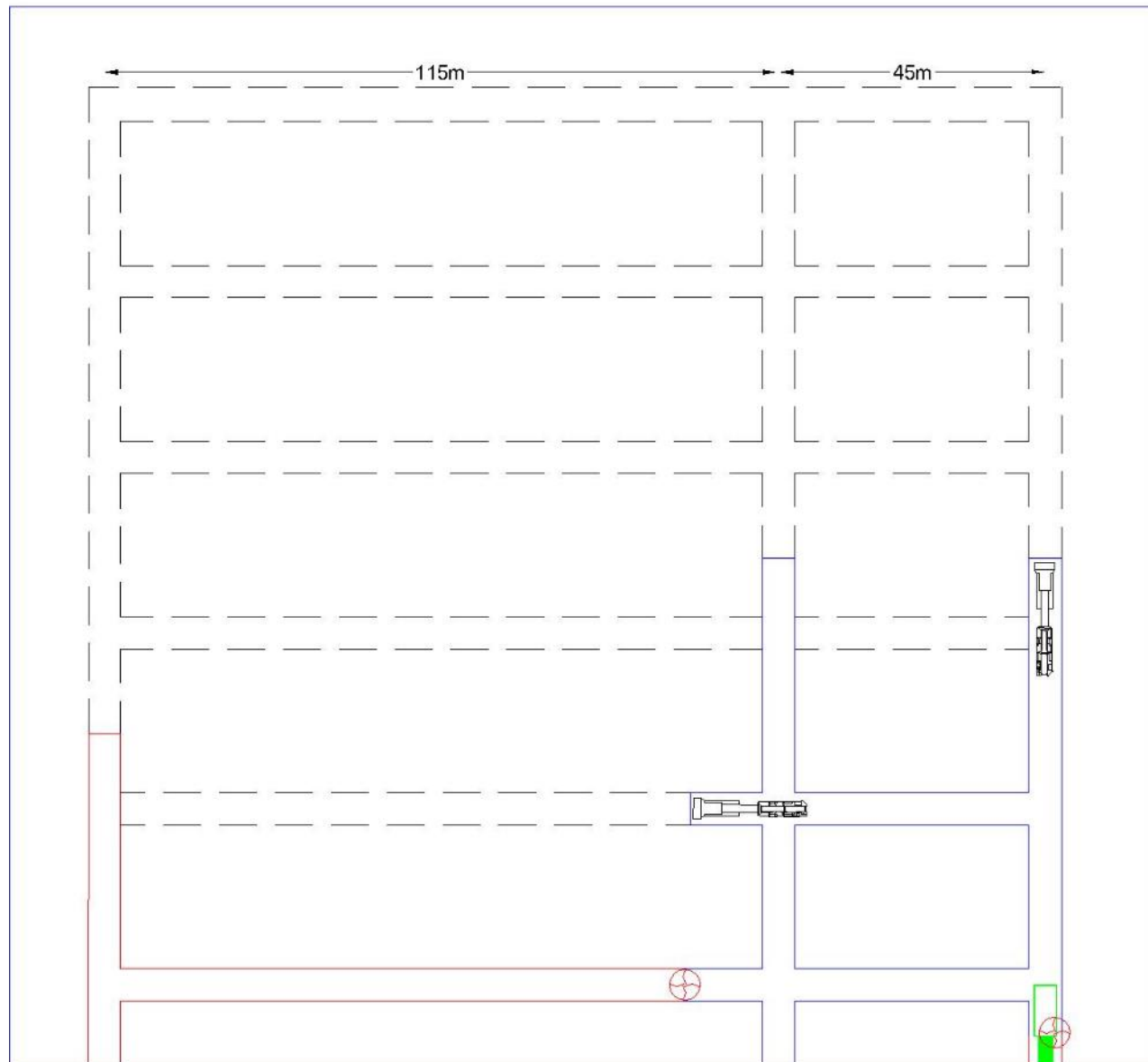


Feeder Breaker

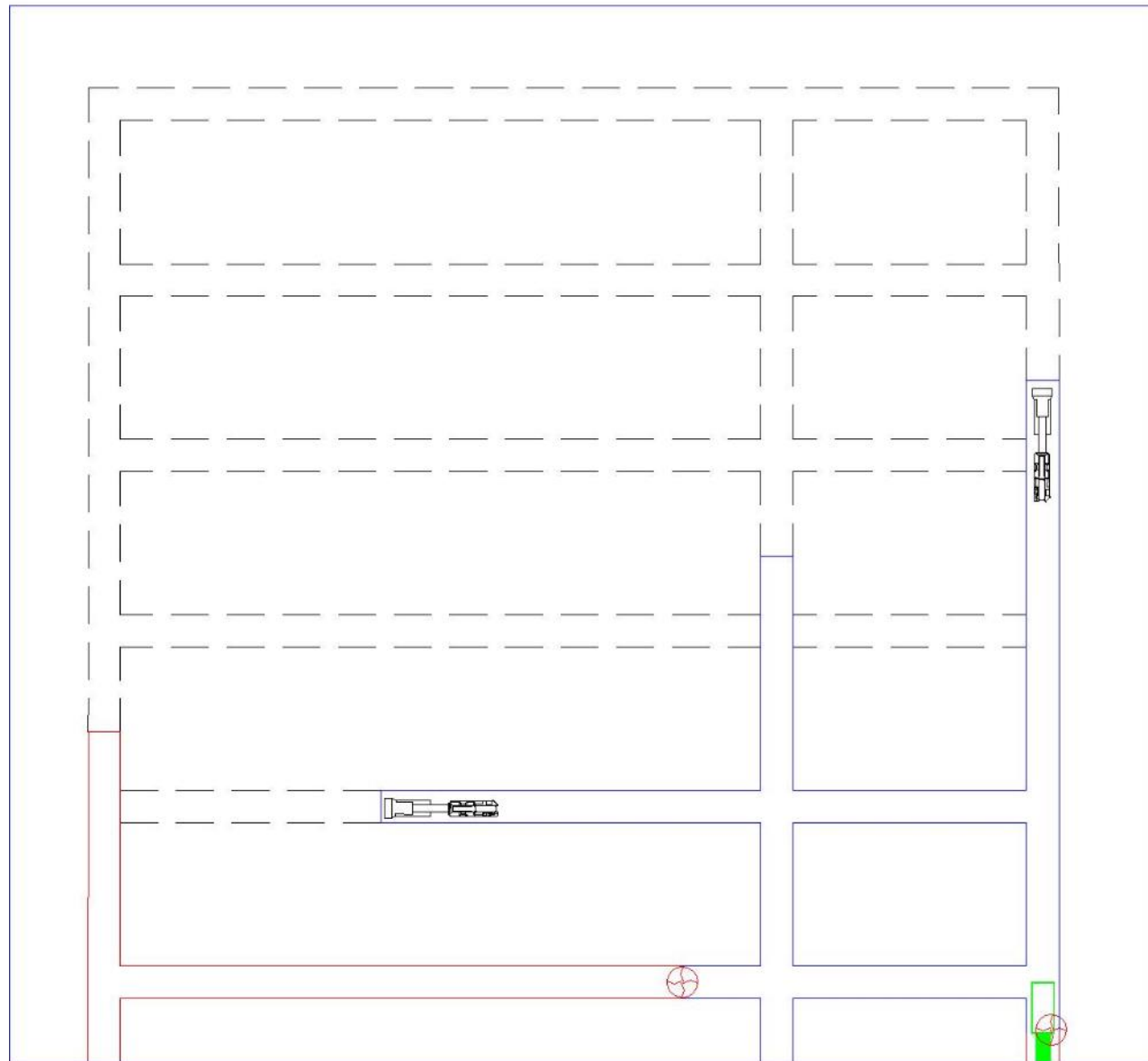
Pillar of Coal

# First workings

- First workings are roadways driven to form pillars. Development of main headings and panel roads to establish access to the coal in the Pillar Extraction panels.

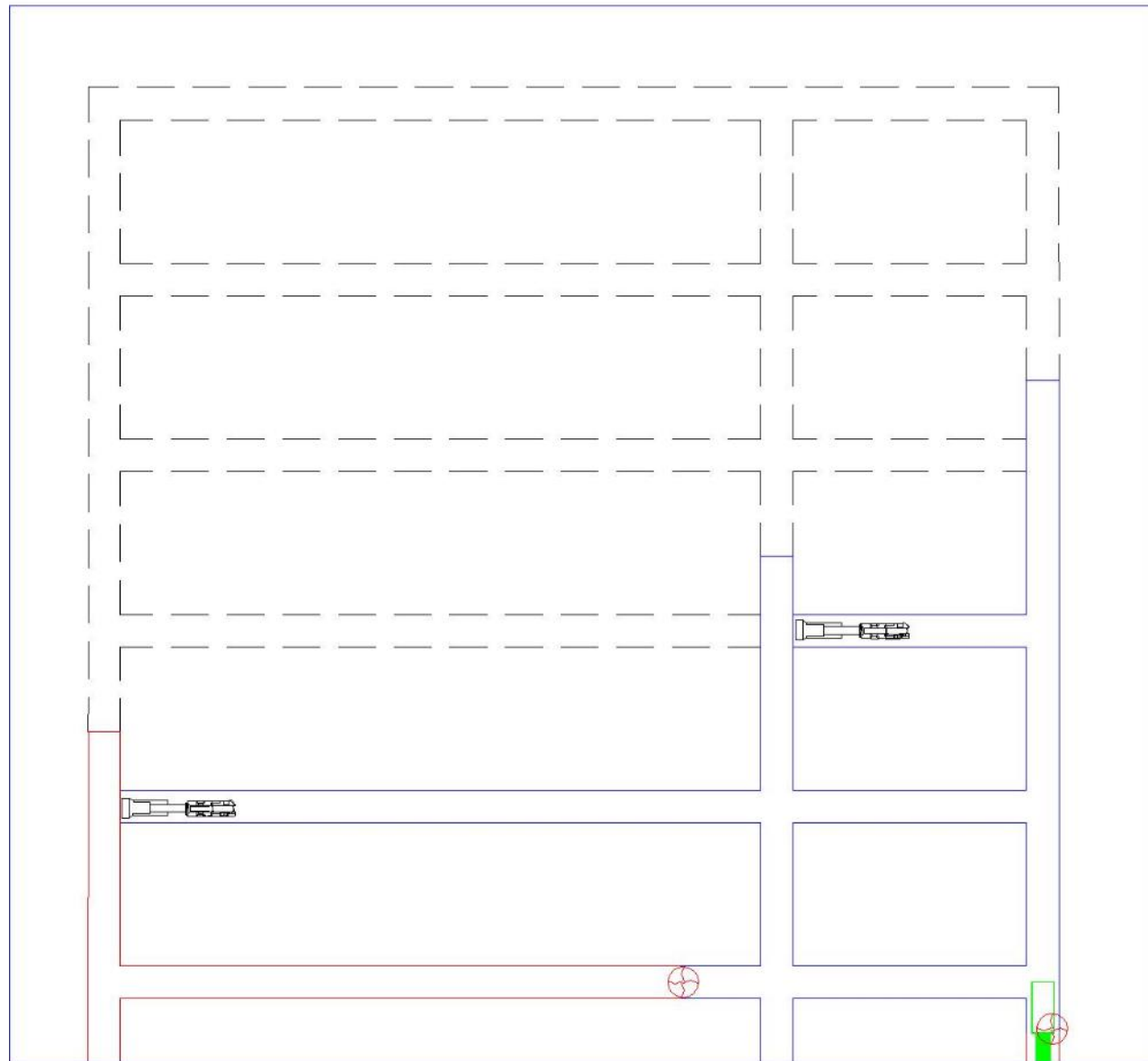


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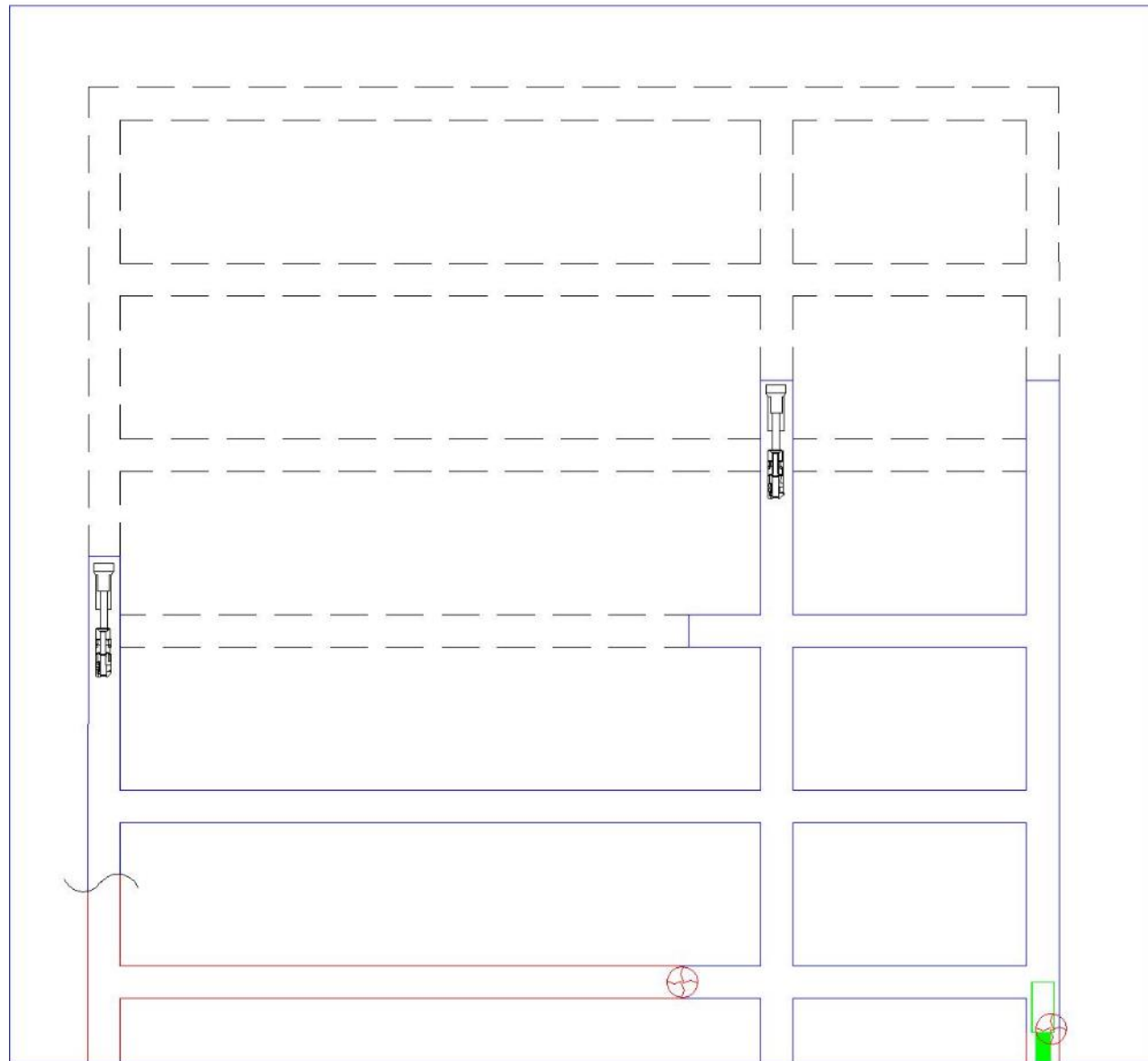


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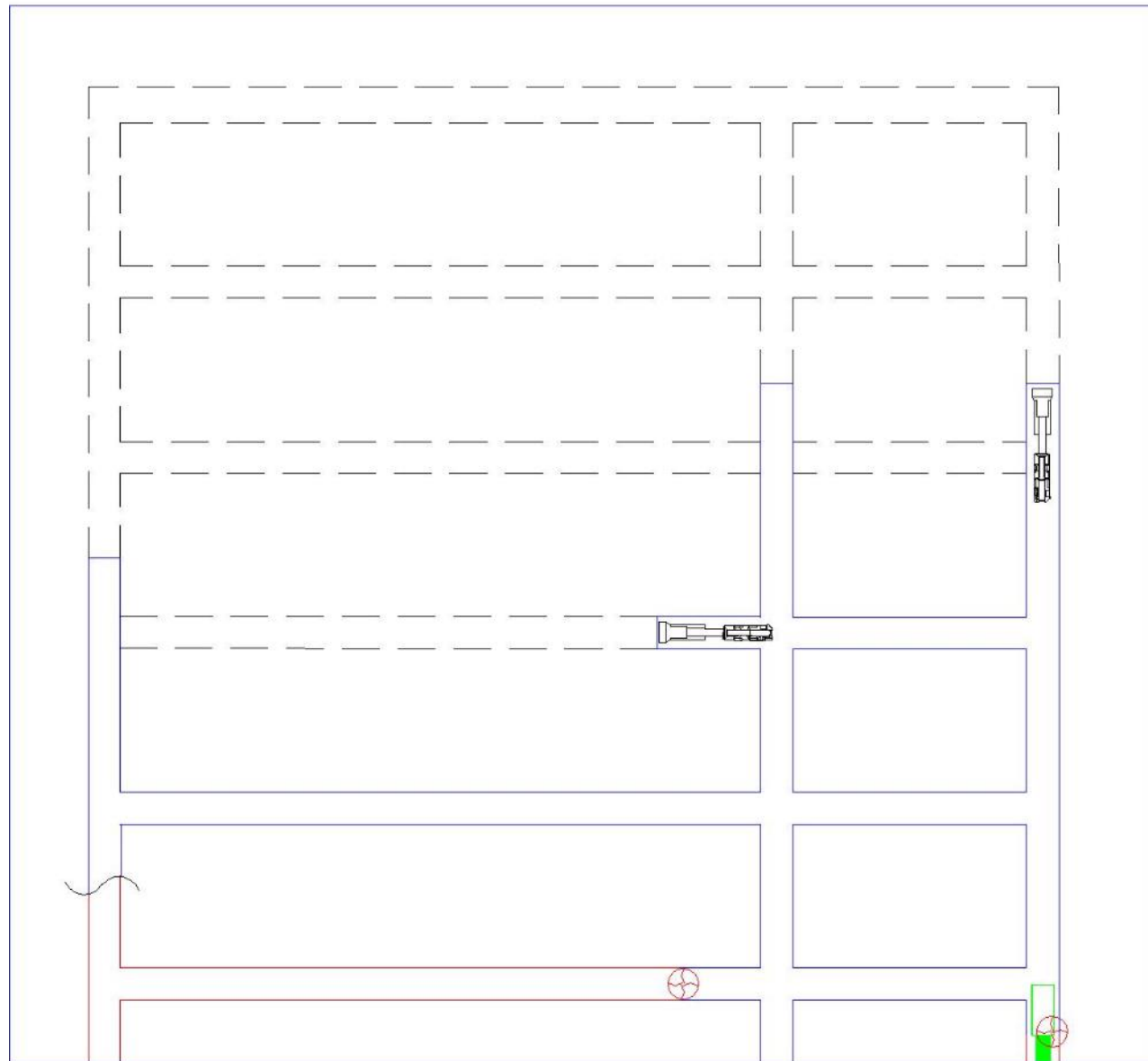




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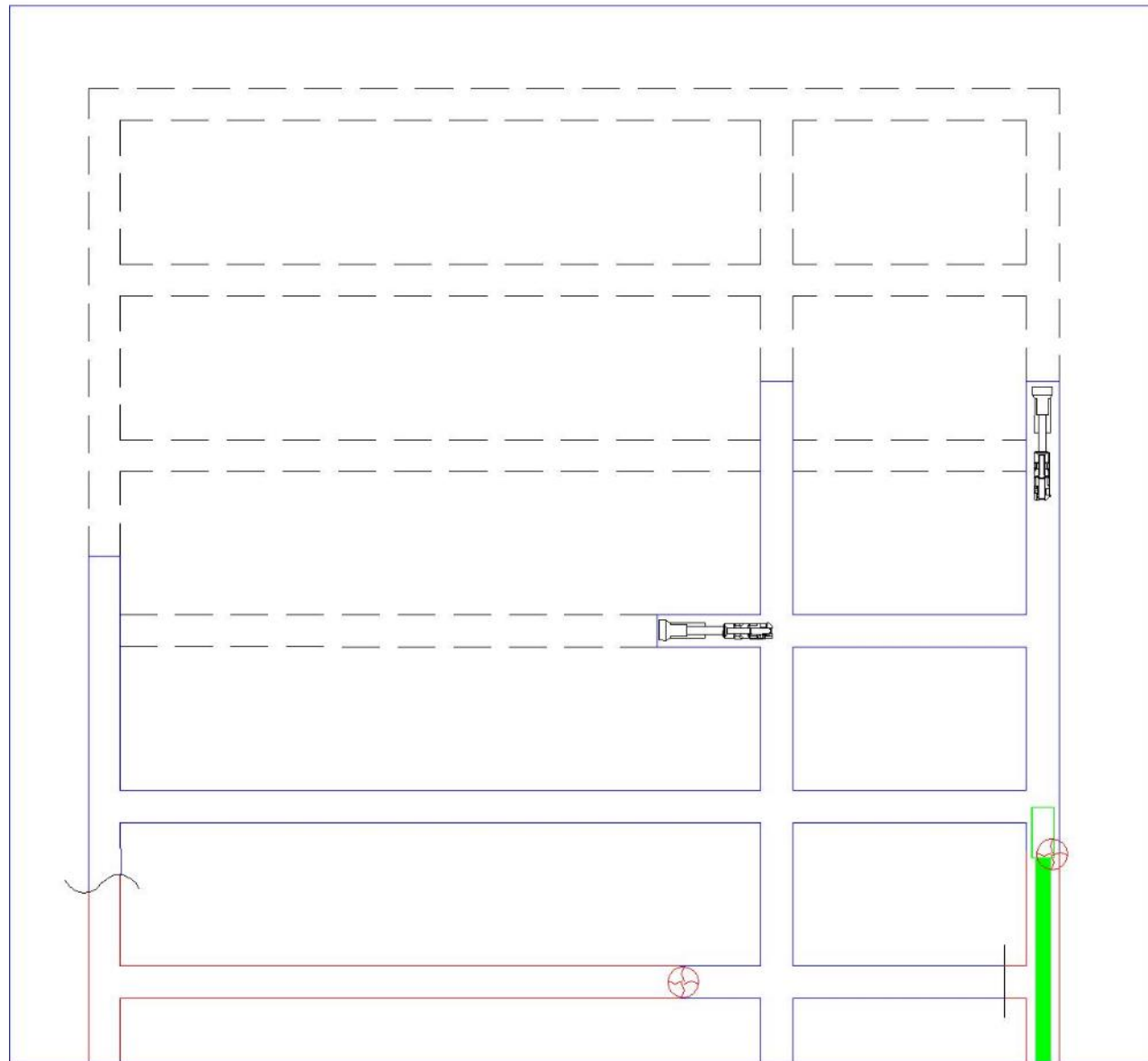


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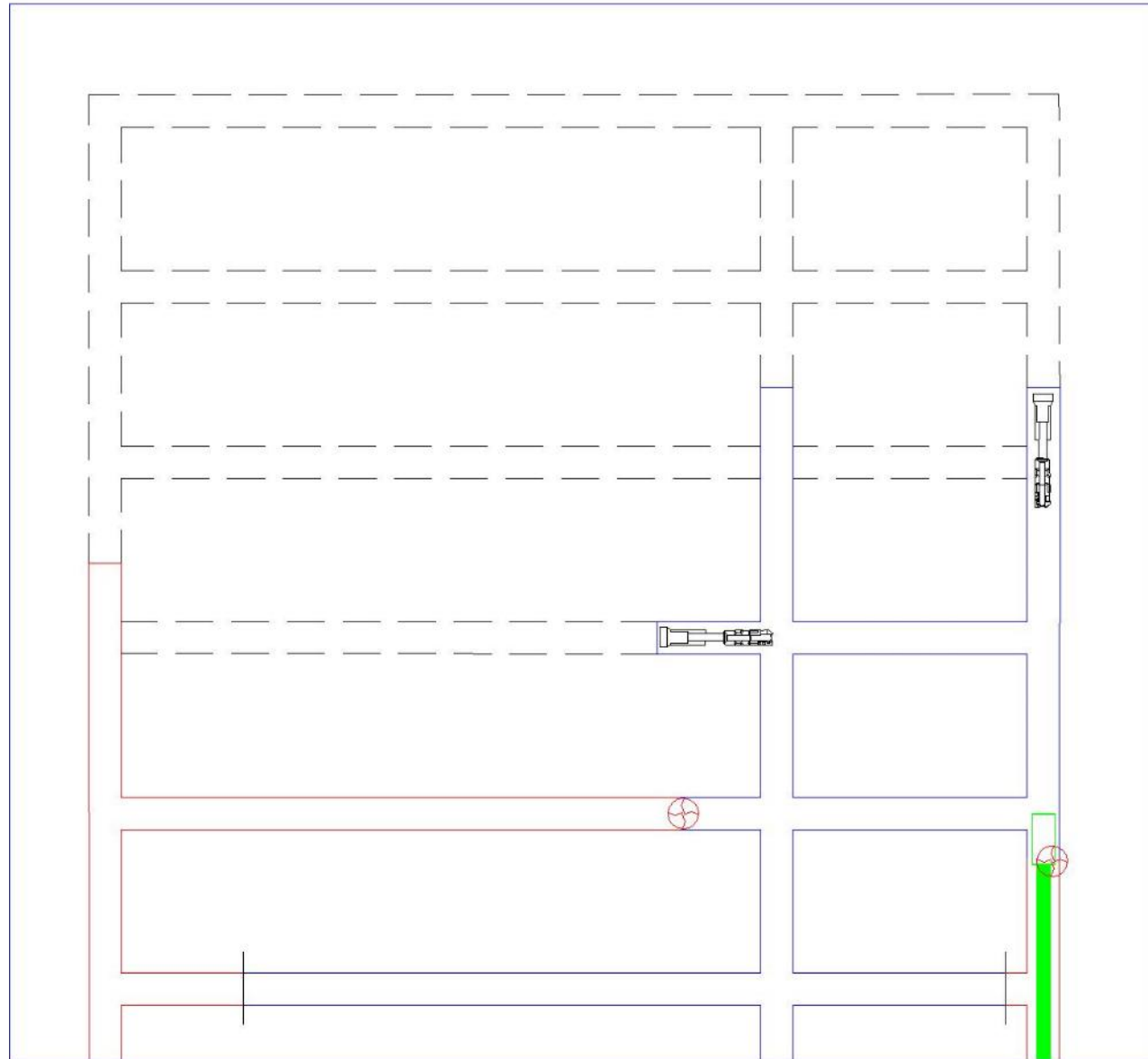


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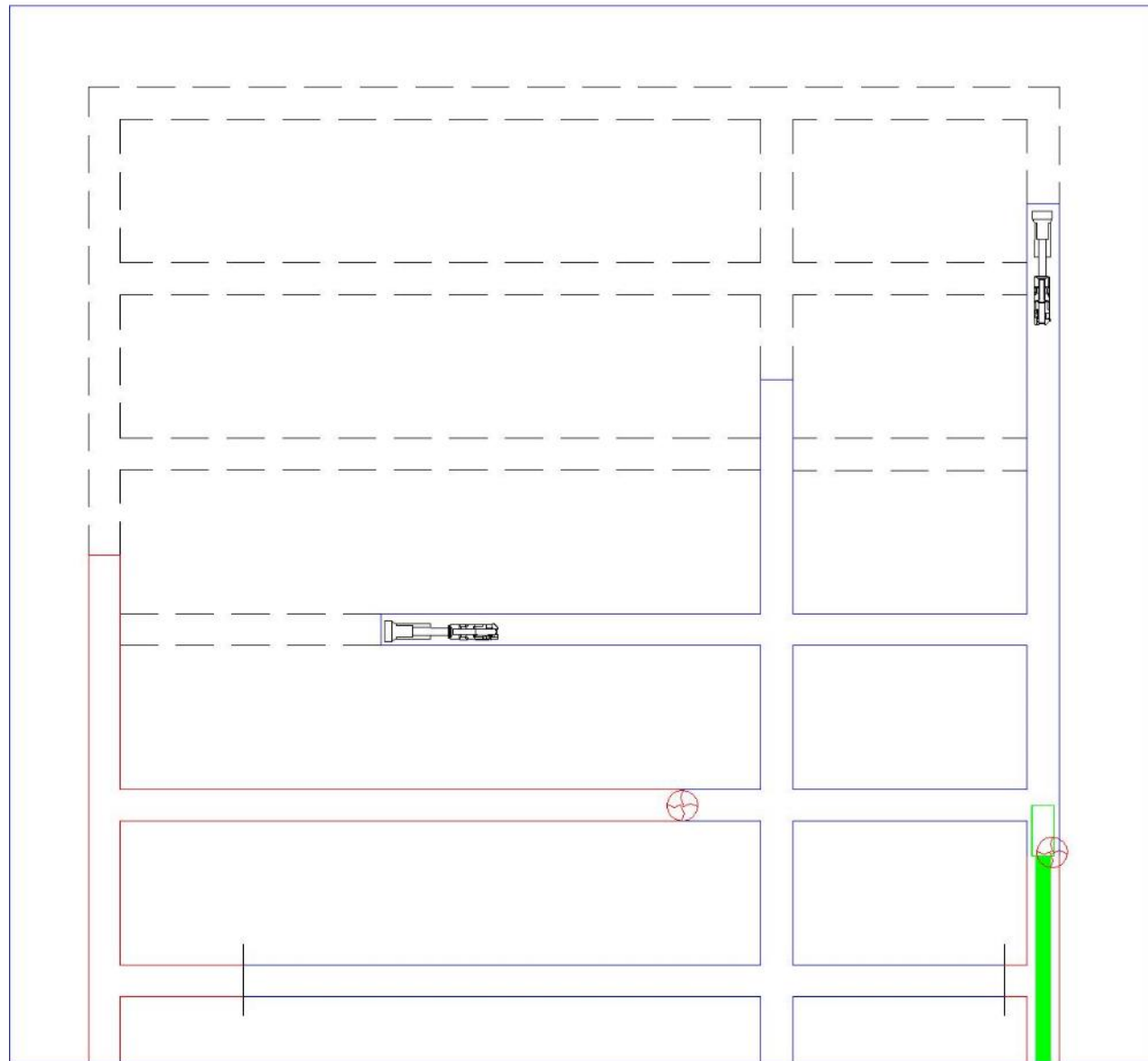




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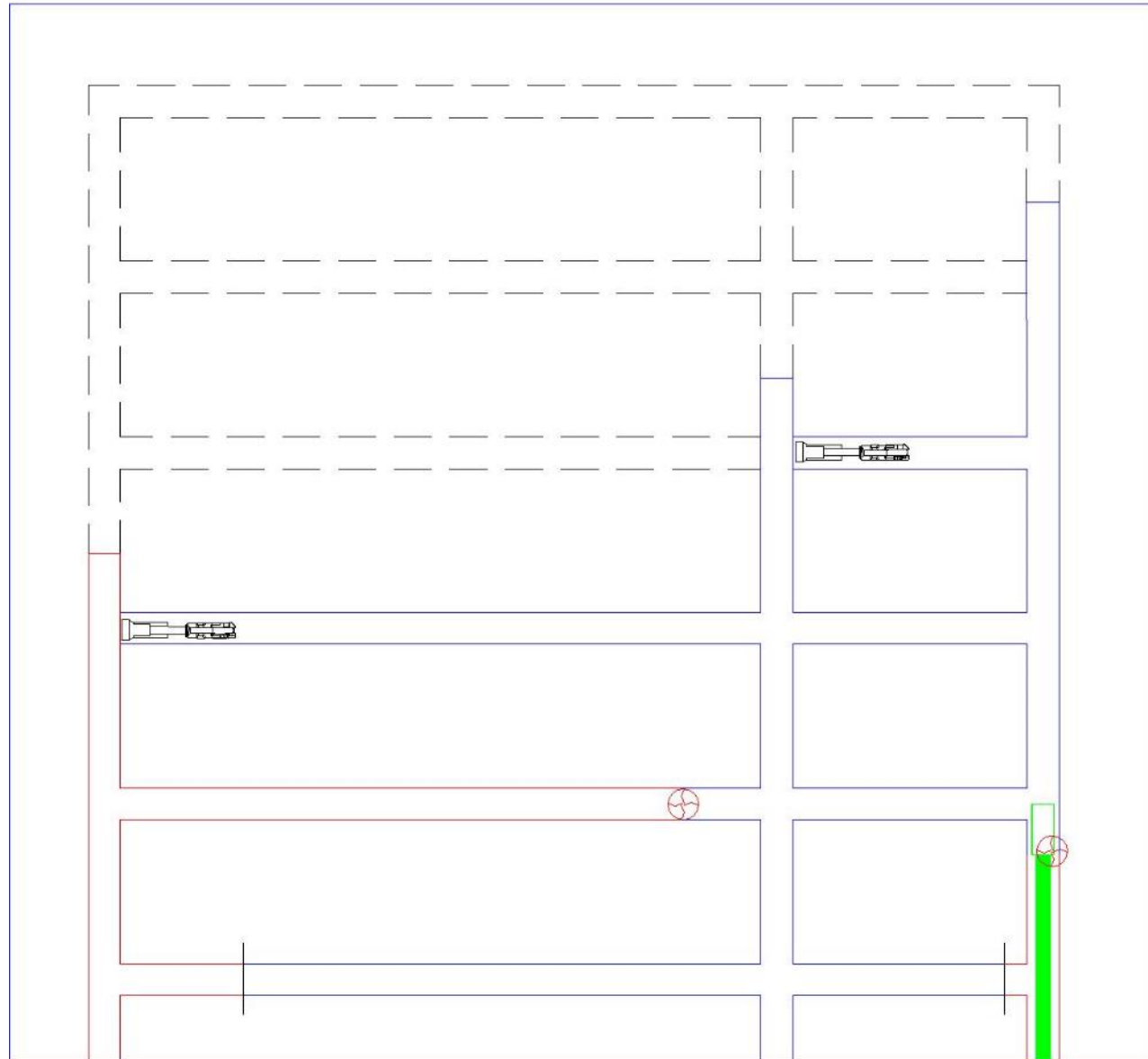


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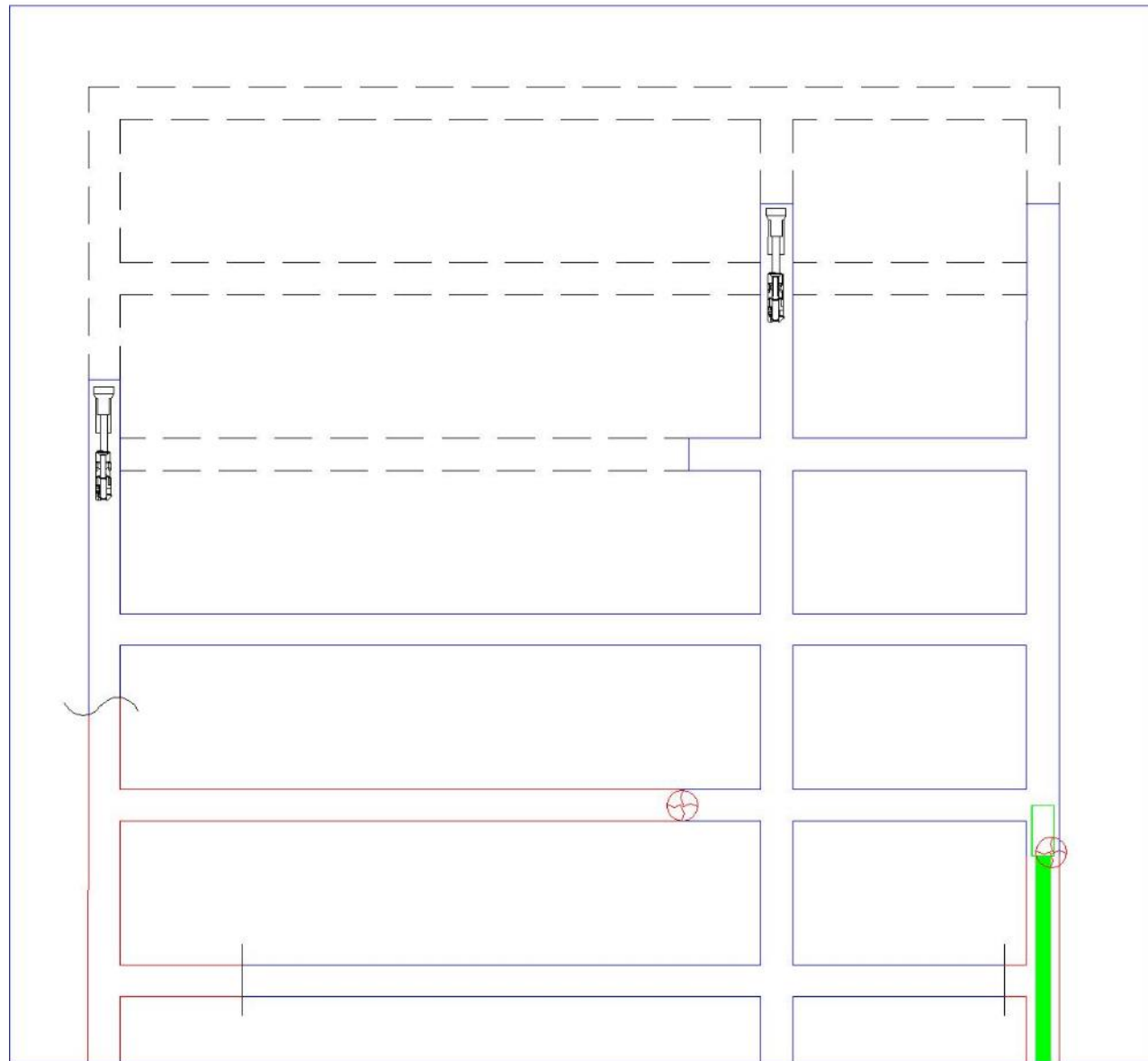


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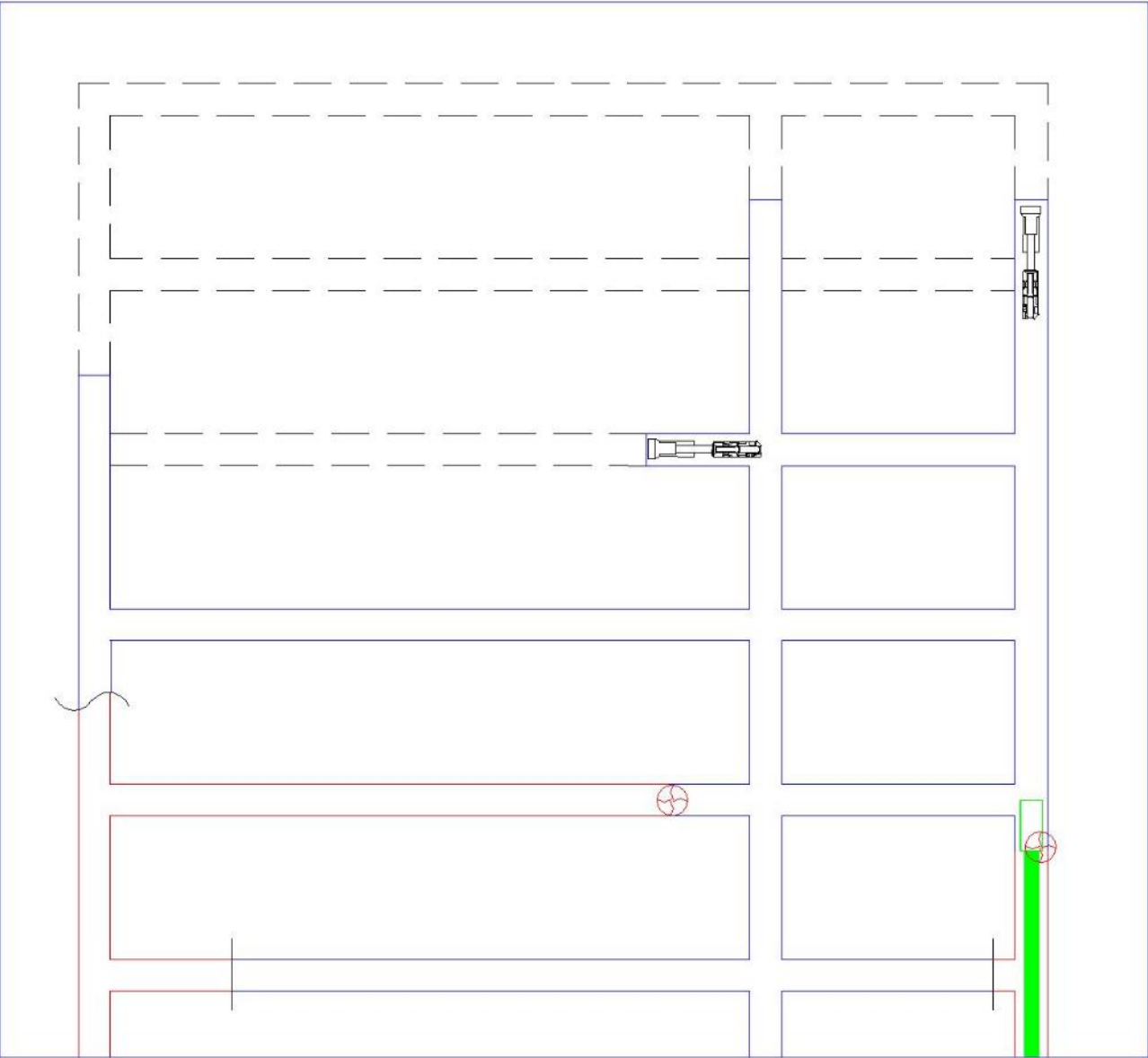




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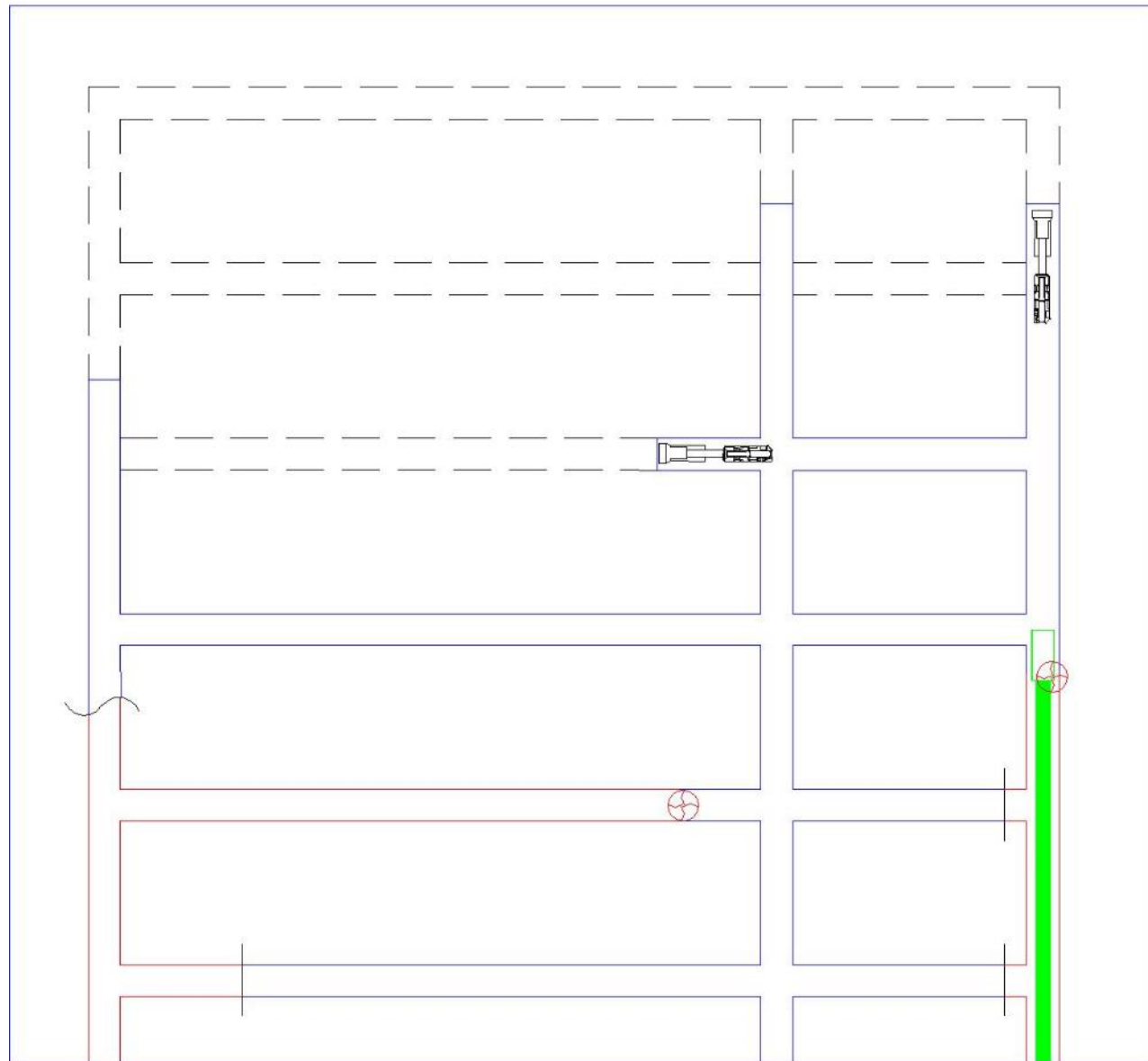


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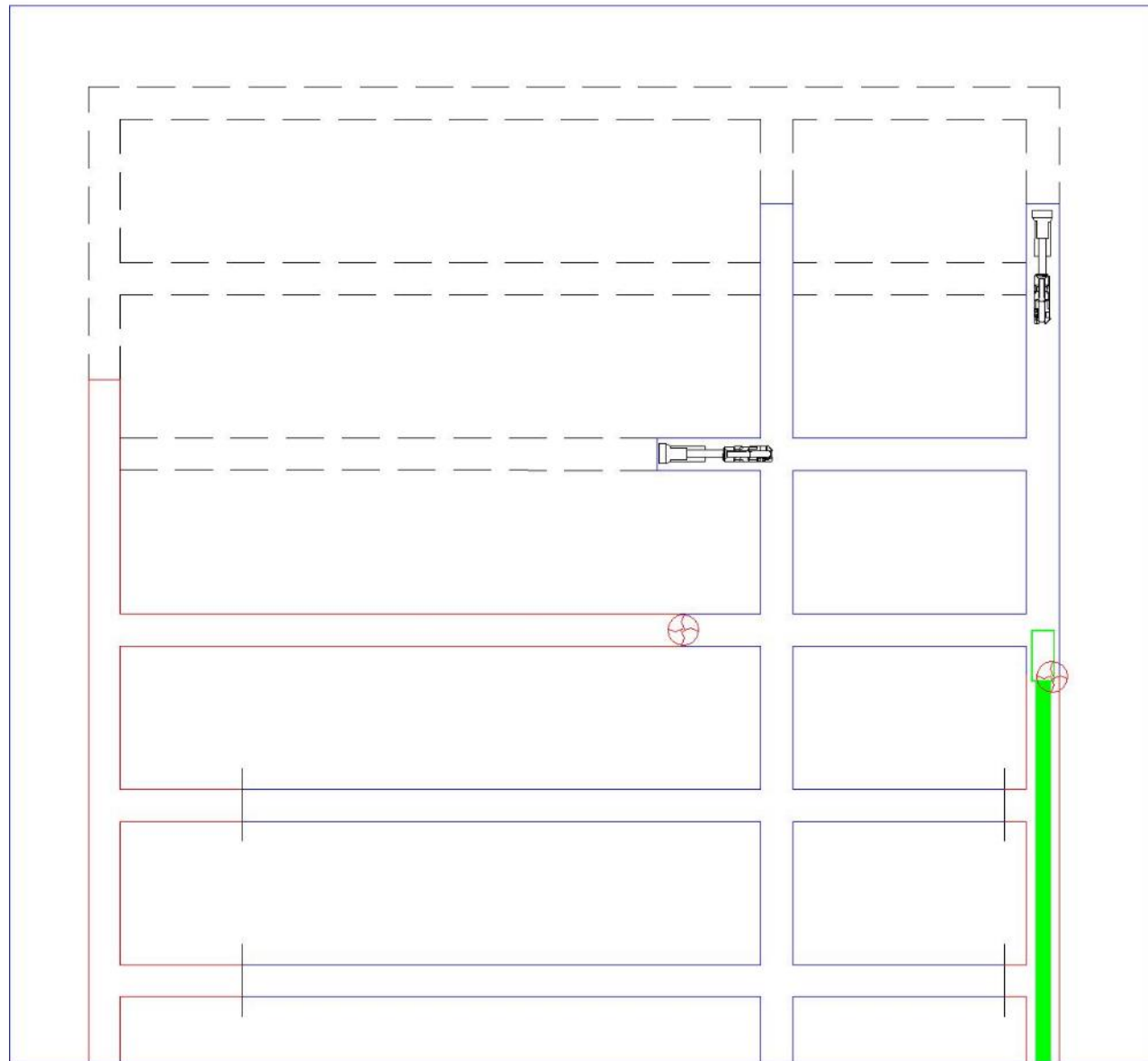


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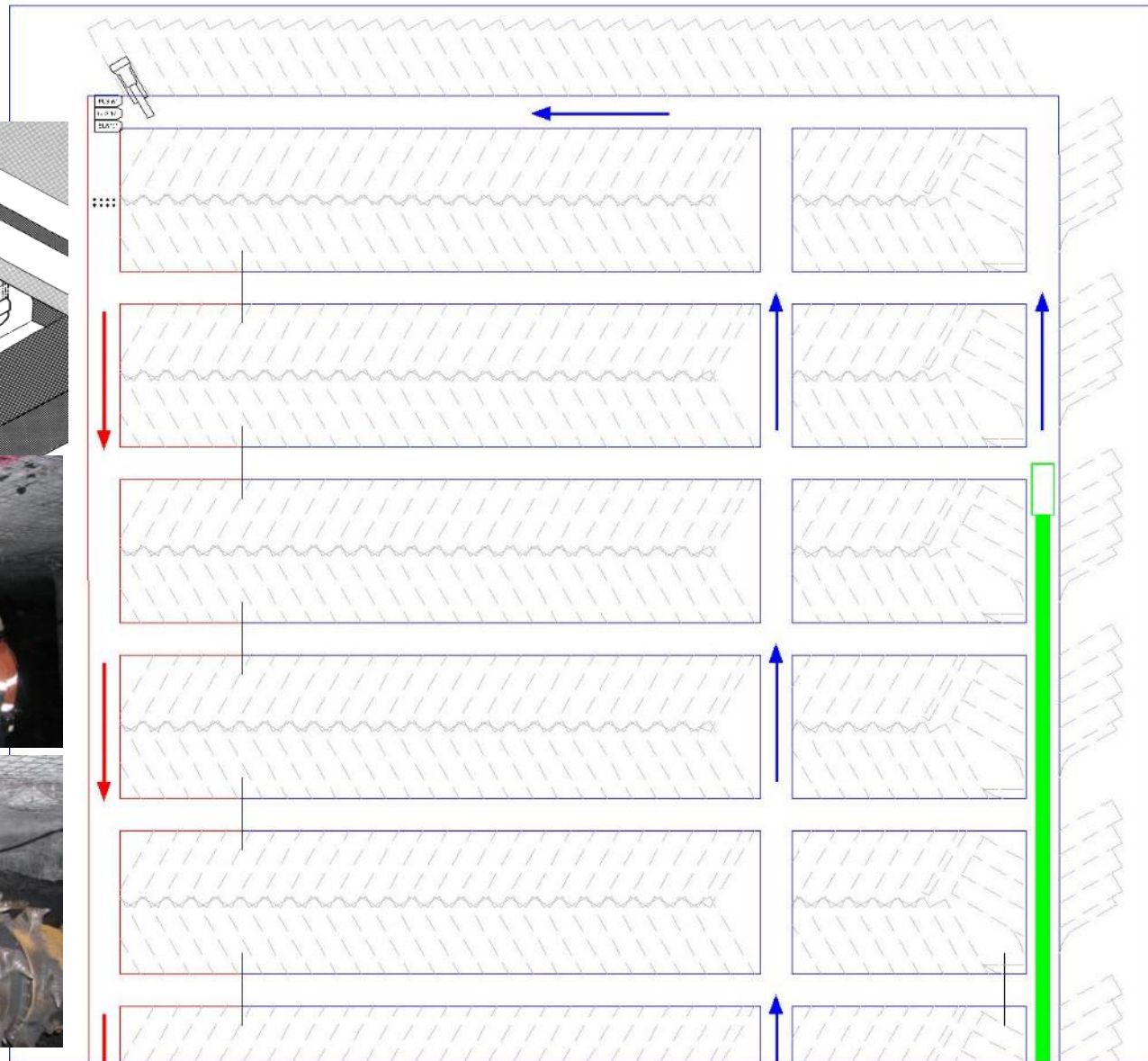
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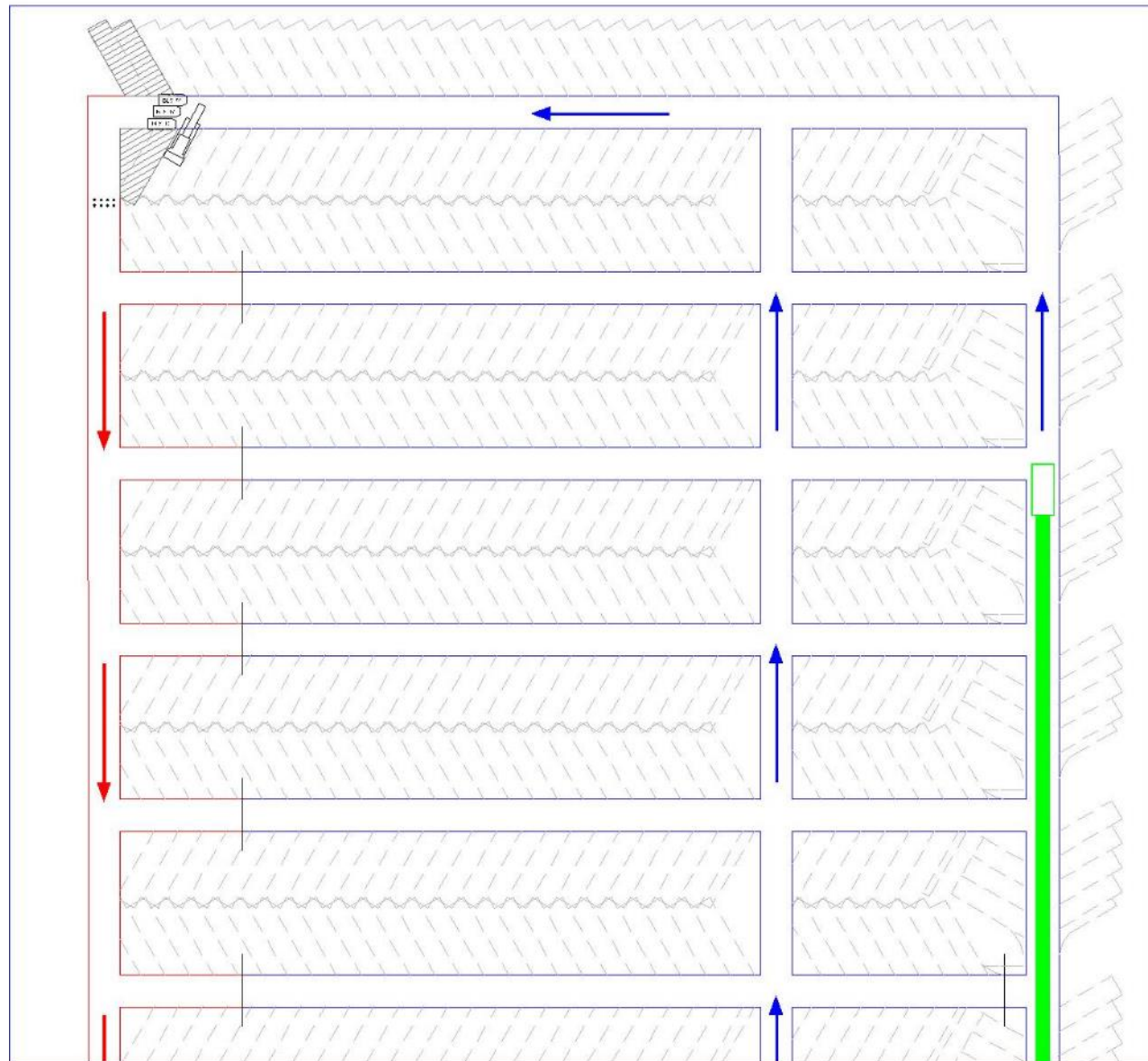
## 2<sup>nd</sup> WORKINGS

- Once 1<sup>st</sup> workings Development is completed, secondary extraction commences
- Extraction of coal from pillars formed during development

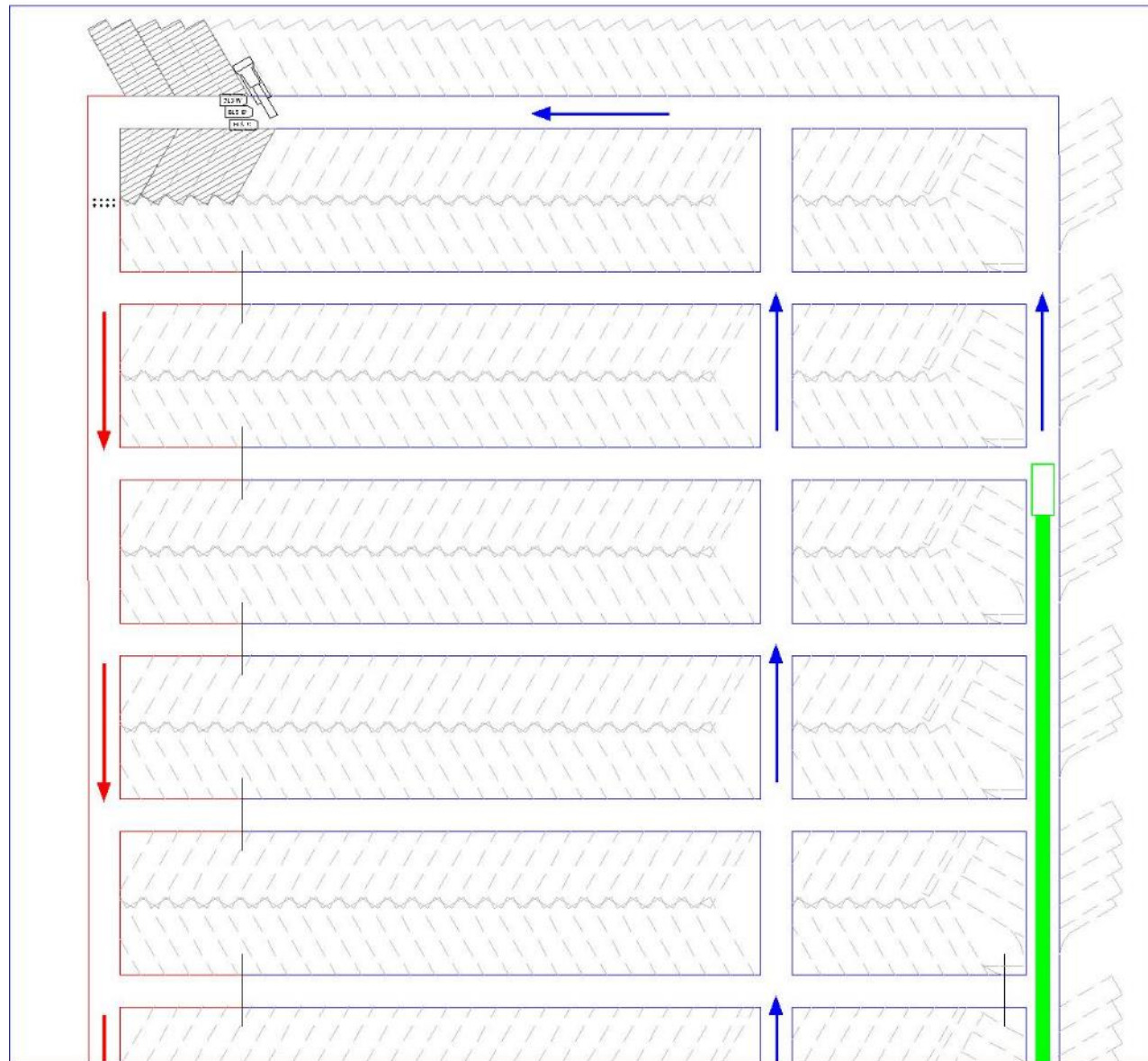




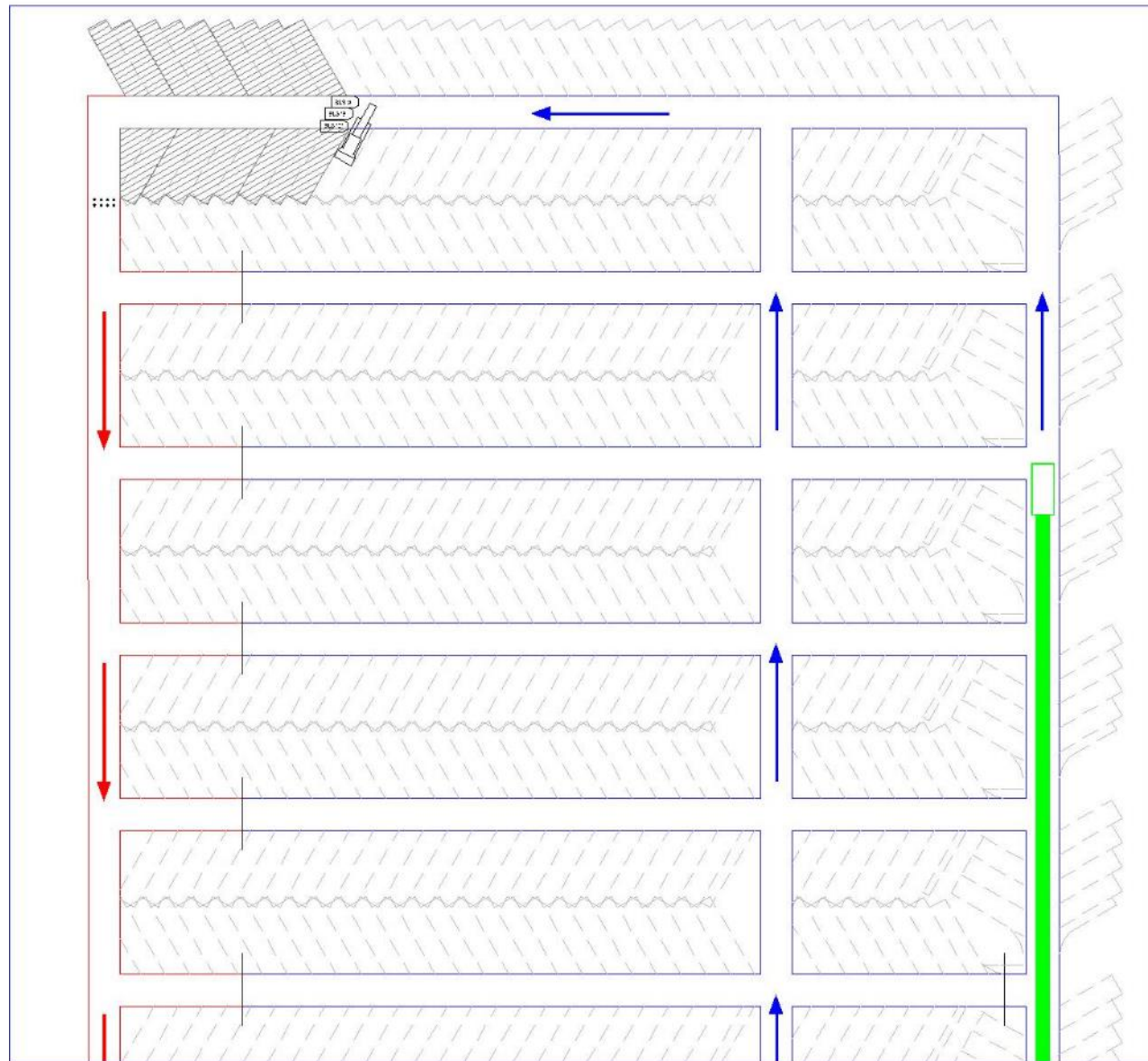
**DONALDSON COAL**  
Part of the Yancoal Australia Group



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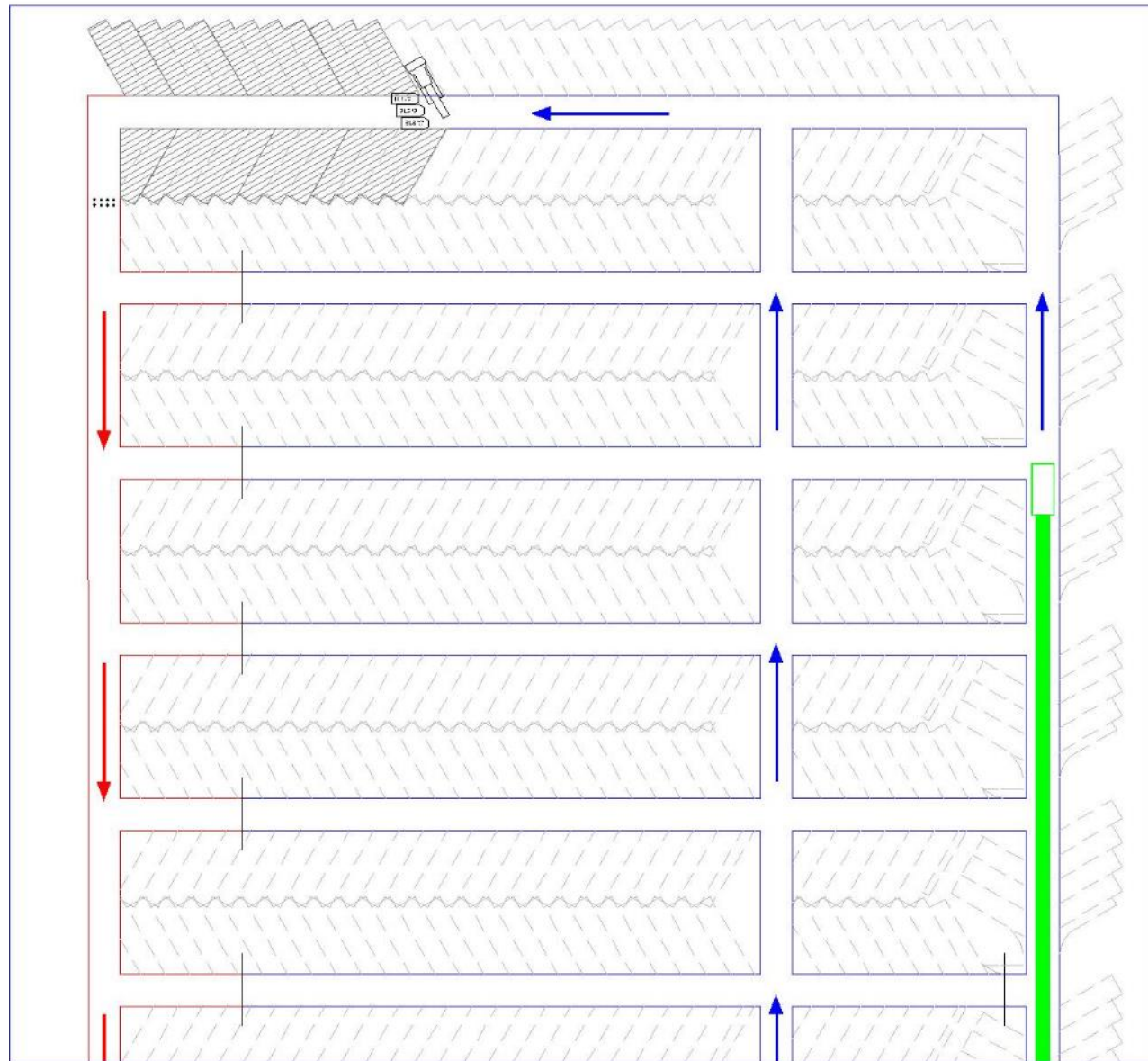




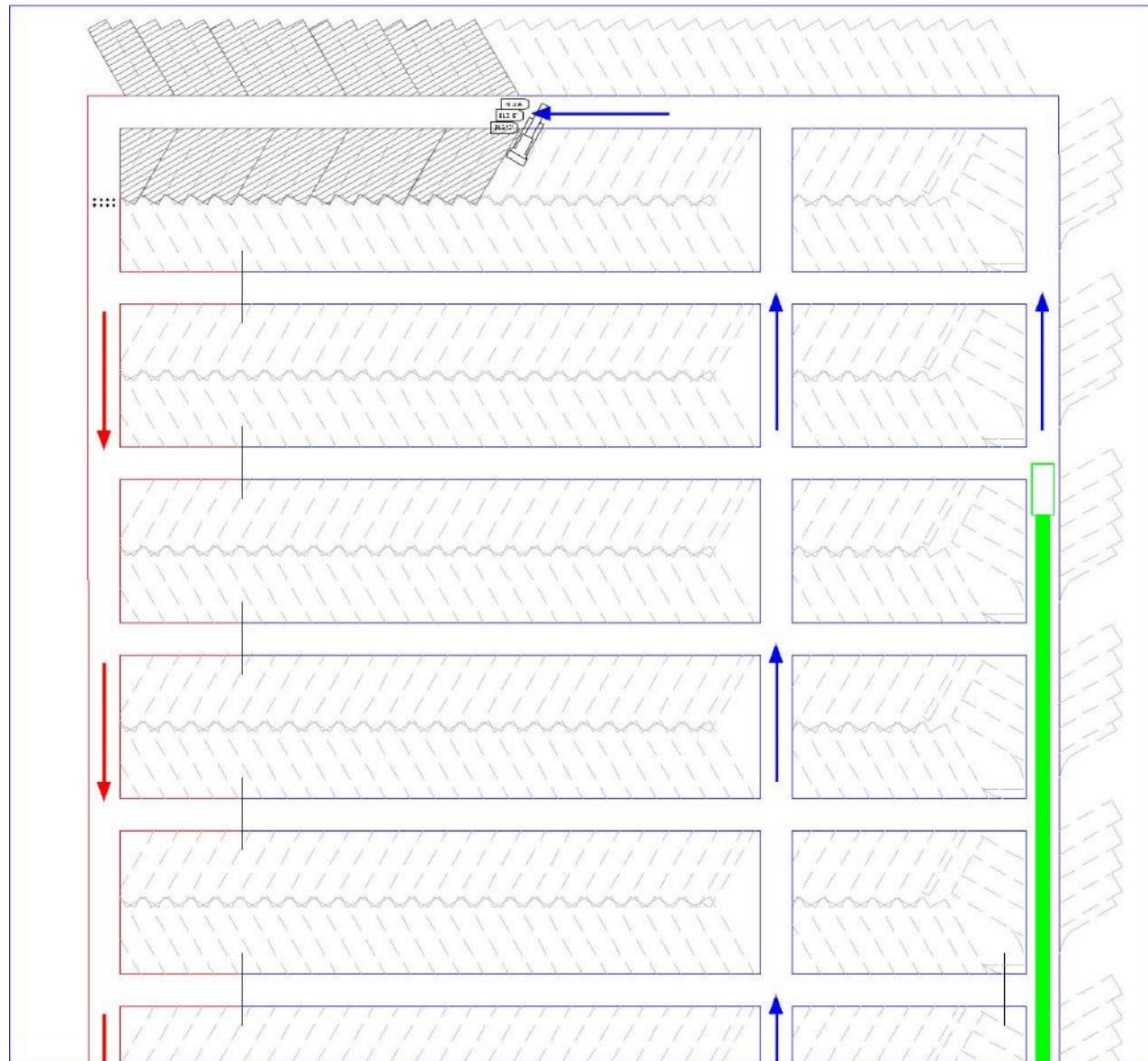


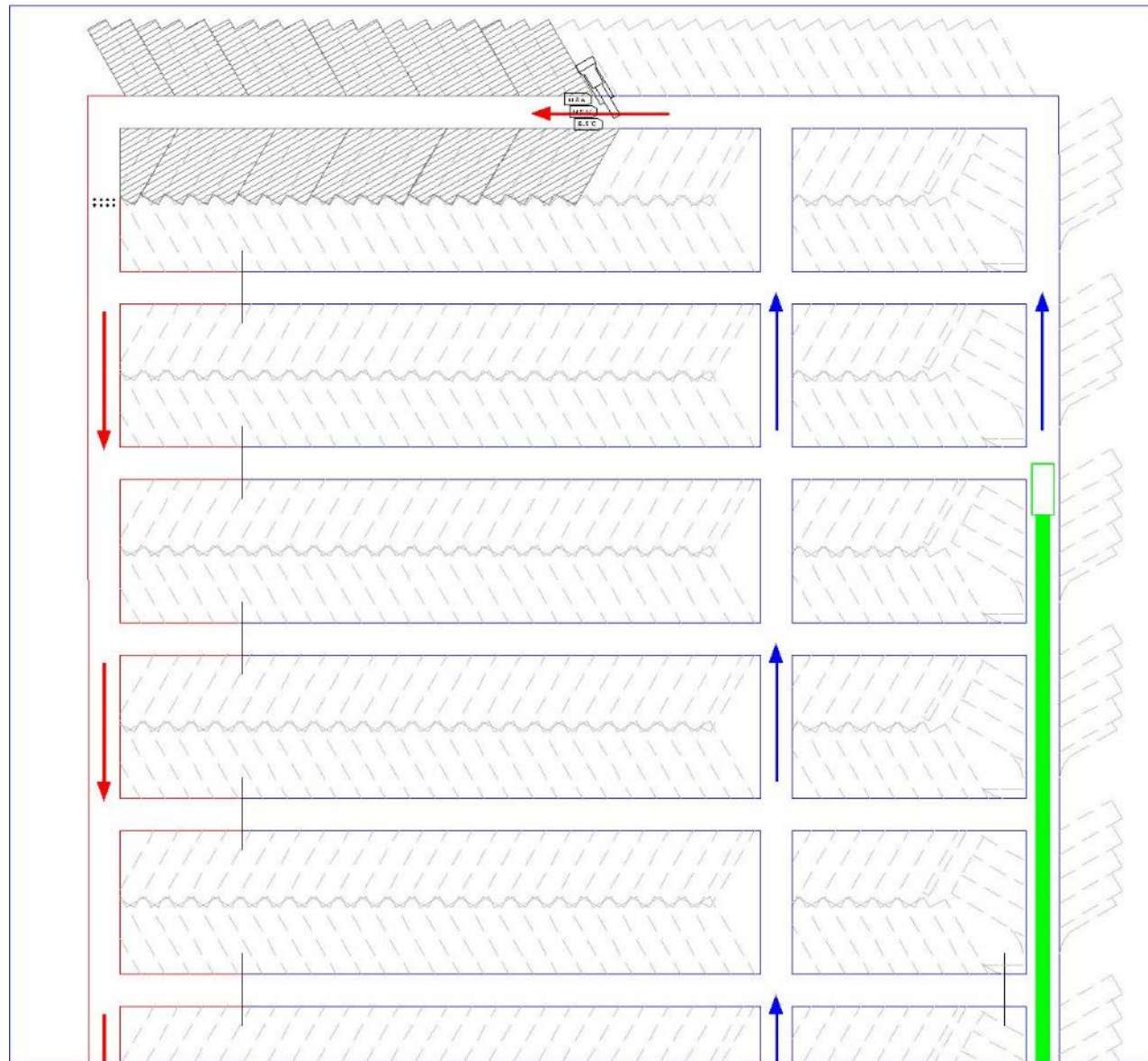
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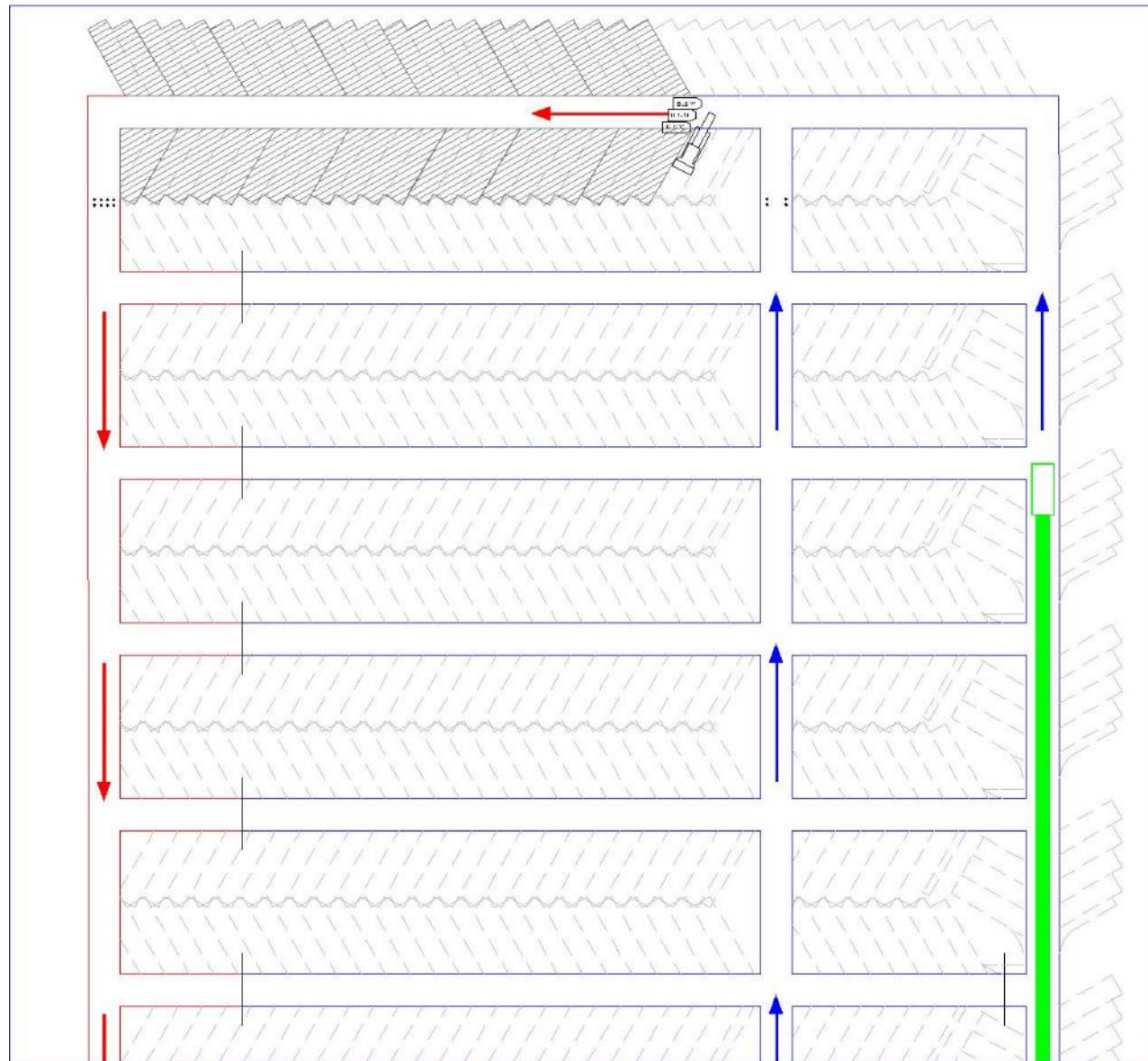
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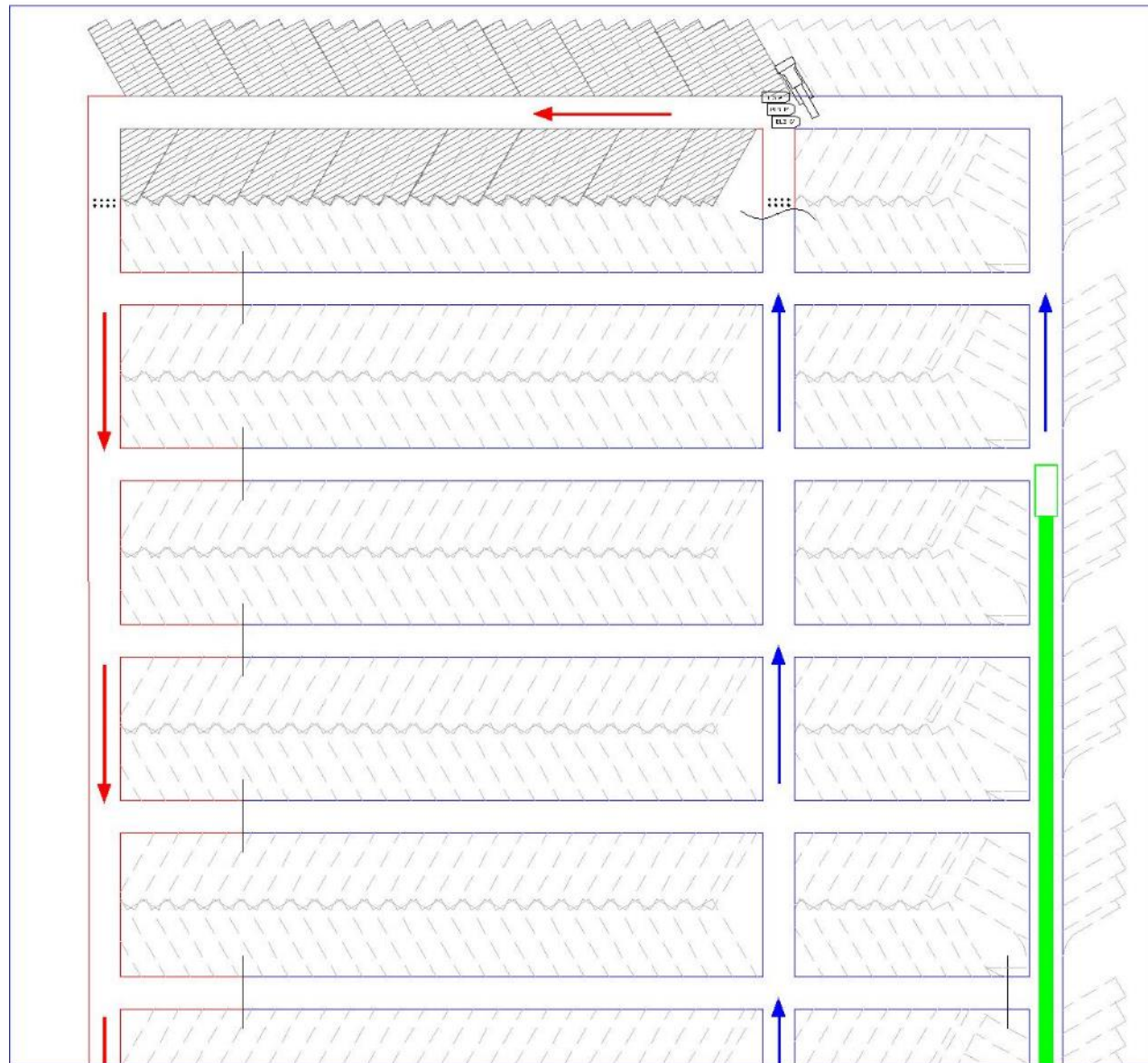
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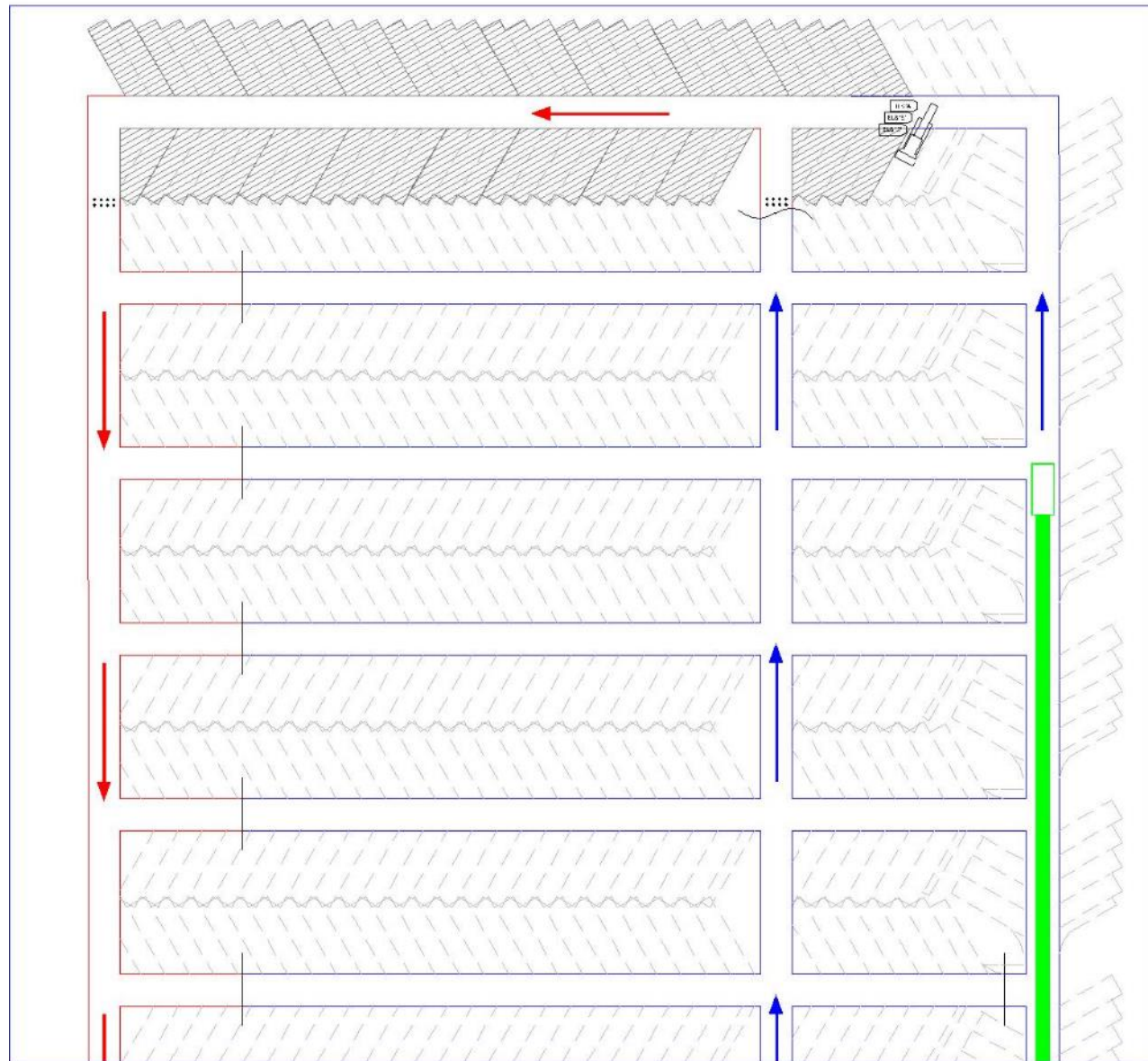


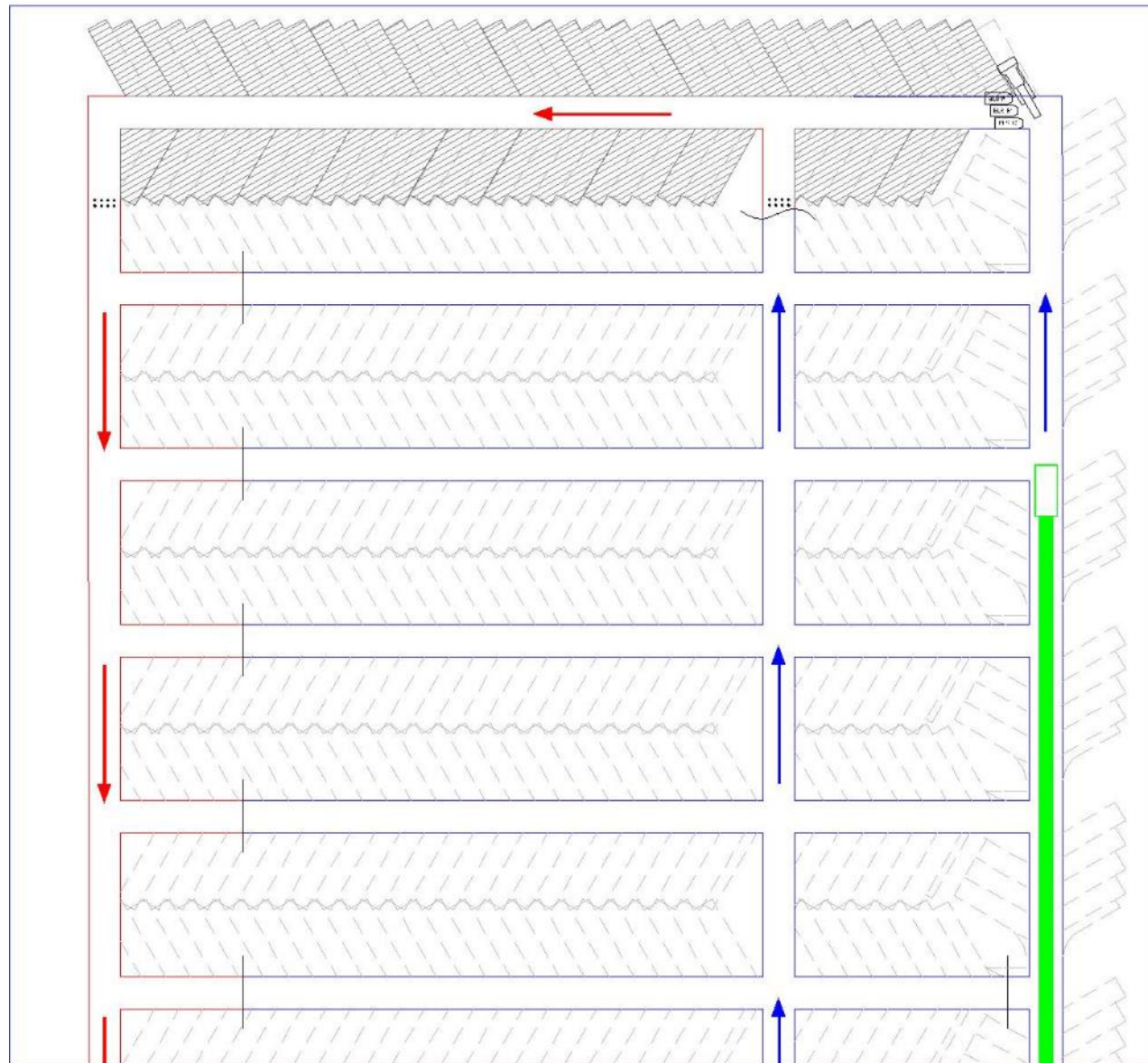
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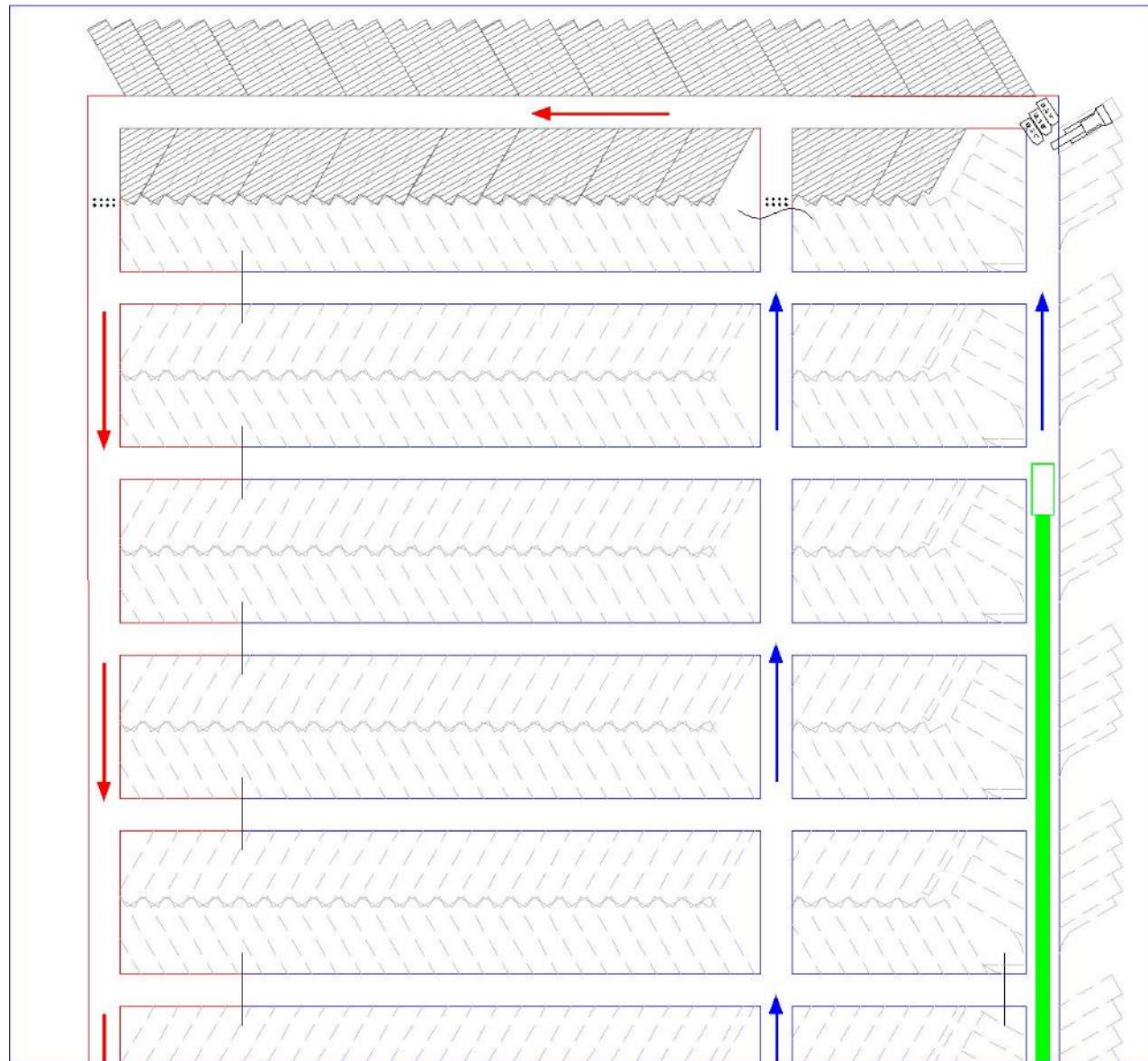
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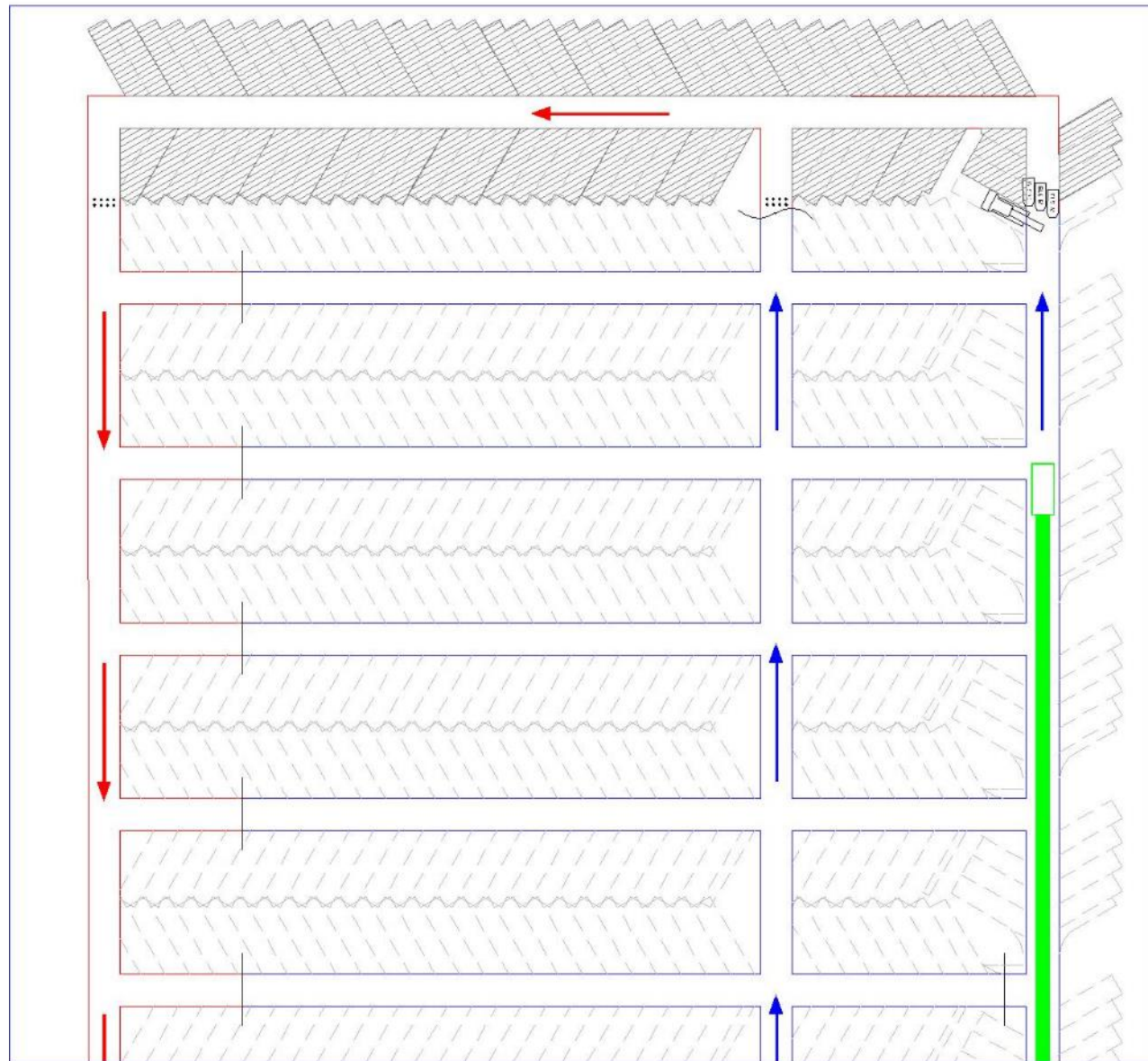
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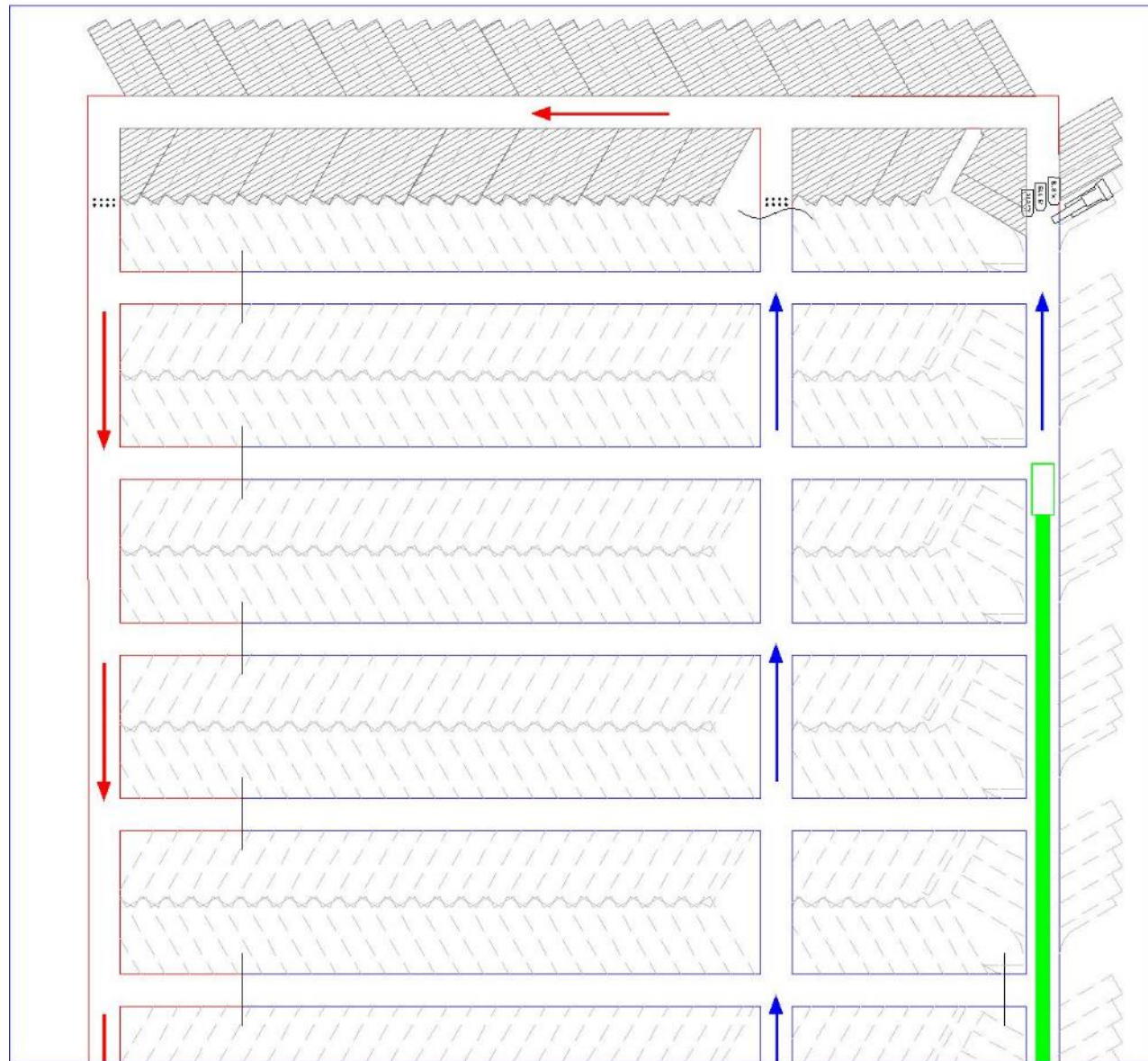


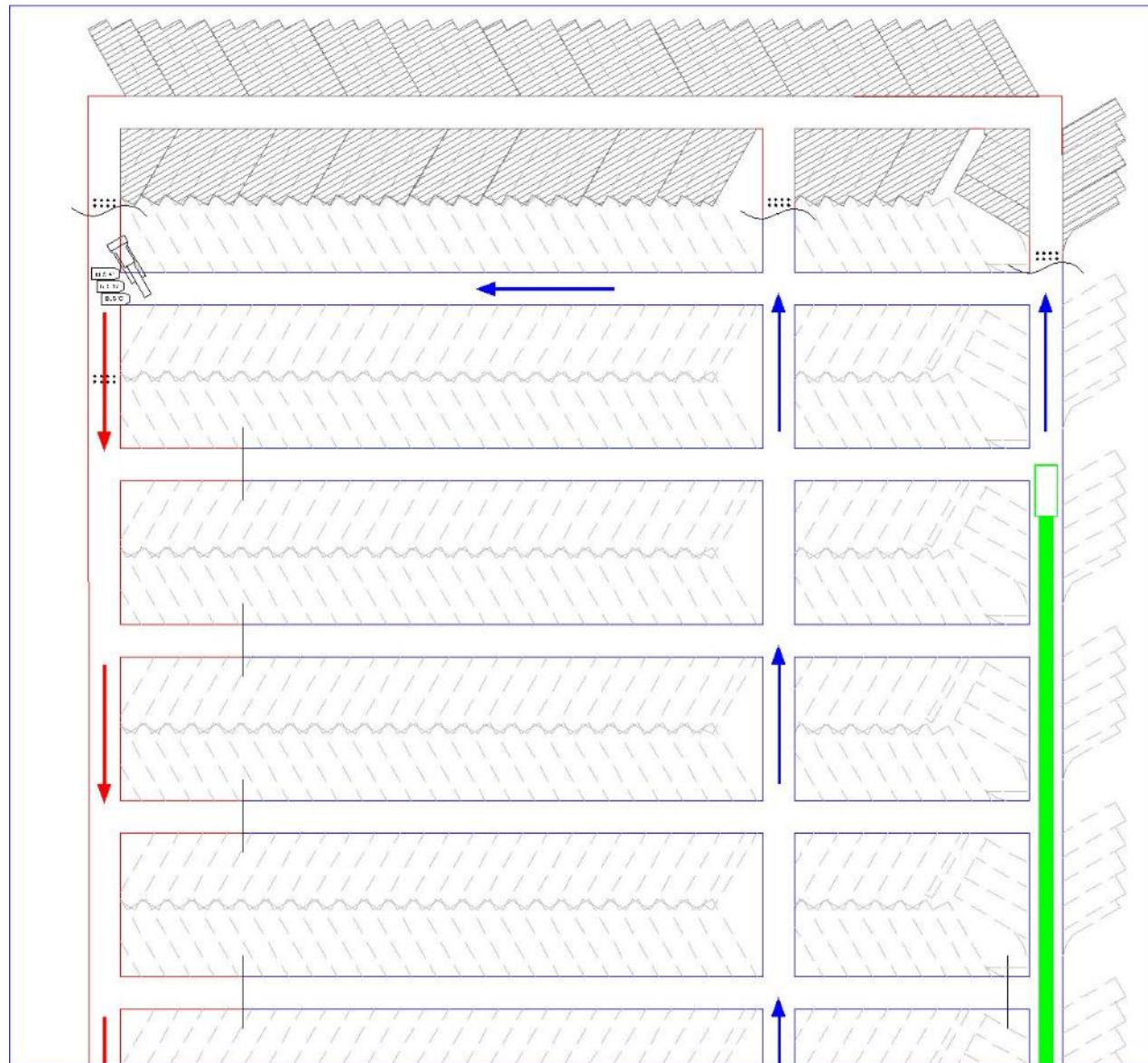
May 6, 2014





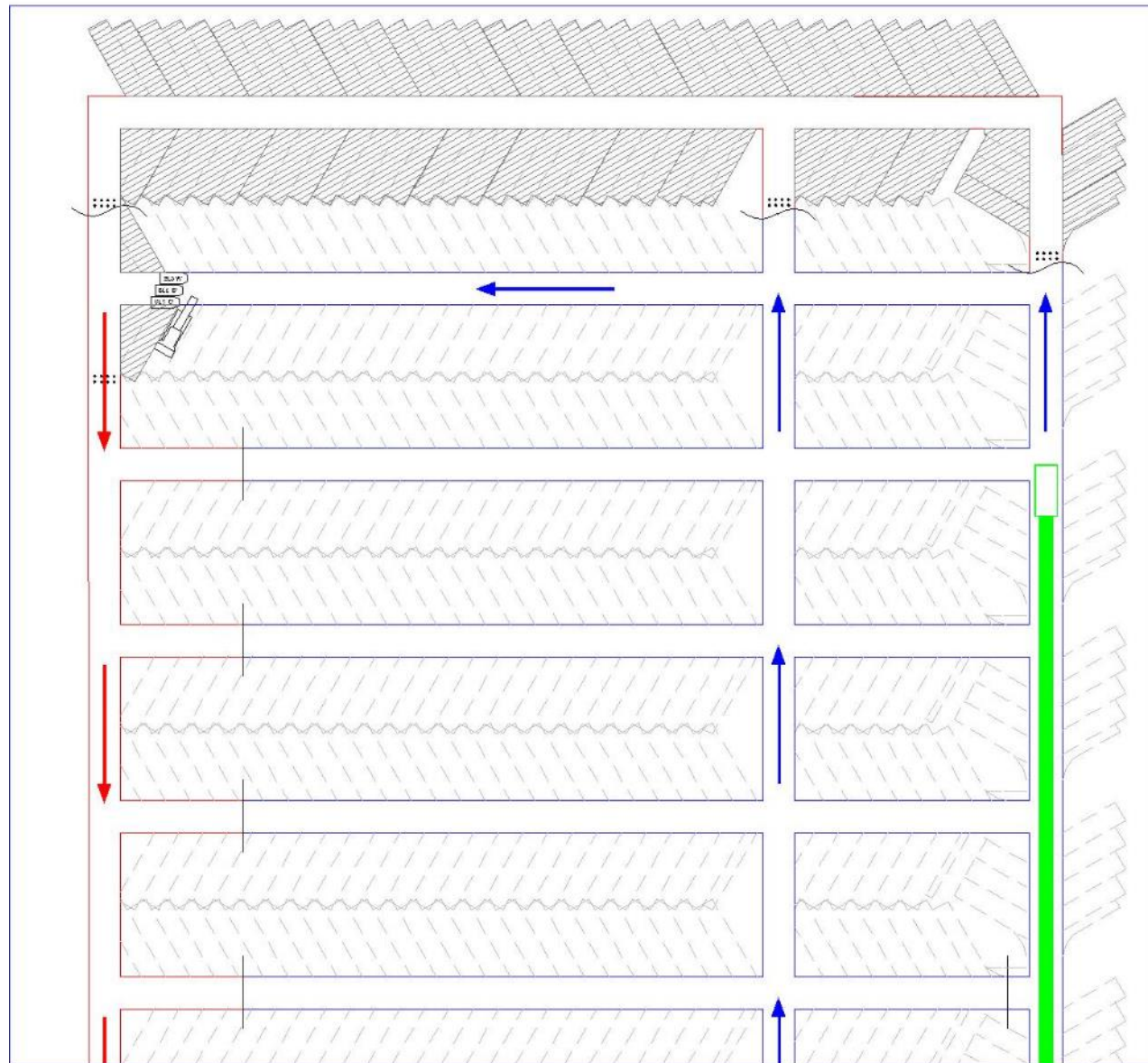
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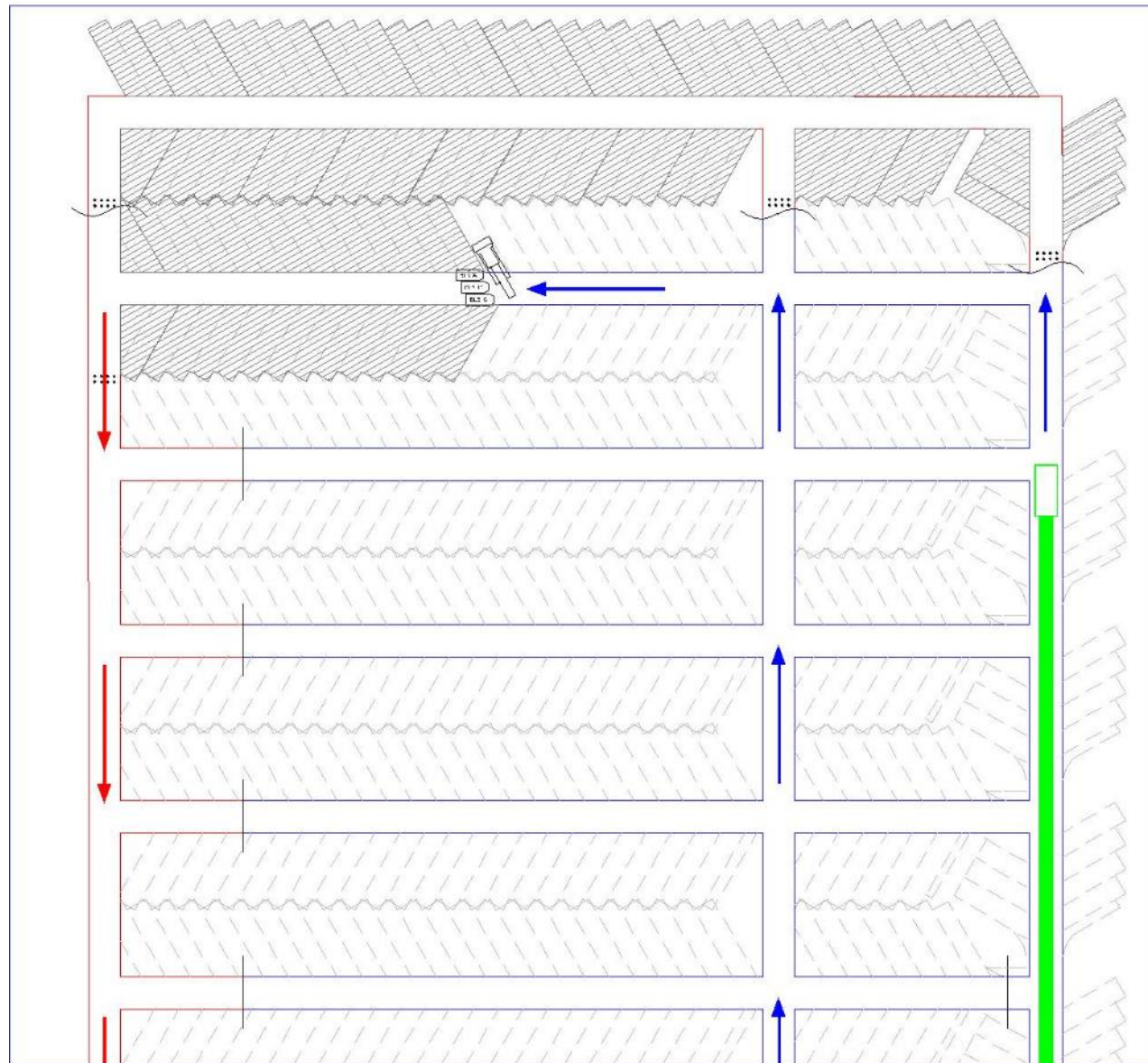
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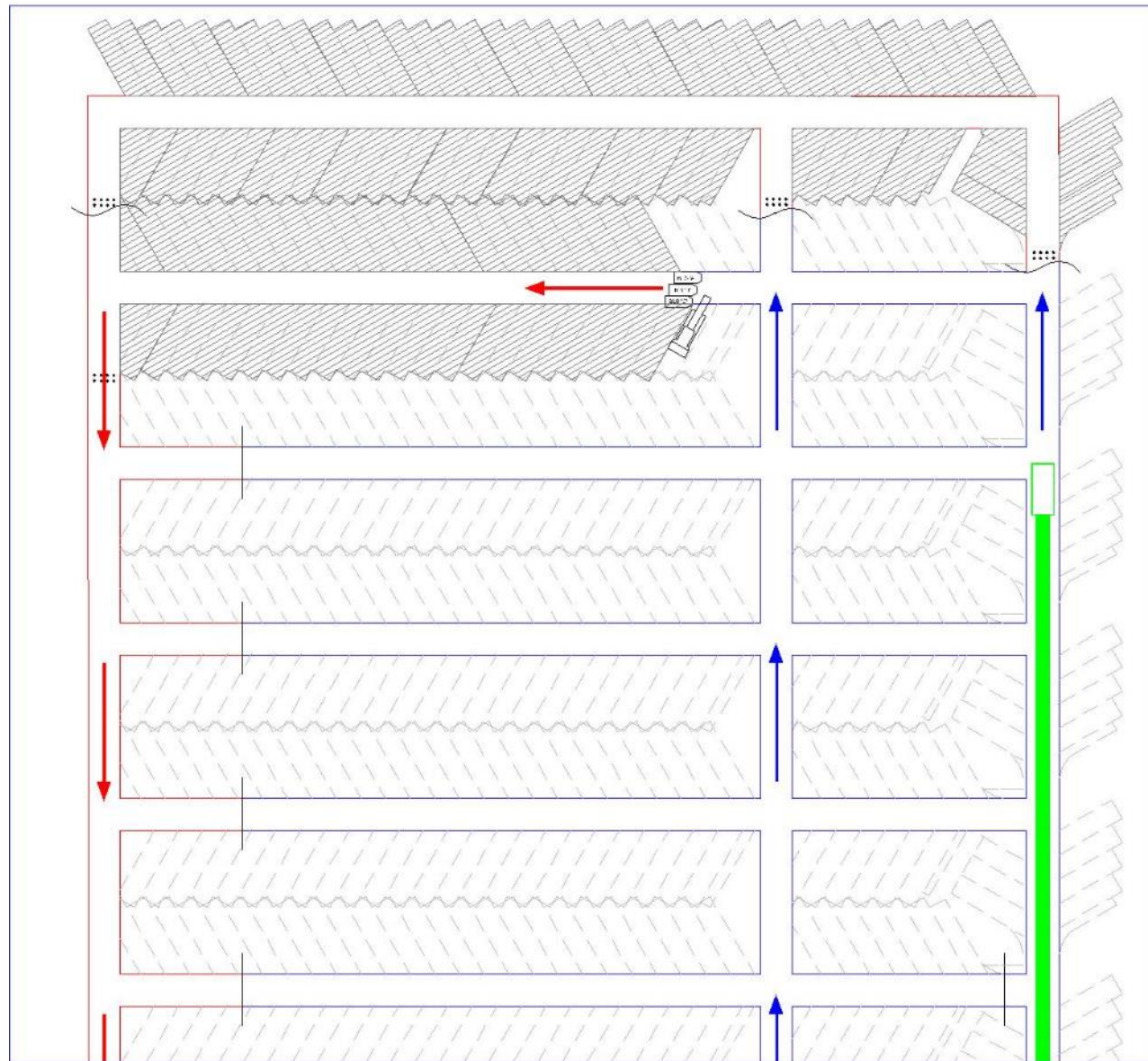


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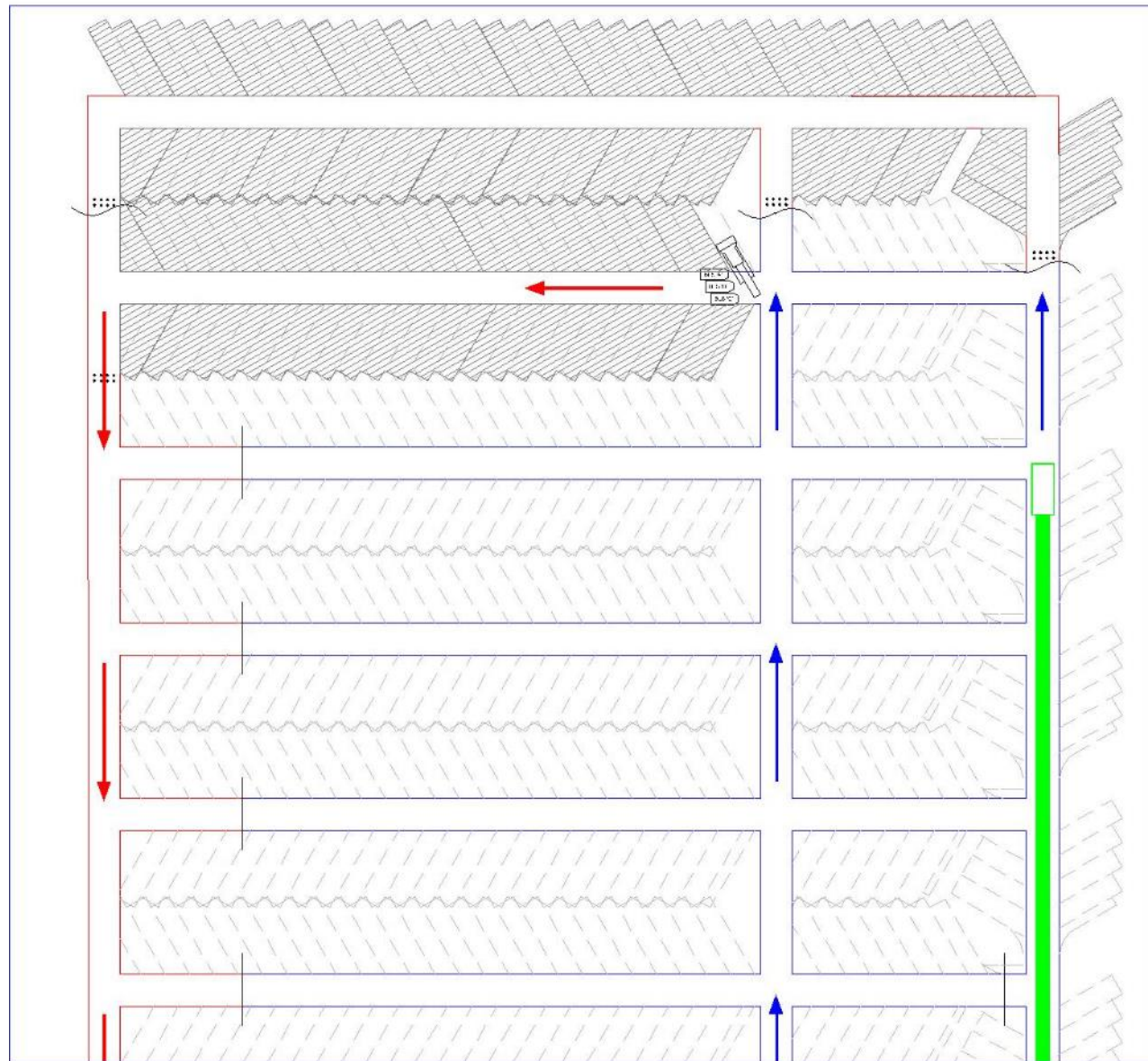




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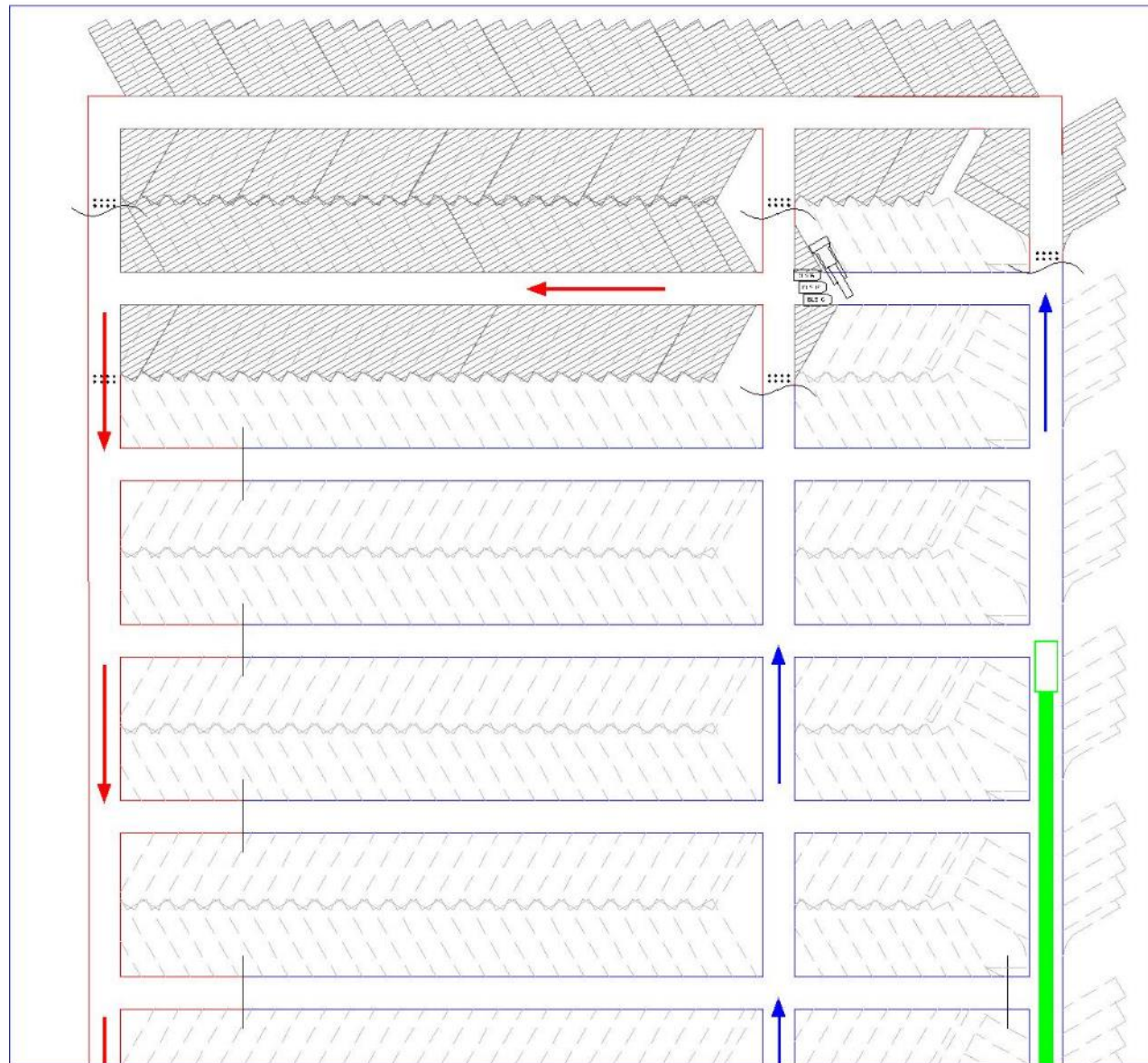


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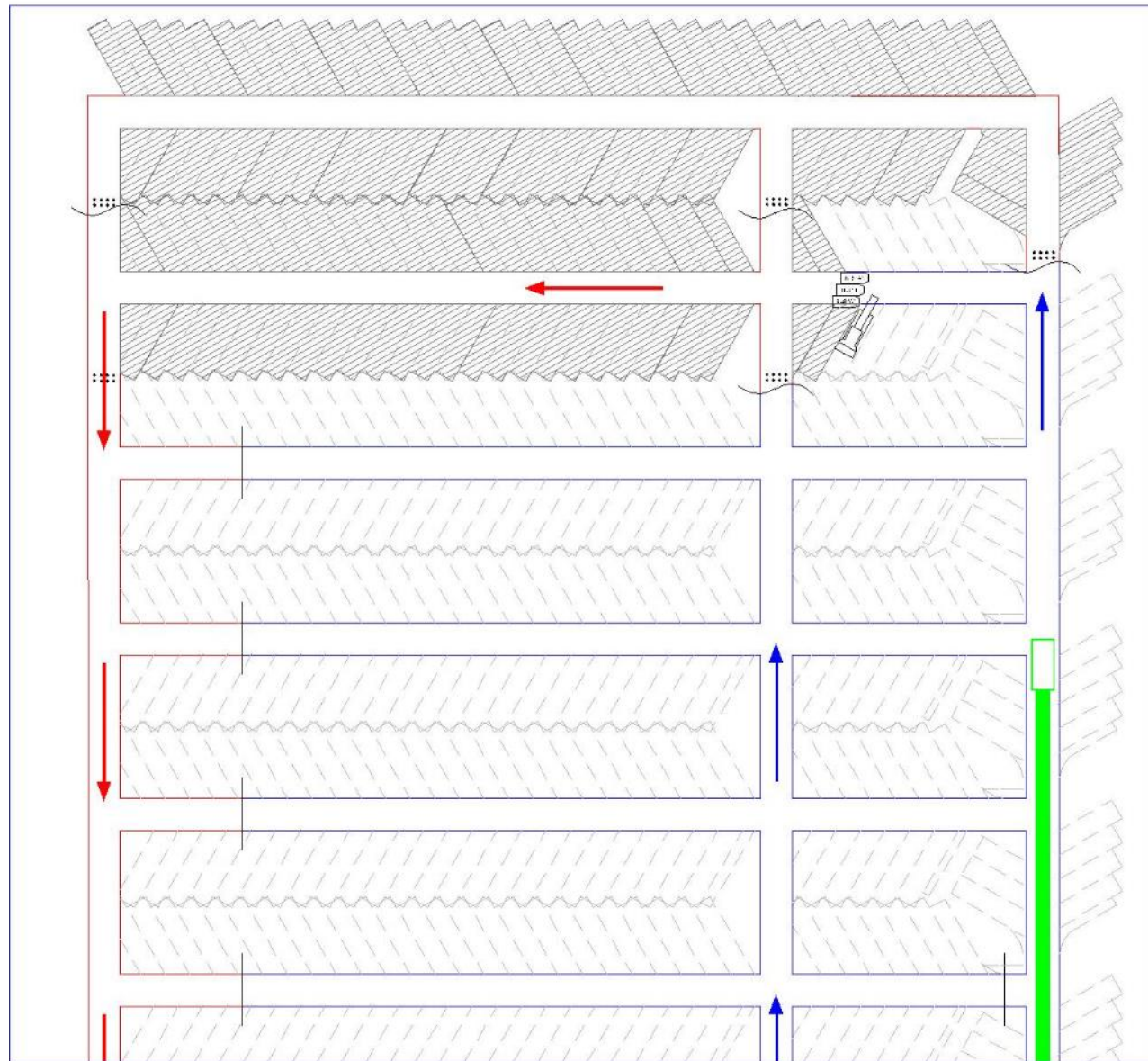
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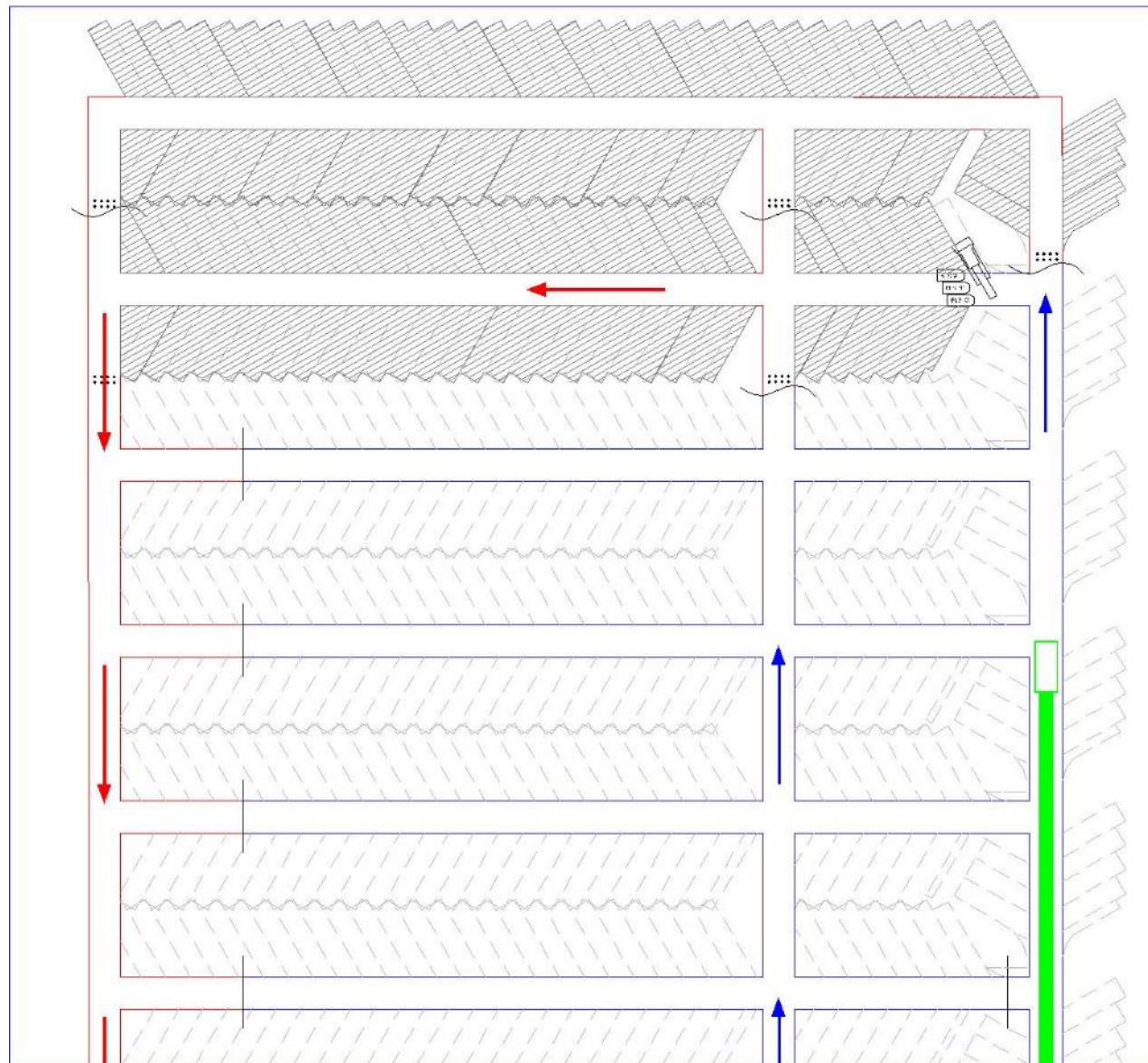


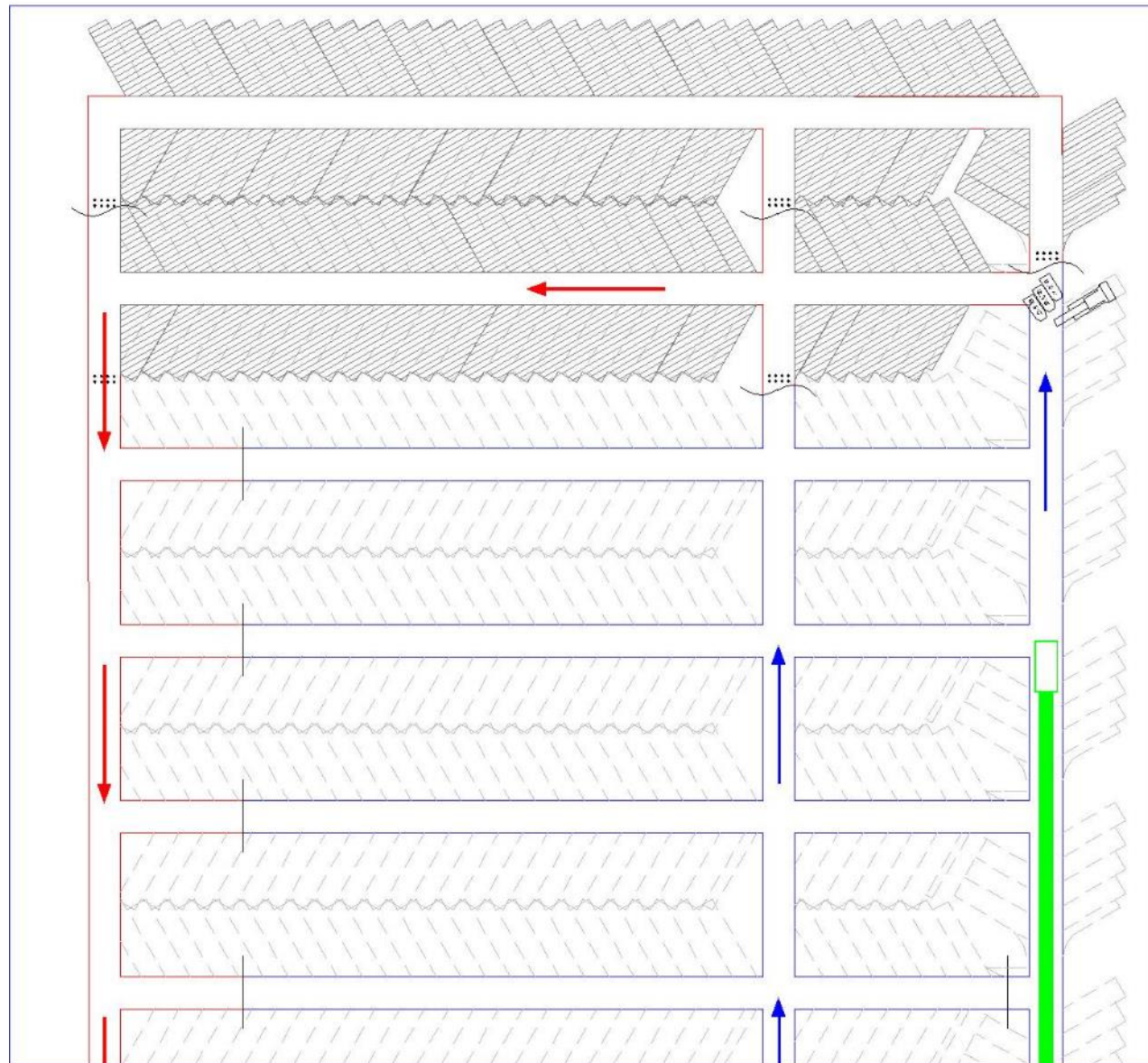


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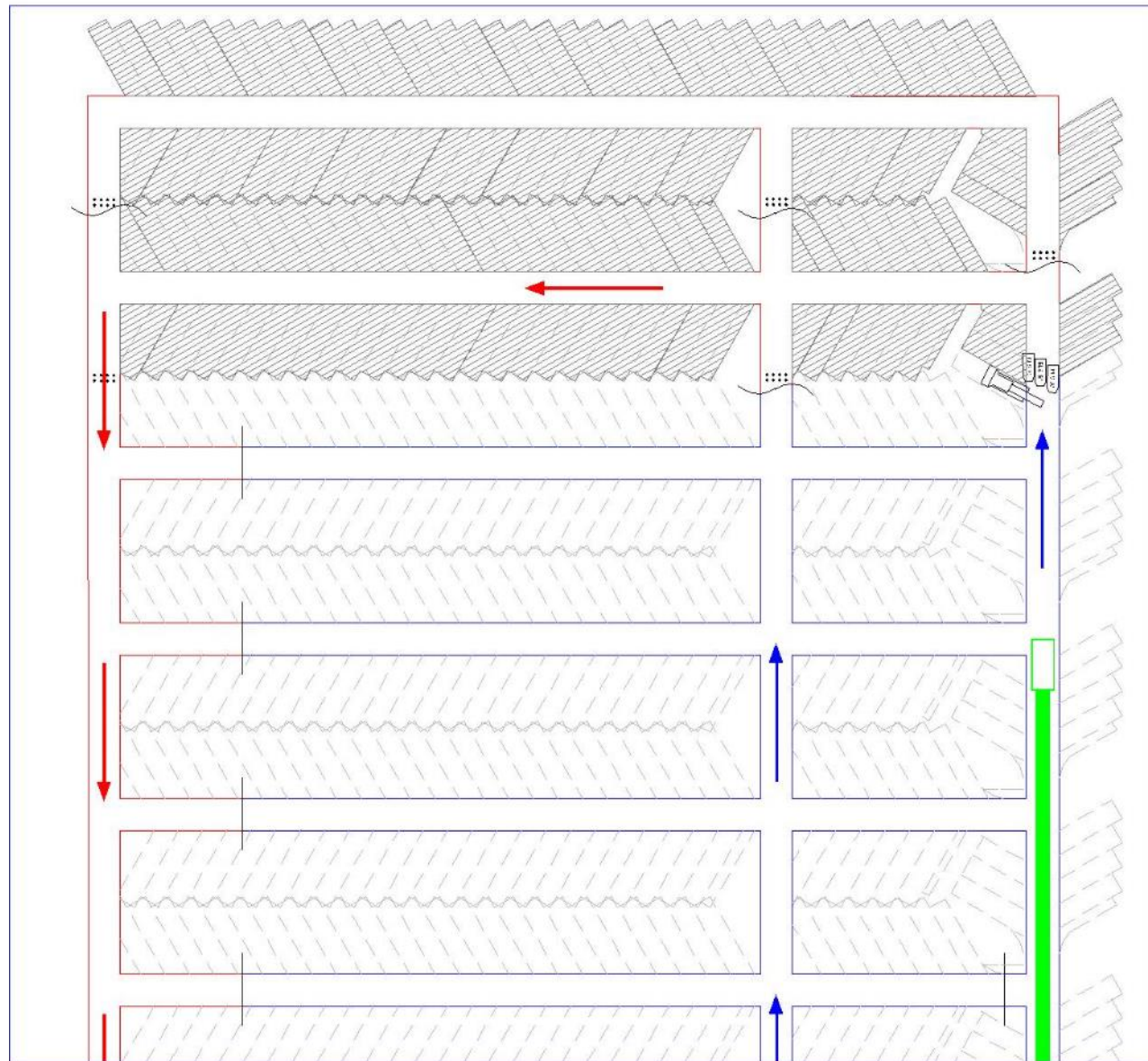






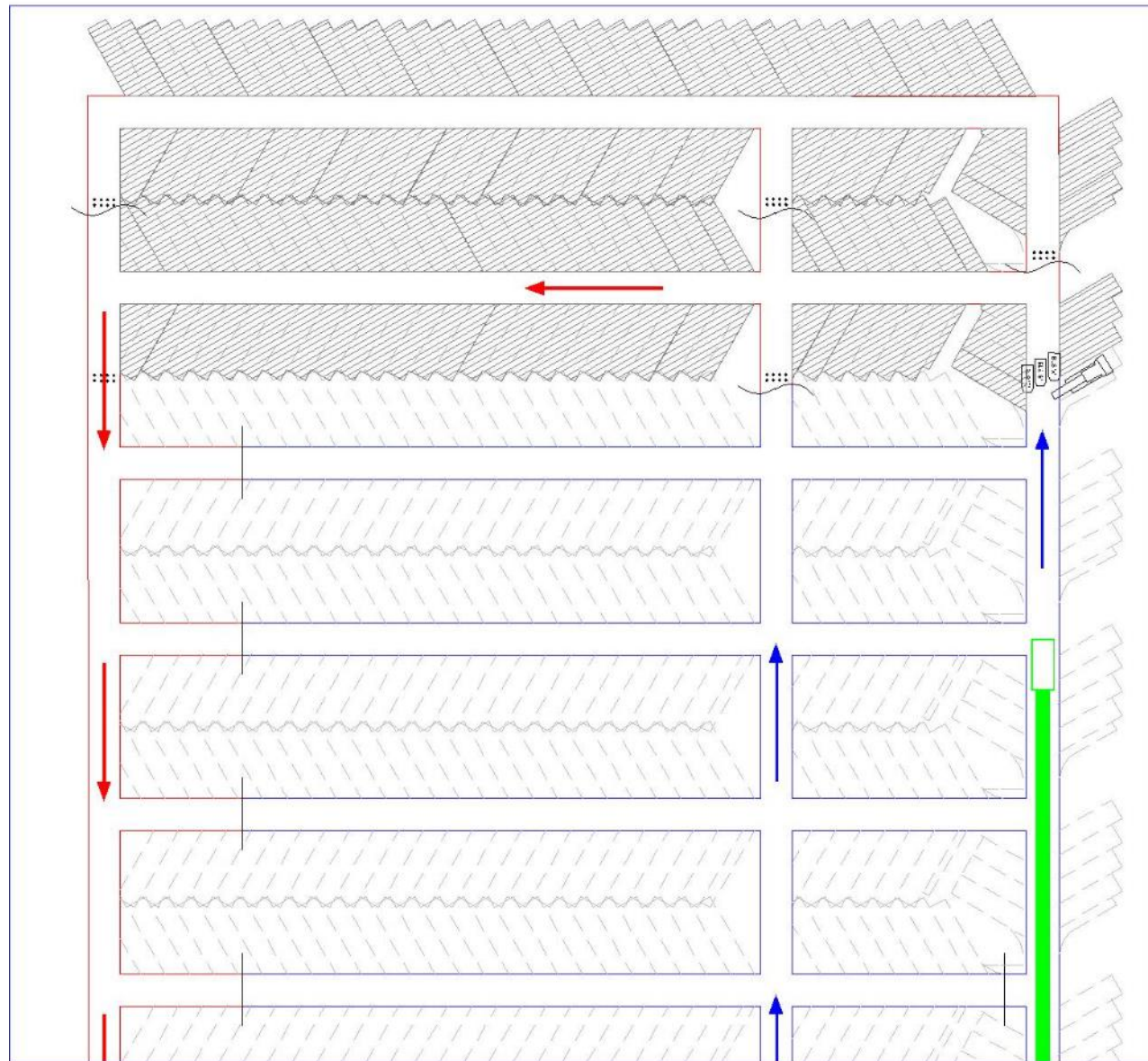




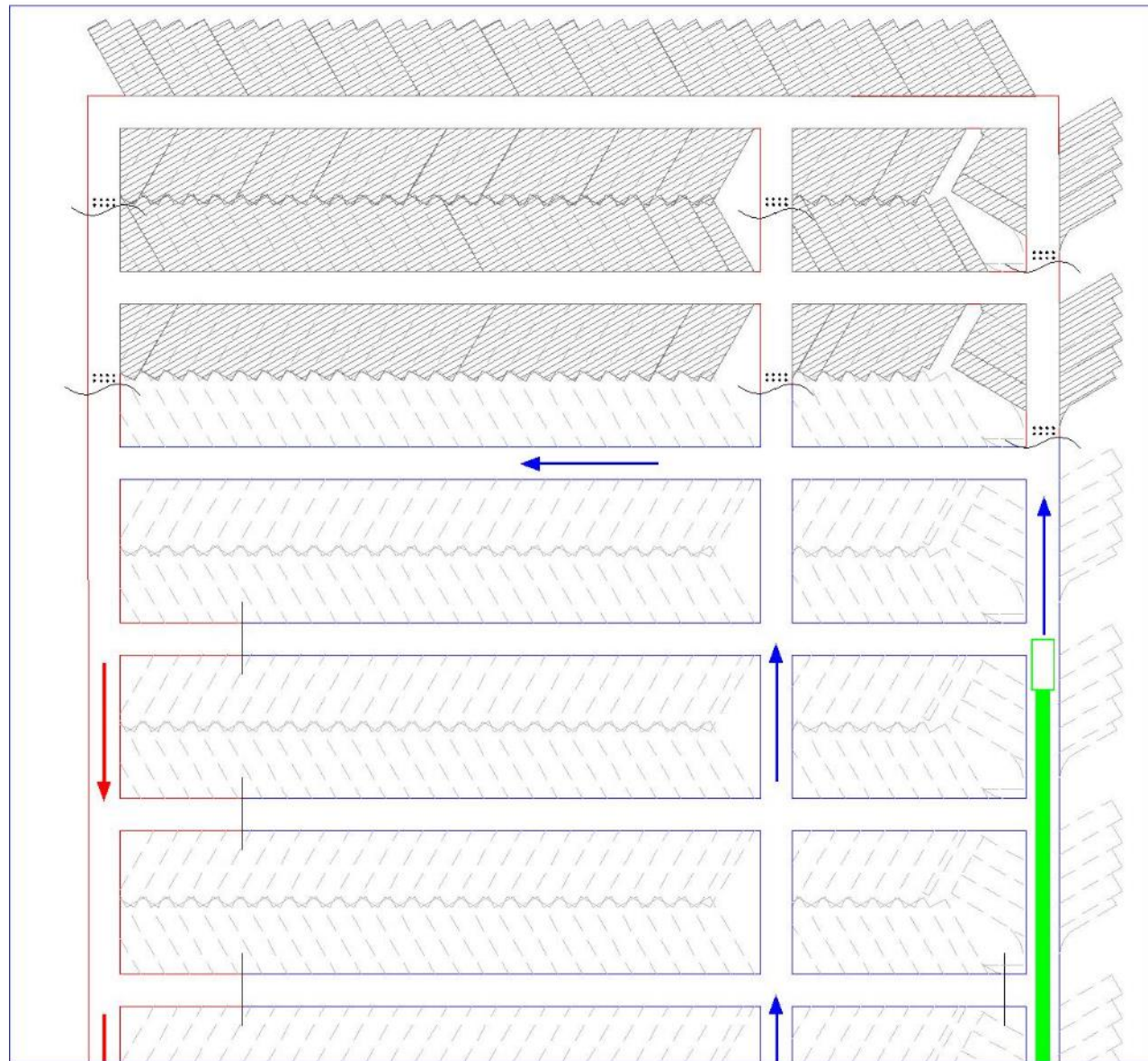


May 6, 2014



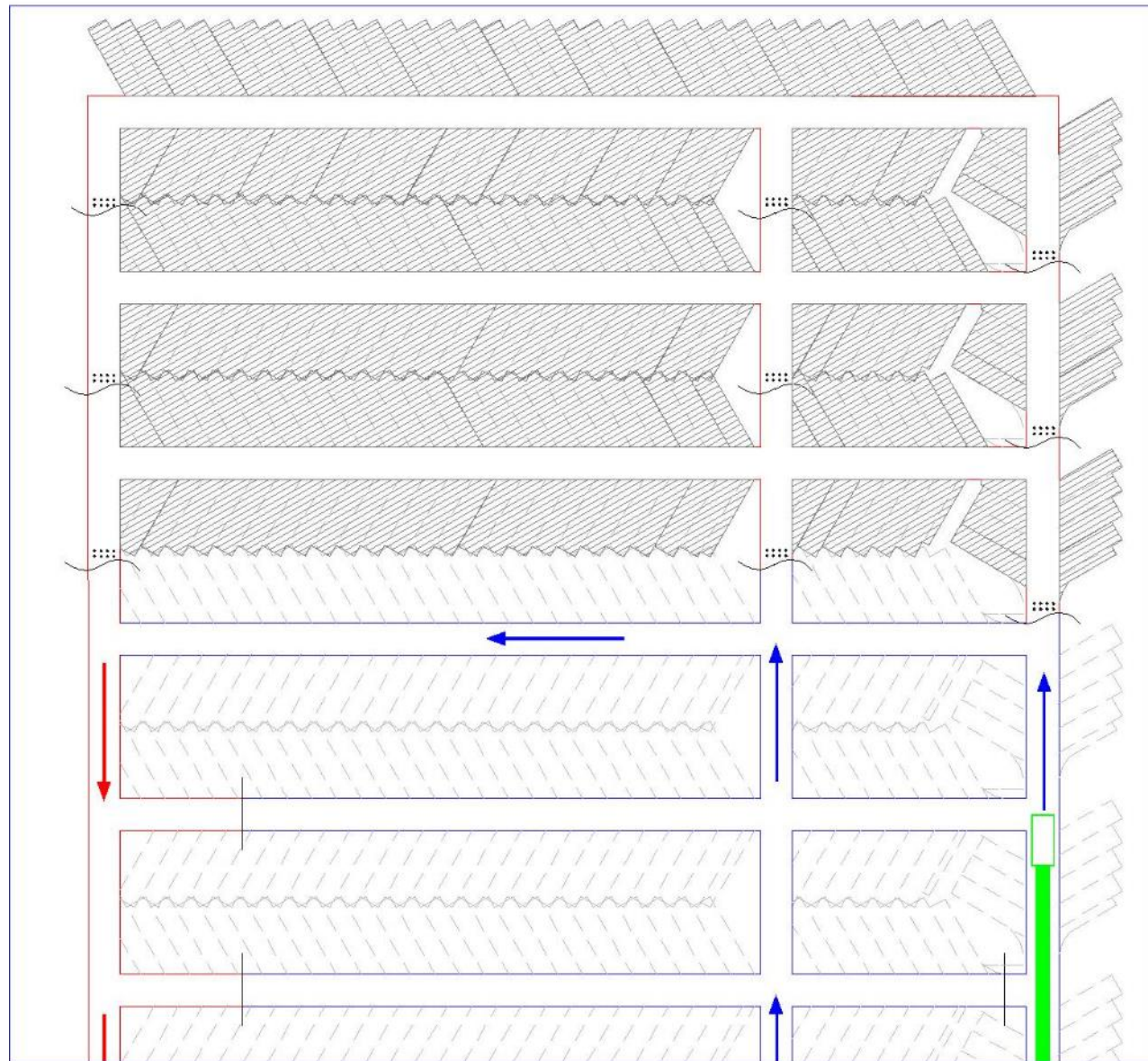


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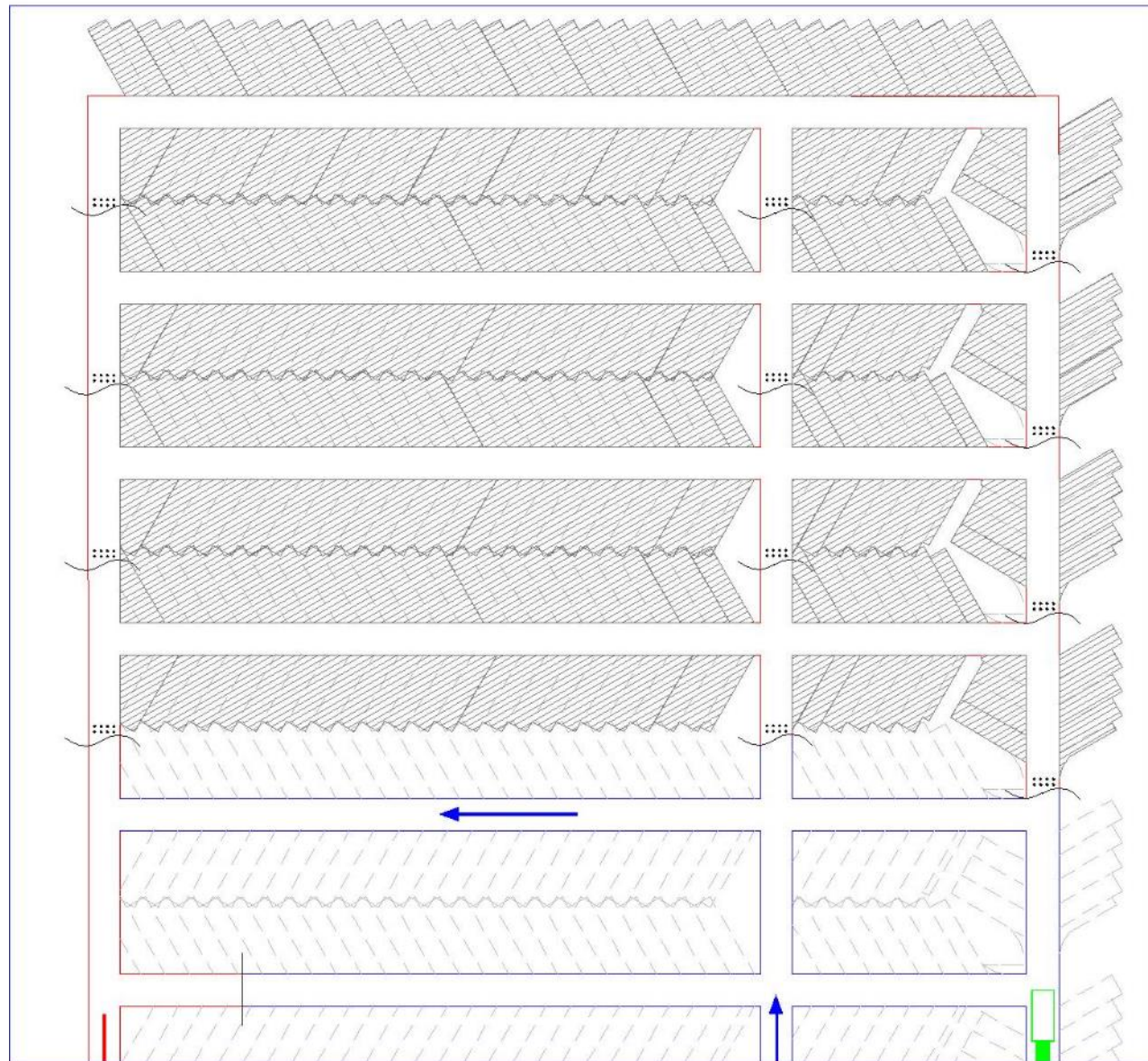


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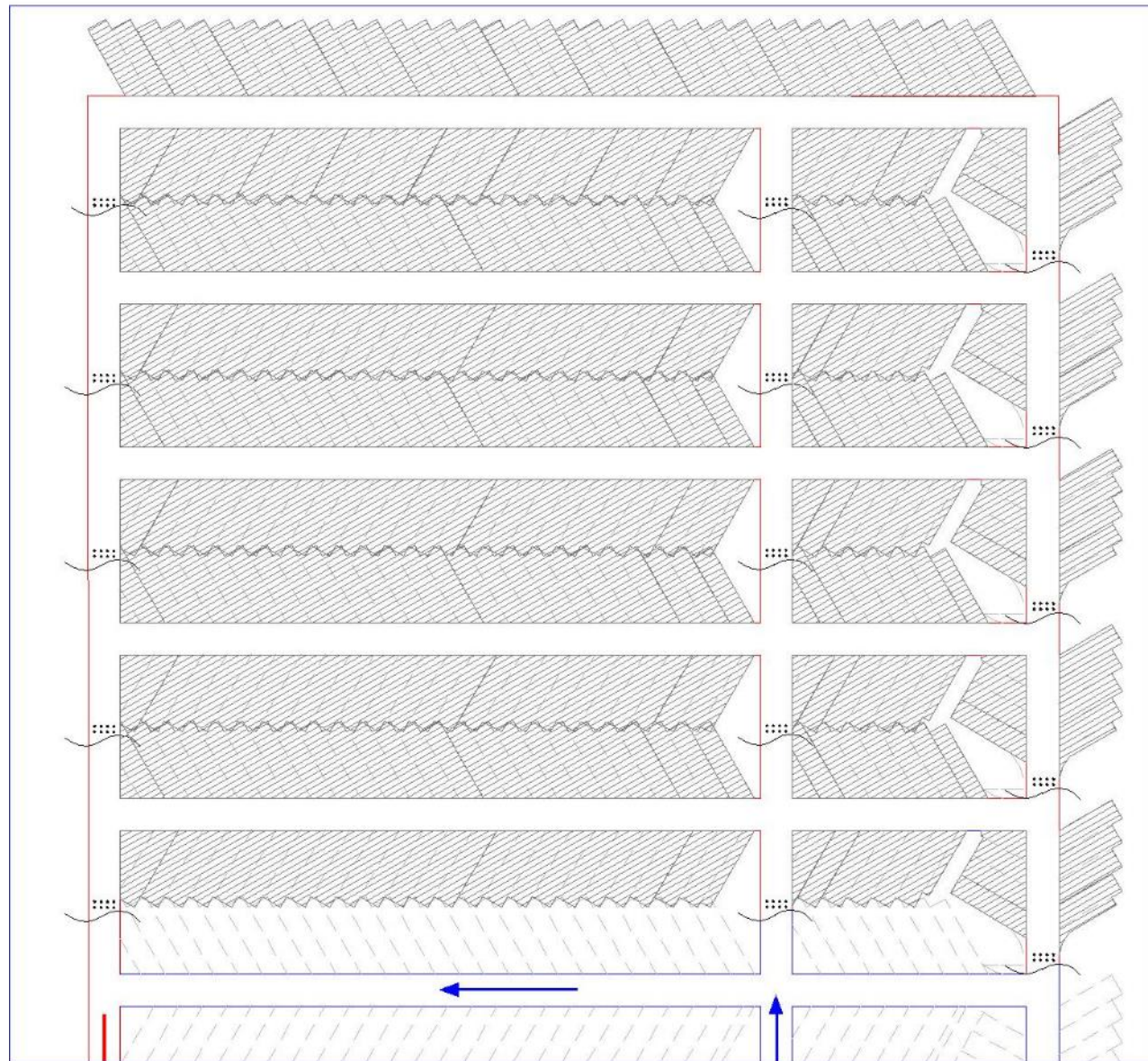




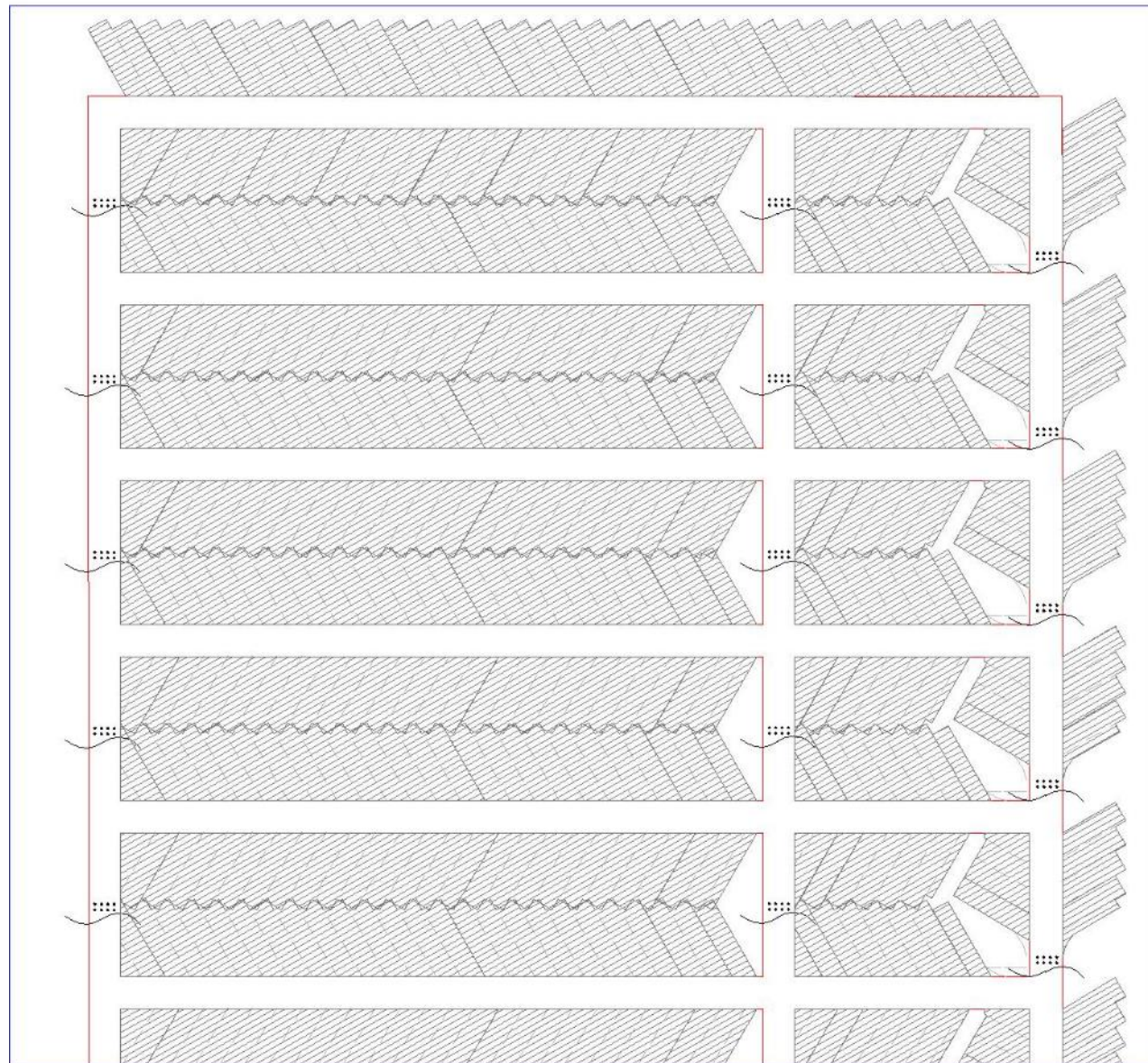
May 6, 2014







May 6, 2014



May 6, 2014



# Surface Features – ML1618 and SMP Areas

ML 1618	SMP Area 1, 2 & 3	EP / SMP Area 4
Pambalong Nature Reserve		
Cliff Lines		
Private property and residences (100+)	Private property and residences	22 Private properties and 16 Principal residences
Numerous dams (approx 175)	Numerous dams	~39 dams
Black Hill school		
Church and Cemetery		
Viney, Blue Gum, Long Gully, Buttai Creeks	Viney Creek	
Boral Asphalt Plant (Black Hill Depot)	Boral Asphalt Plant (Black Hill Depot)	
Catholic Diocese Land	Catholic Diocese Land	
C &A land (Black Hill Land Pty Ltd)	C &A land (Black Hill Land Pty Ltd)	C&A Land
TransGrid 330kV	TransGrid 330kV	
Ausgrid 132kV power line	Ausgrid 132kV power line	
Rural 11kV power lines	Rural 11kV power lines	Rural 11kV power lines
Aboriginal Artefacts	Aboriginal Artefacts	Aboriginal Artefacts
Telstra/Optus Fibre optic cables	Optus / Telstra Fibre optic cable	
Telstra copper comms cables	Telstra copper comms cables	Telstra copper comms cables
Hunter water pipeline	Hunter water pipeline	
Agility gas pipeline		
Public Roads	Public Roads	Public Road
State survey marks	State survey marks	State survey marks
Overlying mine workings		Overlying mine workings
Disused Richmond Vale railway line		
Black Hill & Stockrington Quarries	Black Hill Quarry buildings	

# Subsidence Prediction Methodology

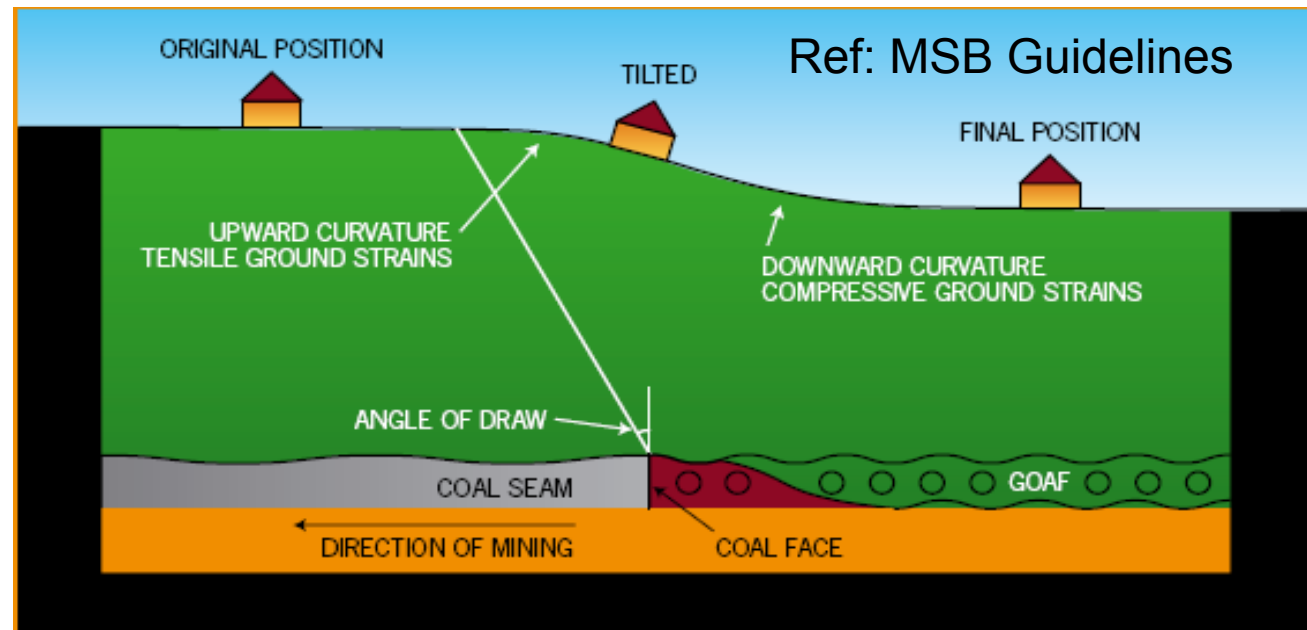
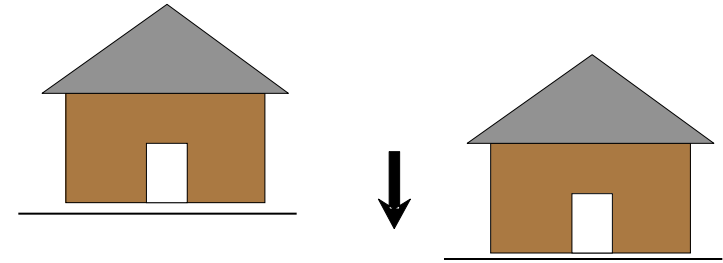
Several industry established empirical models were used to predict the maximum subsidence parameters for the proposed panels. The predictions involved the following work:

- (i) Review of the overburden geology and mining geometry.
- (ii) Review of Area 1, 2 & 3 subsidence monitoring results to date.
- (iii) The **Incremental Profile Method** subsidence prediction model:
  - Empirical model based on extensive monitoring data from the NSW and QLD Coalfields
  - Monitoring data from over 50 collieries and over 500 monitoring lines
  - Calibrated for local conditions using available geological and monitoring data from the mine
- (iv) Predicted subsidence, tilt and curvature contours developed across the mining area.
- (v) Site specific predictions made for the natural and built features.
- (vi) Estimation of sub-surface fracturing heights above the panels using empirically based models in **ACARP, 2003, Forster, 1995** and **Mark, 2007**.



# Subsidence Parameters

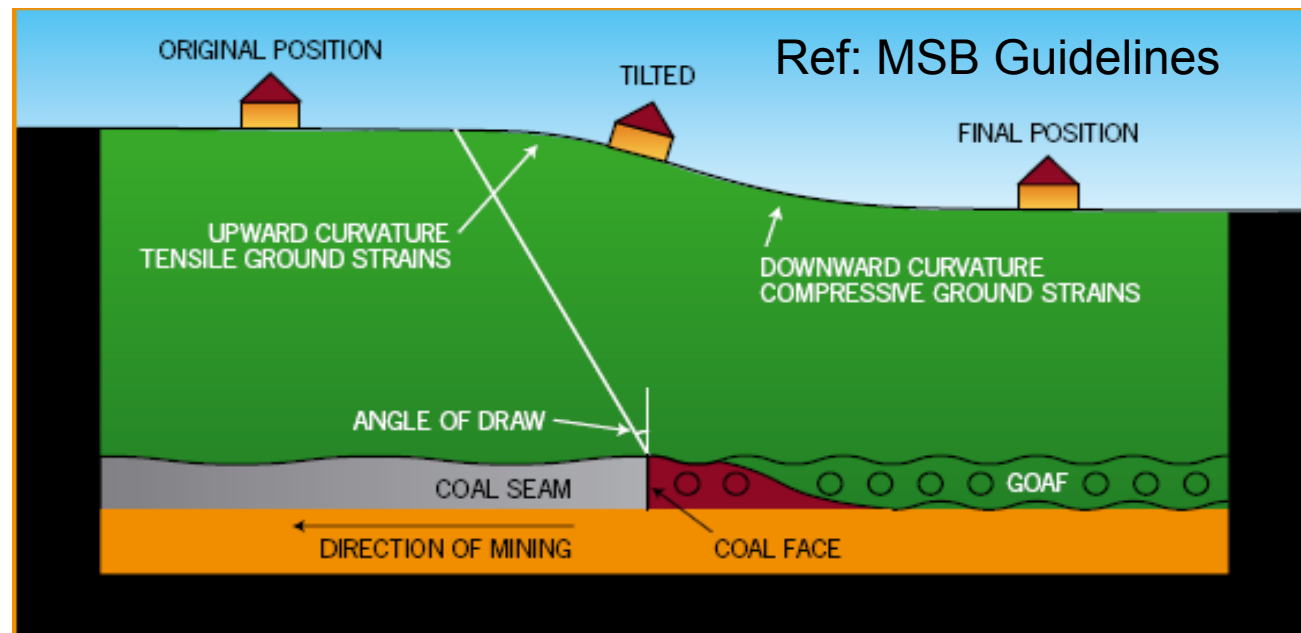
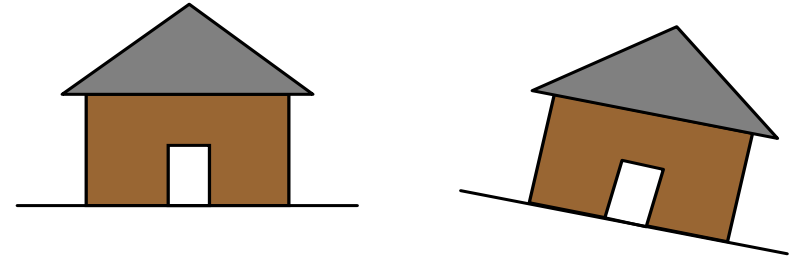
- Vertical subsidence (m)  
rarely a direct concern, except  
when adjacent to water bodies  
or flat terrain with watercourses  
(i.e. ponding)



# Subsidence Parameters

- Tilt (mm/m)

does not result in structural damage, but  
can affect structure serviceability

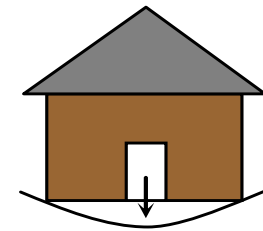


# Subsidence Parameters

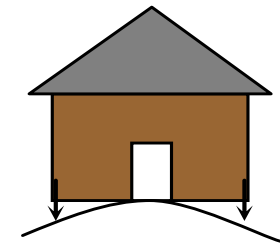
- Curvature (1/km)

bending of the ground (radius of curvature)

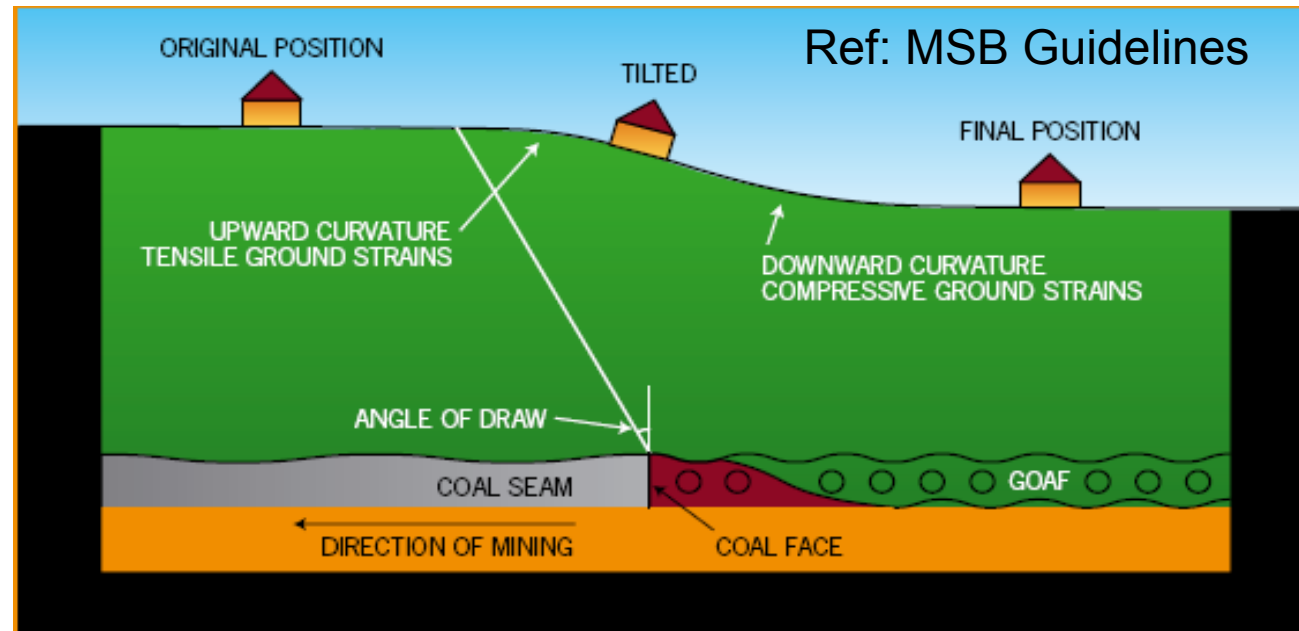
major damage driver, including cracking  
shearing, deformation of structures



sagging

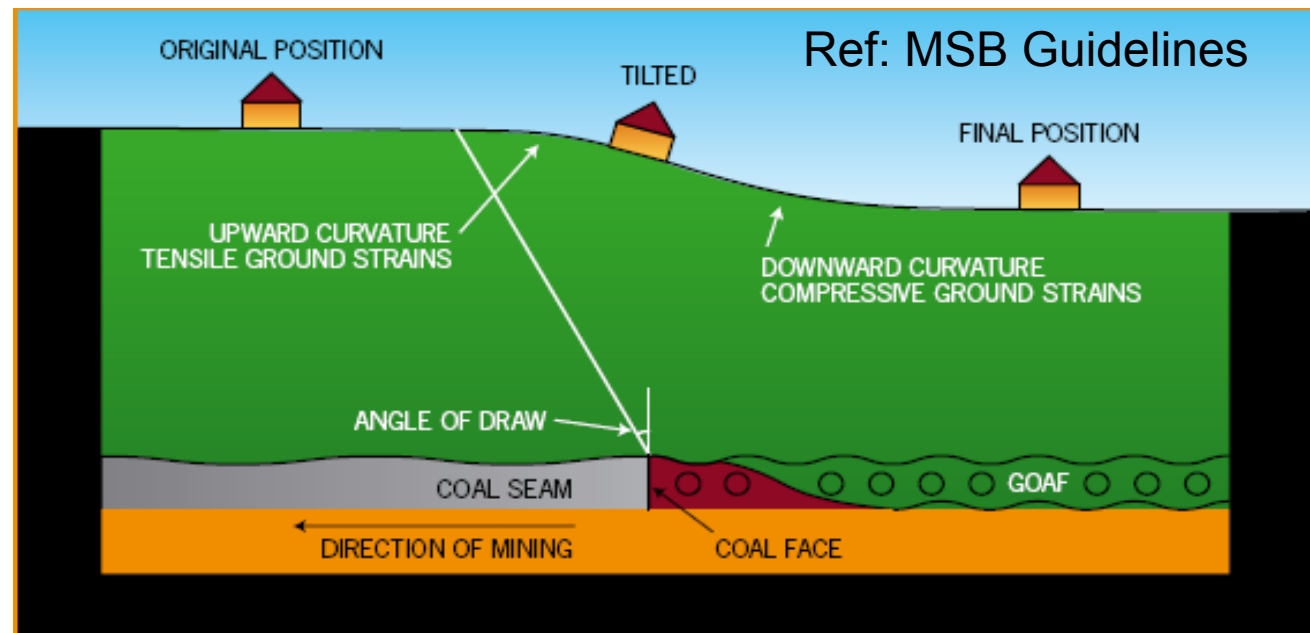
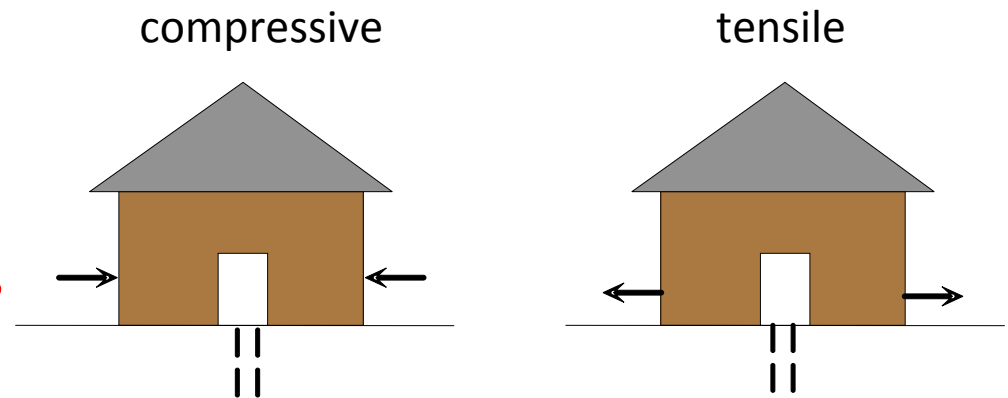


hogging



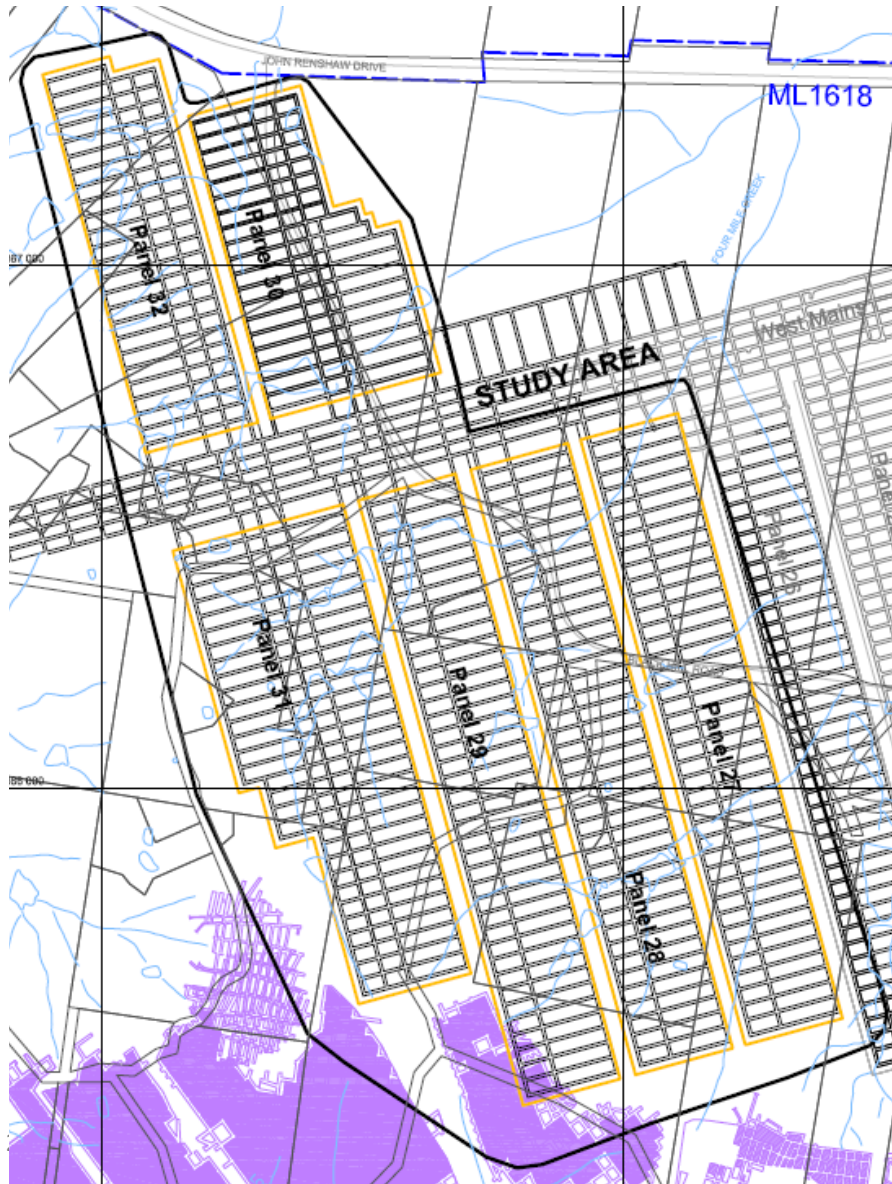
# Subsidence Parameters

- Horizontal strain (mm/m)  
tensile or compressive  
and has similar damage outcomes  
as curvature





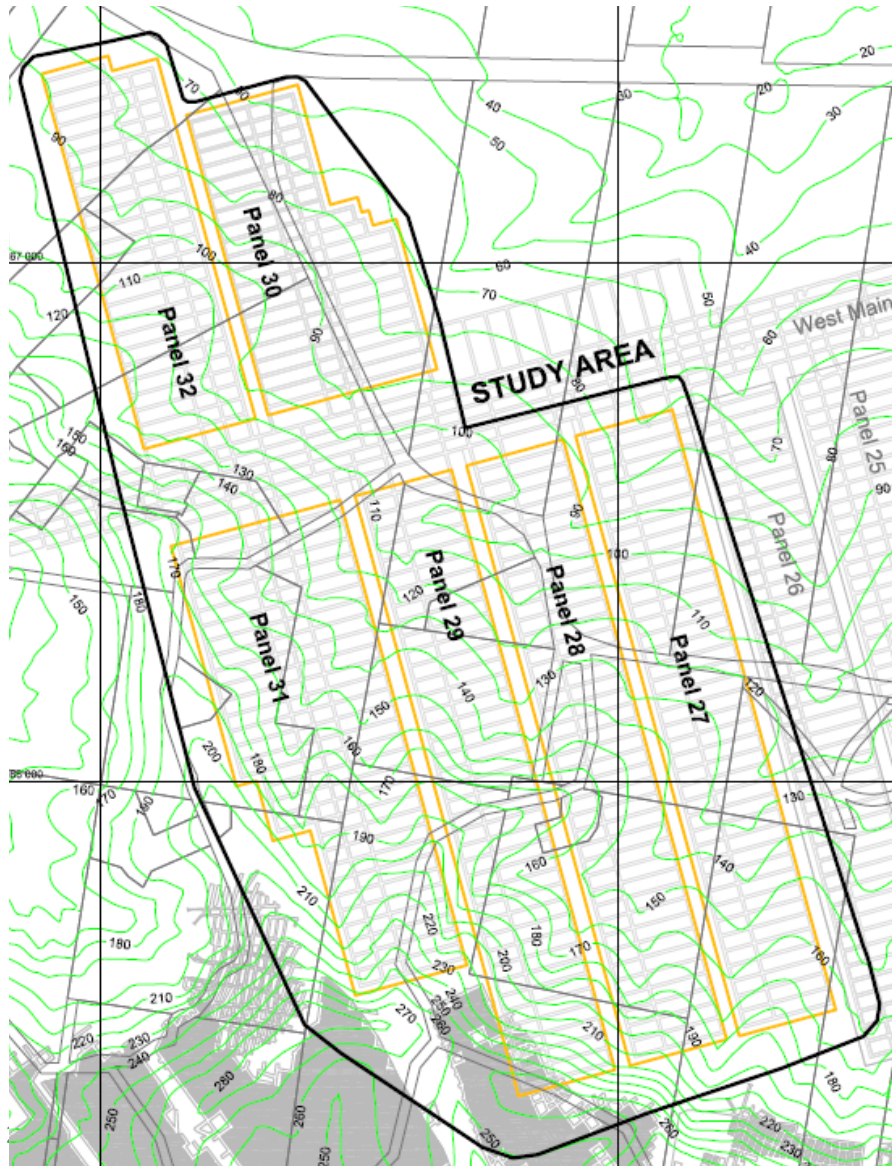
# Prediction Input: Mining Geometry



## Mining Geometry:

- 0.6 km to 1.2 km lengths
- 190 – 225 metres overall void widths
- 25 metre barrier pillars widths
- Typically single-seam mining, historic Borehole Seam workings above southern end of Panel 29

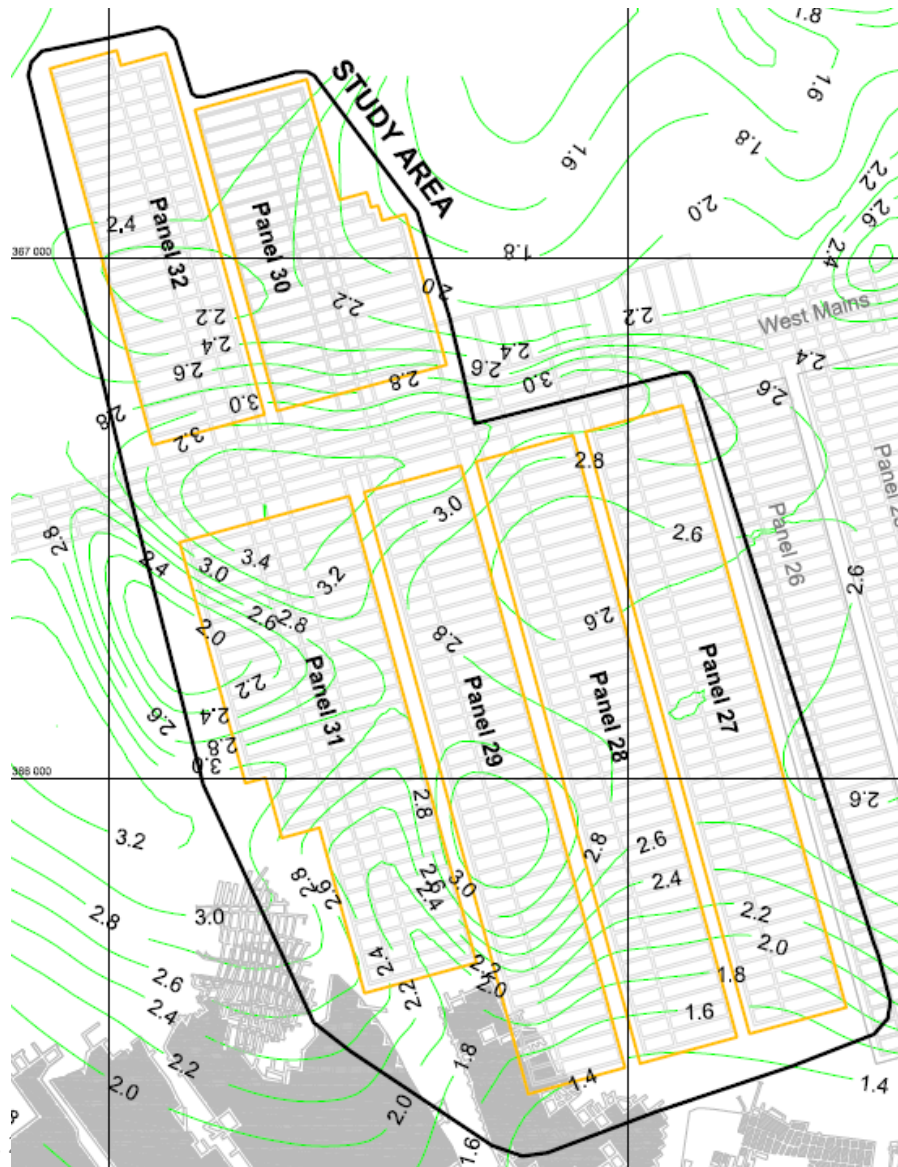
# Prediction Input: Cover Depth



## Depth of Cover:

- Minimum of 55 metres at northern end of Panel 30
- Maximum of 260 metres at southern end of Panel 31
- 60 metres to 120 metres along Black Hill Road
- Similar to SMP Area 3, similar or greater than SMP Areas 1 & 2

# Prediction Input: Seam thickness/Mining Height



## Seam thickness:

- 1.8 metres to 3.4 metres
- 2.8 metre maximum extraction height
- Similar to SMP Area 3, similar or greater than Areas SMP Areas 1 & 2

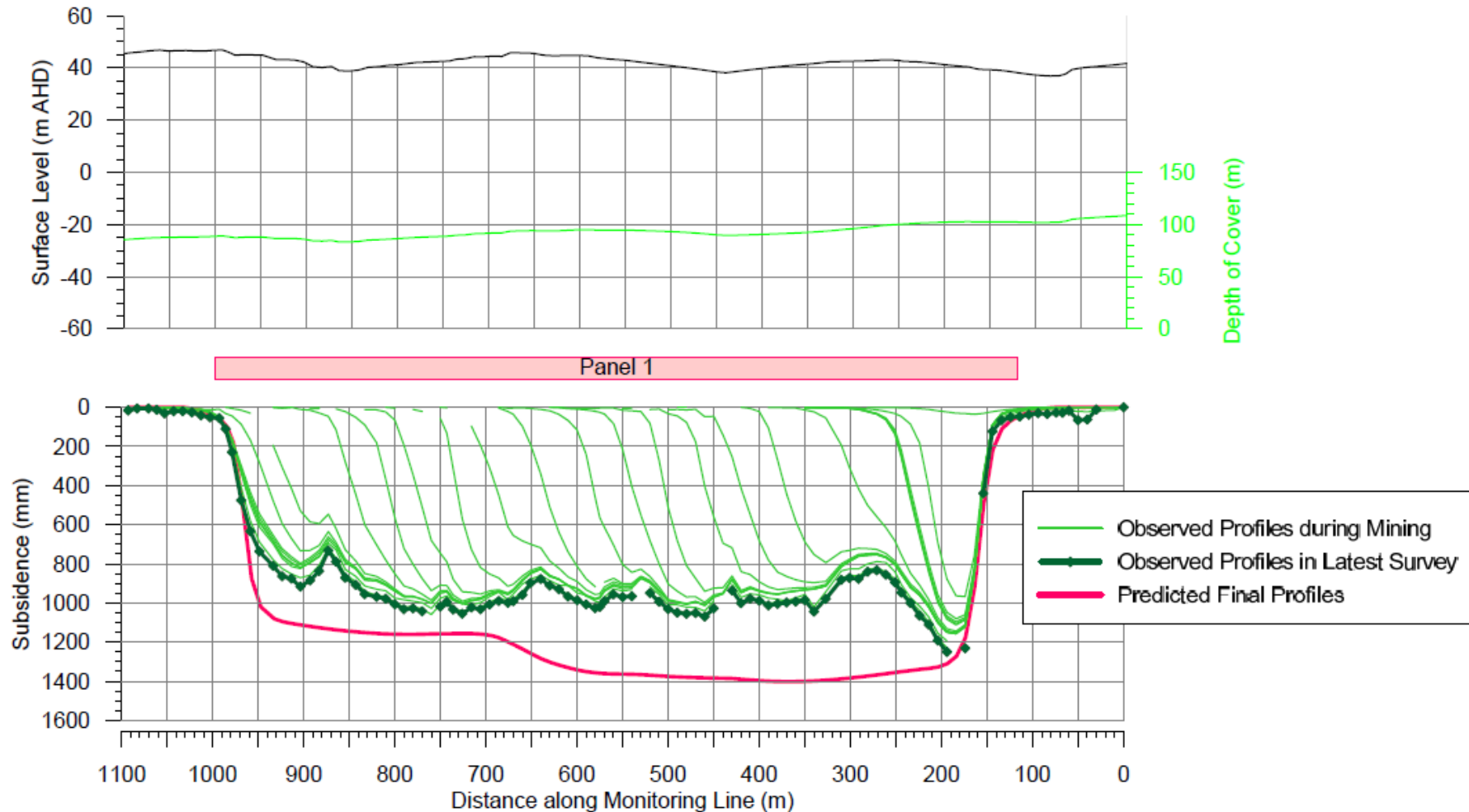
## Mining height:

- Roadways driven at ~2.5m



# Prediction Input: Monitoring Data

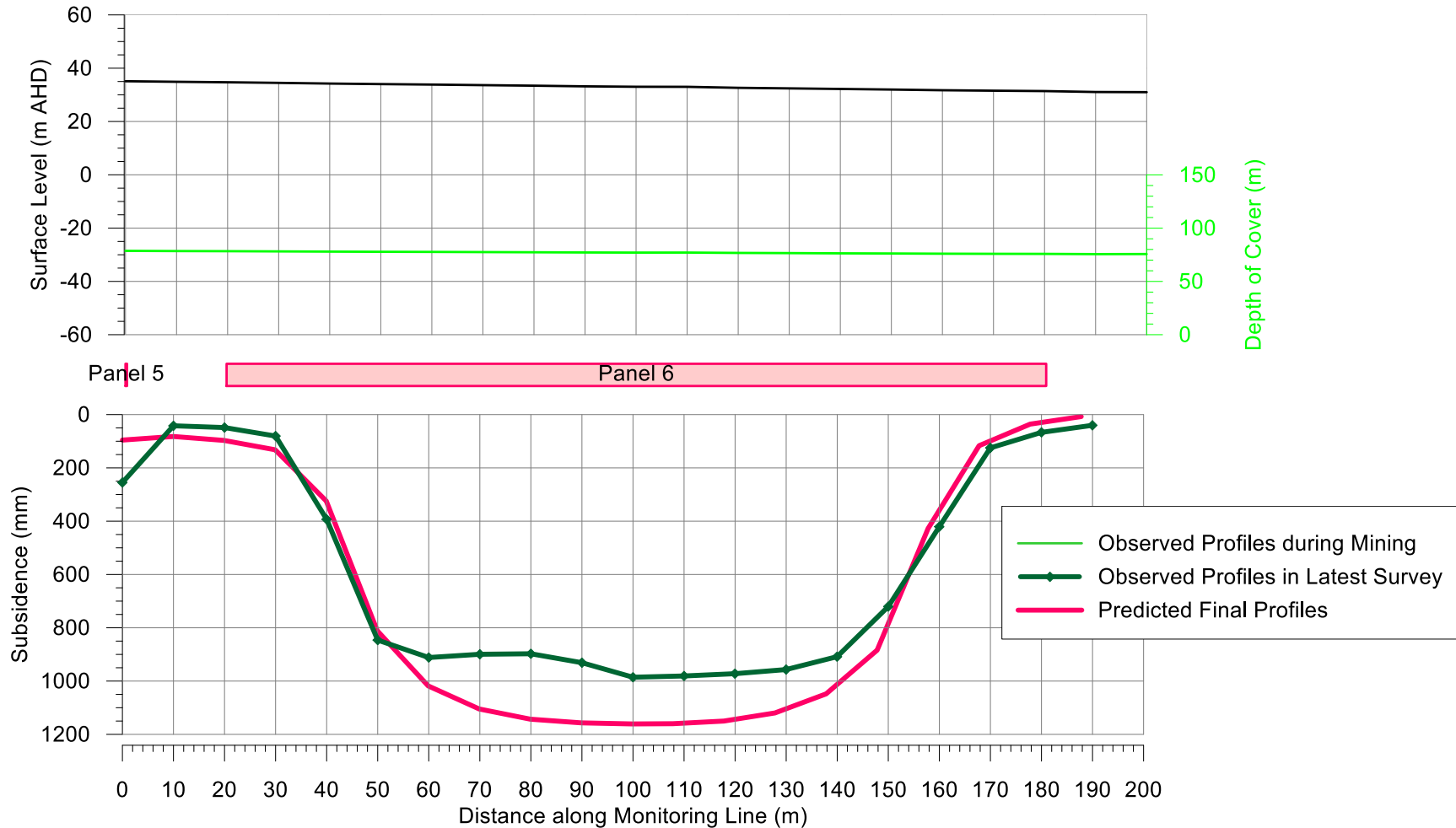
## Panel 1 Centreline:





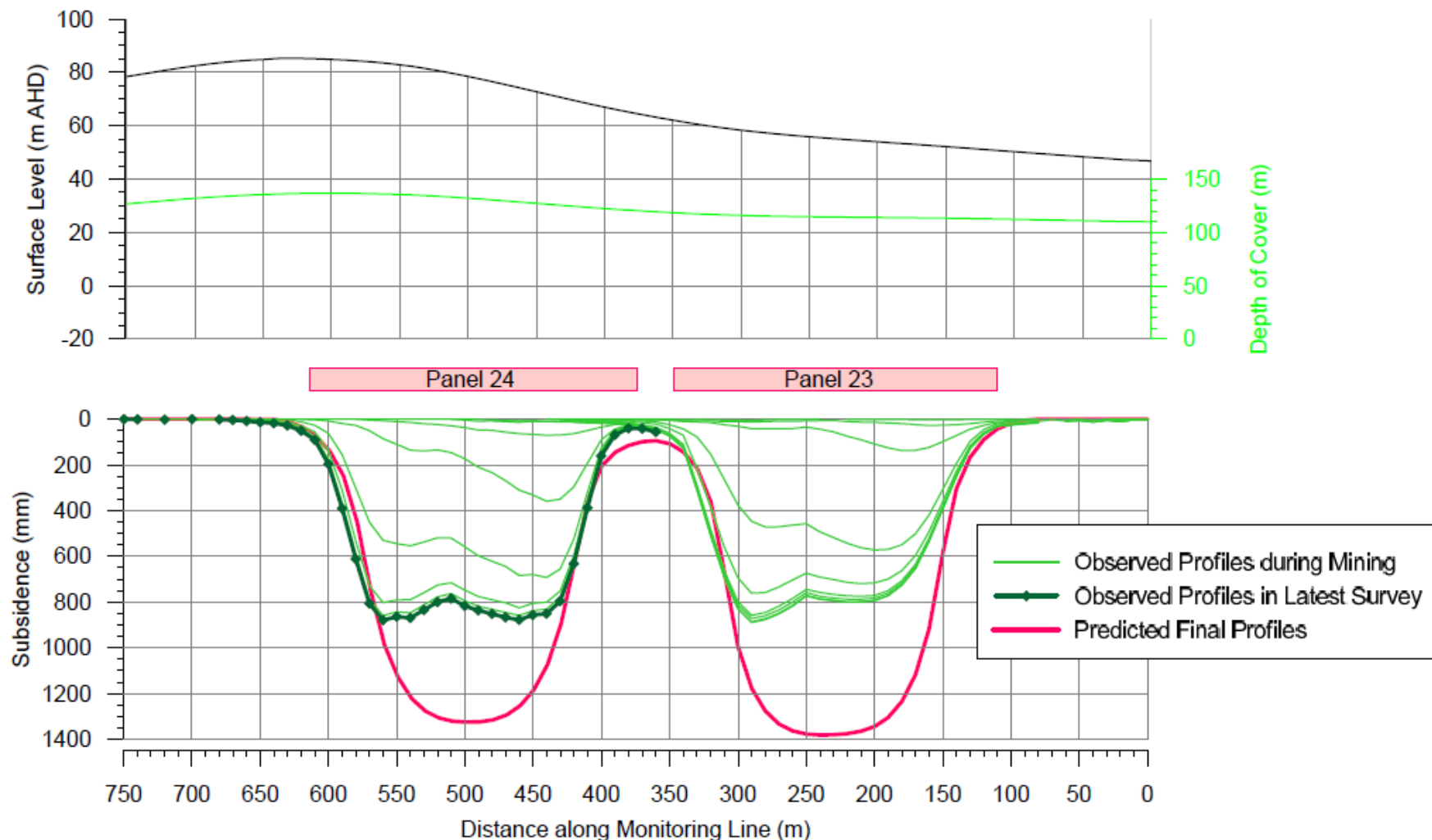
# Prediction Input: Monitoring Data

Panel 6 Crossline:



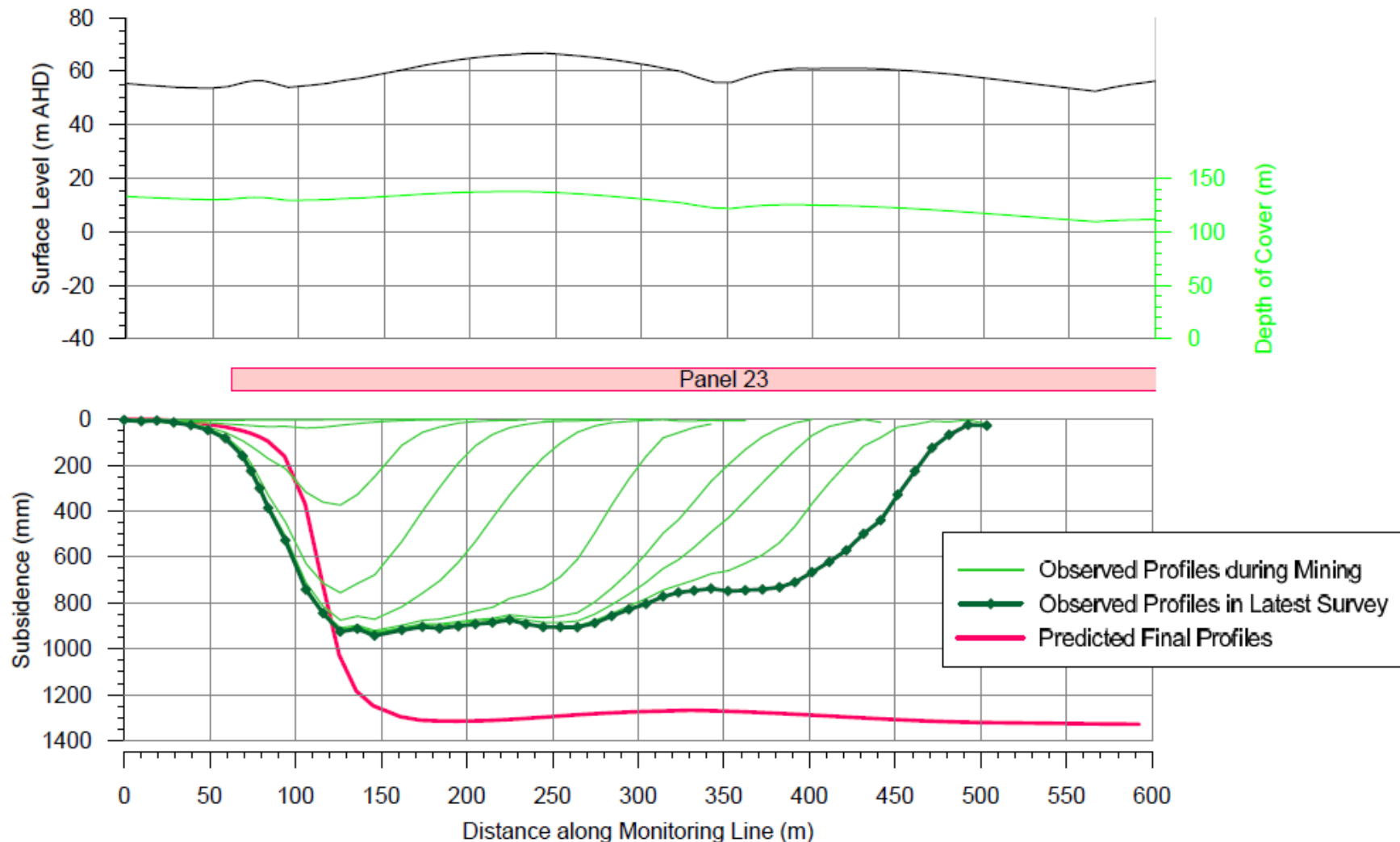
# Prediction Input: Monitoring Data

## Black Hill Road Line:



# Prediction Input: Monitoring Data

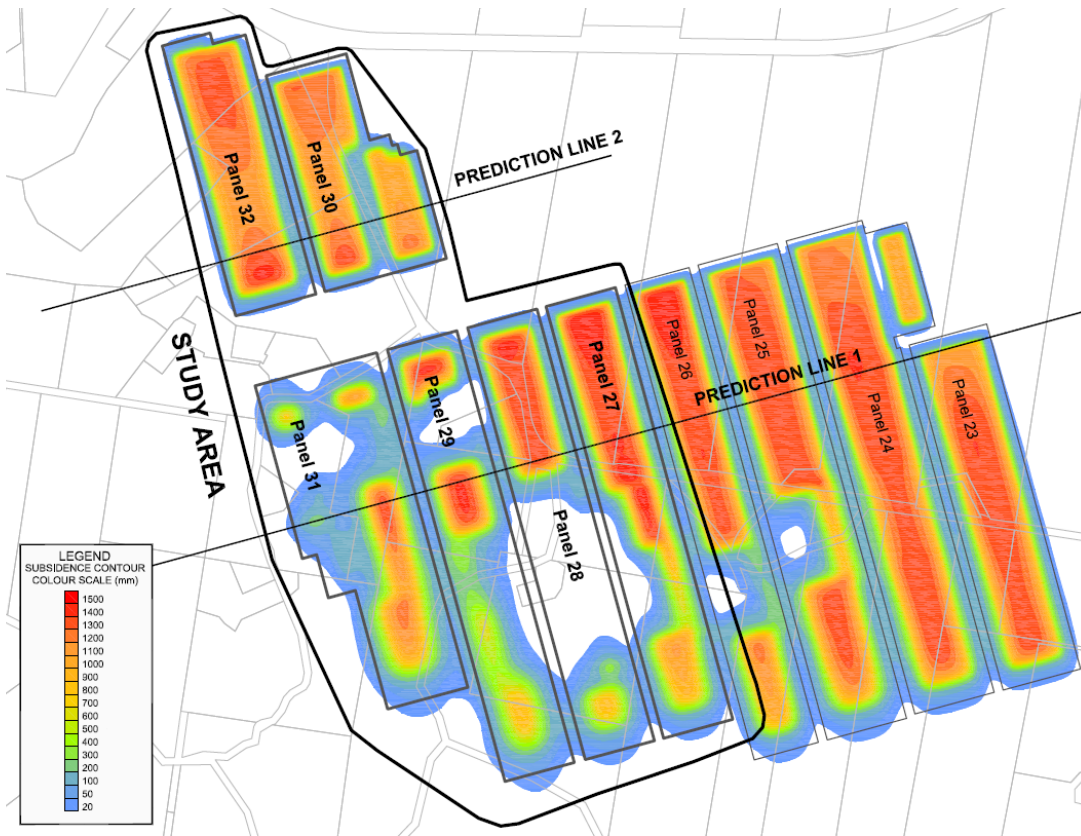
## Panel 23 Centreline:



# Prediction Outcomes: Vertical Subsidence

## Predicted Subsidence:

- 1.0 metres to 1.5 metres subsidence above panels
- Represents 54 % of the seam thickness
- < 20 mm within SCZ's





# Prediction Outcomes: Tilt



## Predicted Tilt:

- 70 mm/m (i.e. 7 %) at northern end
- 40 mm/m to 70mm/m (i.e. 4 % to 7%) along Black Hill Road
- < 0.5 mm/m (i.e. < 0.1 %) within SCZ's

# Prediction Outcomes: Curvature

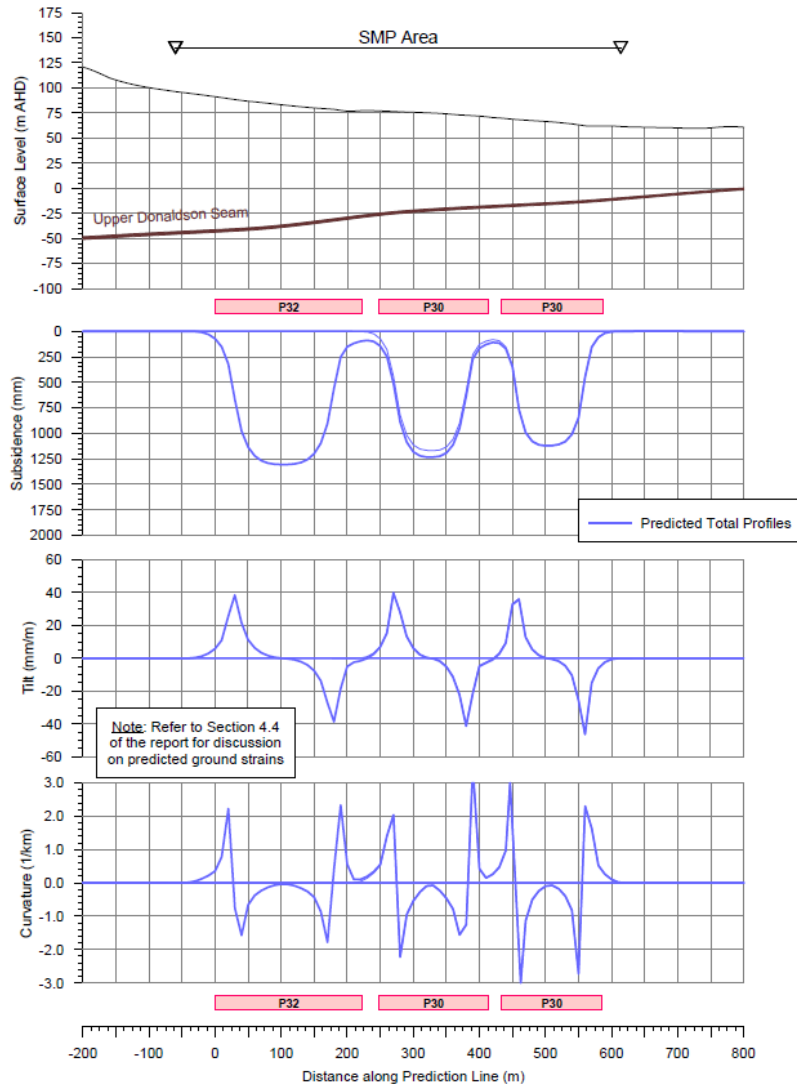


## Predicted Curvature:

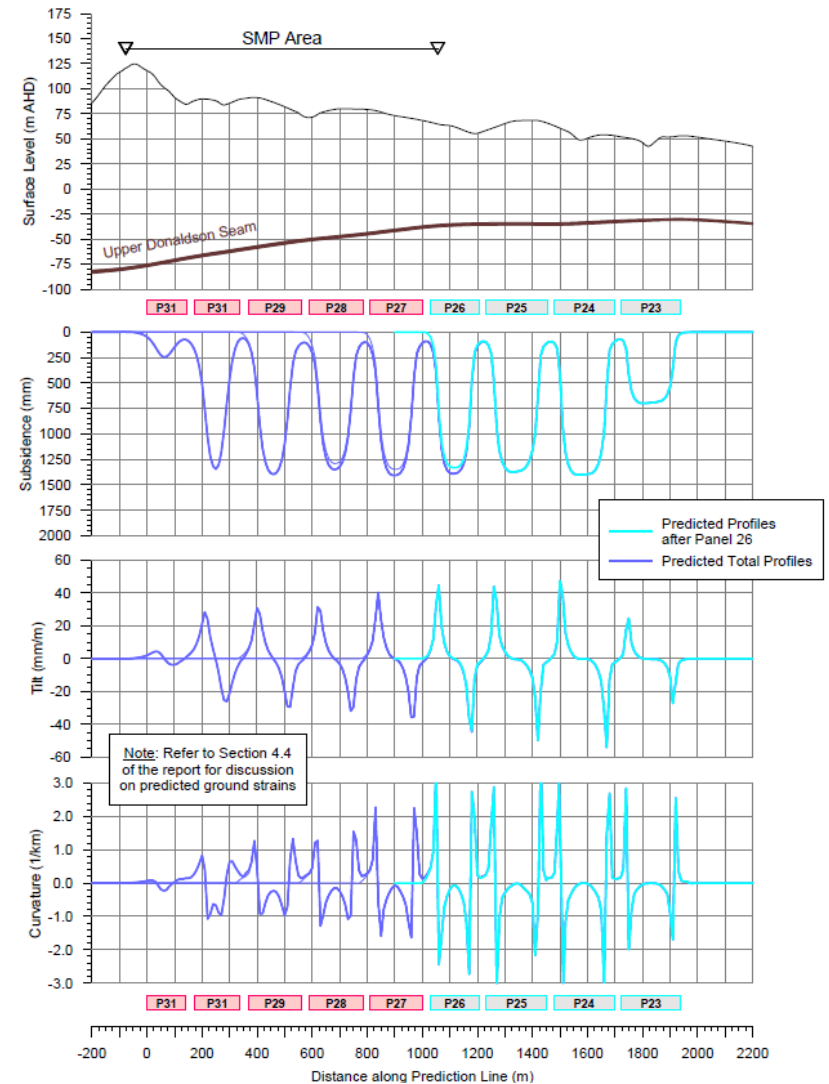
- $> 3 \text{ km}^{-1}$  (i.e.  $< 0.3 \text{ km}$  radius of curvature) at northern end
- $2 \text{ km}^{-1}$  to  $3 \text{ km}^{-1}$  (i.e.  $0.3 \text{ km}$  to  $0.5 \text{ km}$  radius of curvature) along Black Hill Road
- $< 0.01 \text{ km}^{-1}$  (i.e. not measurable) within SCZ's

# Prediction Outcomes: Prediction Lines

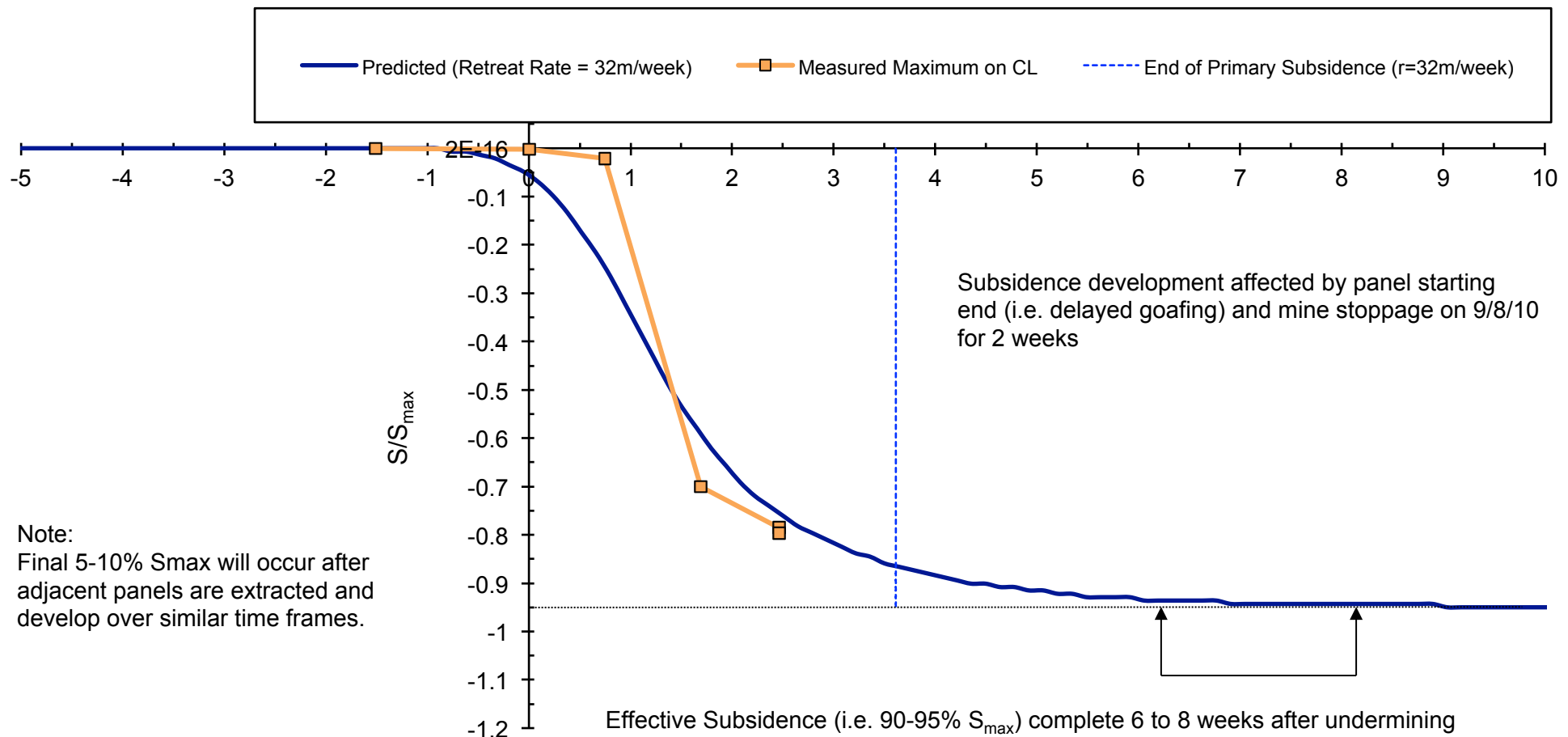
**Predicted Profiles of Conventional Subsidence, Tilt and Curvature along Prediction Line 2 Resulting from the Extraction of Panels 30 to 32**



**Predicted Profiles of Conventional Subsidence, Tilt and Curvature along Prediction Line 1 Resulting from the Extraction of Panels 23 to 31**

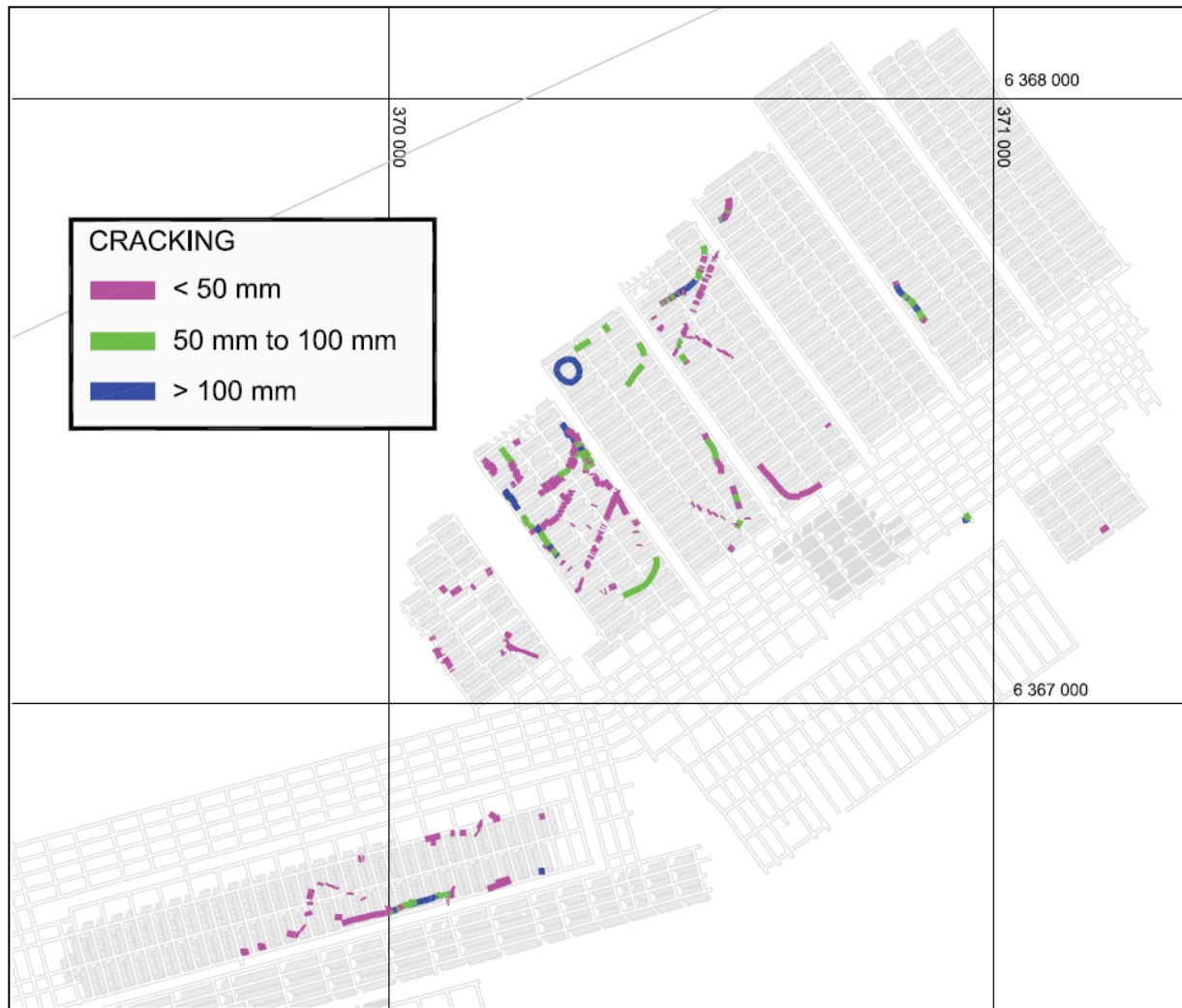


# Abel Subsidence Development Rates – Areas 1, 2 & 3





# Surface Cracking



## Surface Cracking:

- Surface cracking at northern ends of panels expected to be similar to that observed in Areas 1 and 2
- Surface cracks typically between 25mm and 100mm
- Localised surface cracks greater than 200 mm
- Surface cracking at southern ends less due to higher depths of cover

# Areas 1, 2 & 3 Approval and Conditions, Management Plans, Monitoring Programs

- Various Management Plans / Programs have been implemented,
  - Subsidence Monitoring Programs (Surface and Underground);
  - Environmental Management Plans;
  - Public Safety Management Plans;
  - Infrastructure Management Plans for Hunter Water Corporation, TransGrid , Ausgrid, Telstra and Blackhill Road;
  - Property Subsidence Management Plans have been developed including Dam Monitoring Management

# EP / SMP Area 4 Key features

- Private properties and Principal Residences – Property Management Plans to be prepared – to include Mine Subsidence Board inspection, Dam Monitoring & Management Strategy and also consideration of outbuildings and other improvements as ‘other surface structures’. Discussions will also be held, as part of the EP / SMP application preparation with property owners and the MSB regarding mitigation / rehabilitation and responsibilities
- Public Roads – Existing Management Plan with Cessnock City Council to be reviewed.
- Telstra Copper cables – Existing Management Plan with Telstra to be reviewed.
- Ausgrid rural 11kV power lines – Existing Infrastructure Management Plan to reviewed;

# Property Subsidence Management Plans

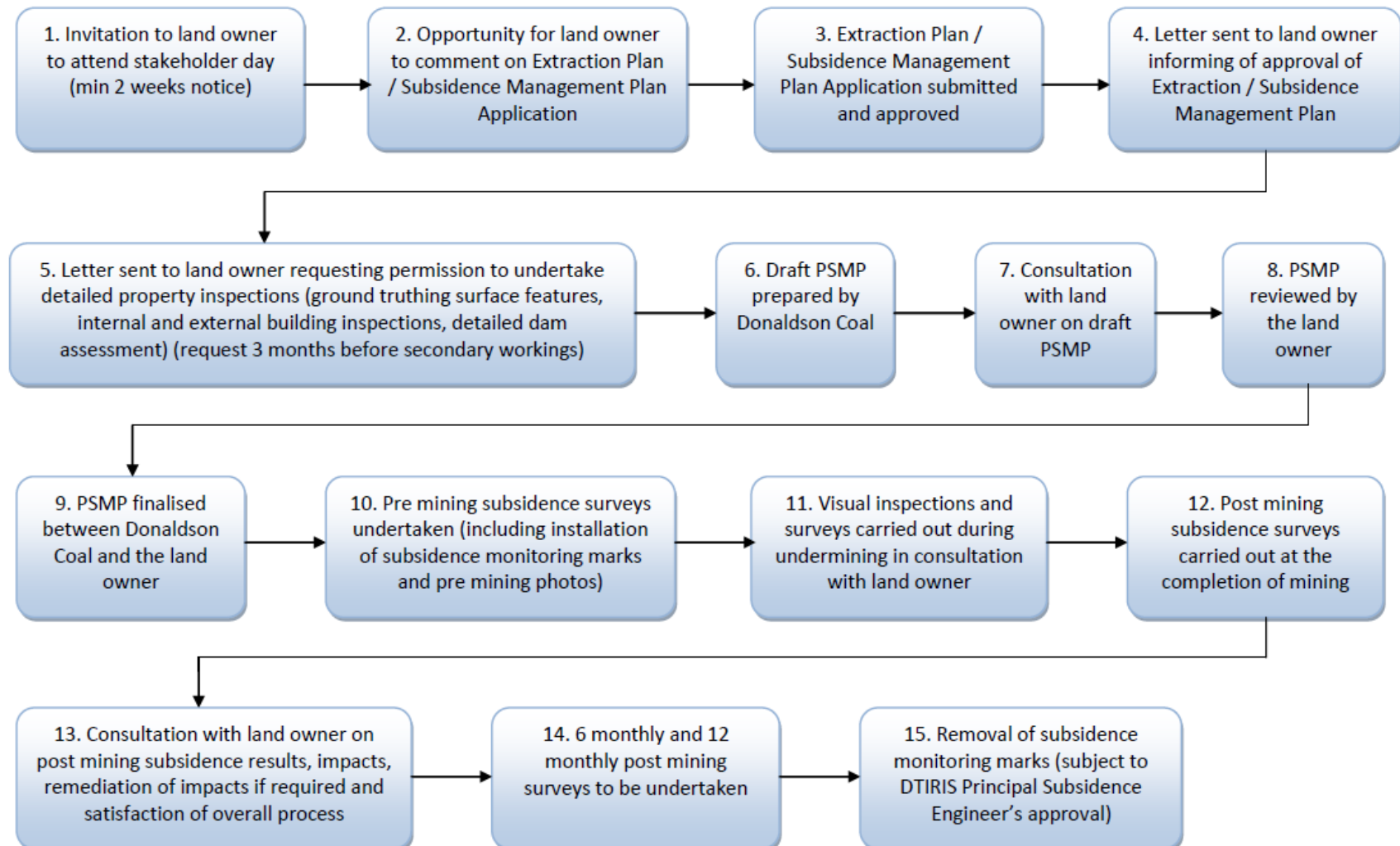
- The Land Management Plan will include Property Subsidence Management Plans addressing management of each individual private property



# PSMP Flow Chart

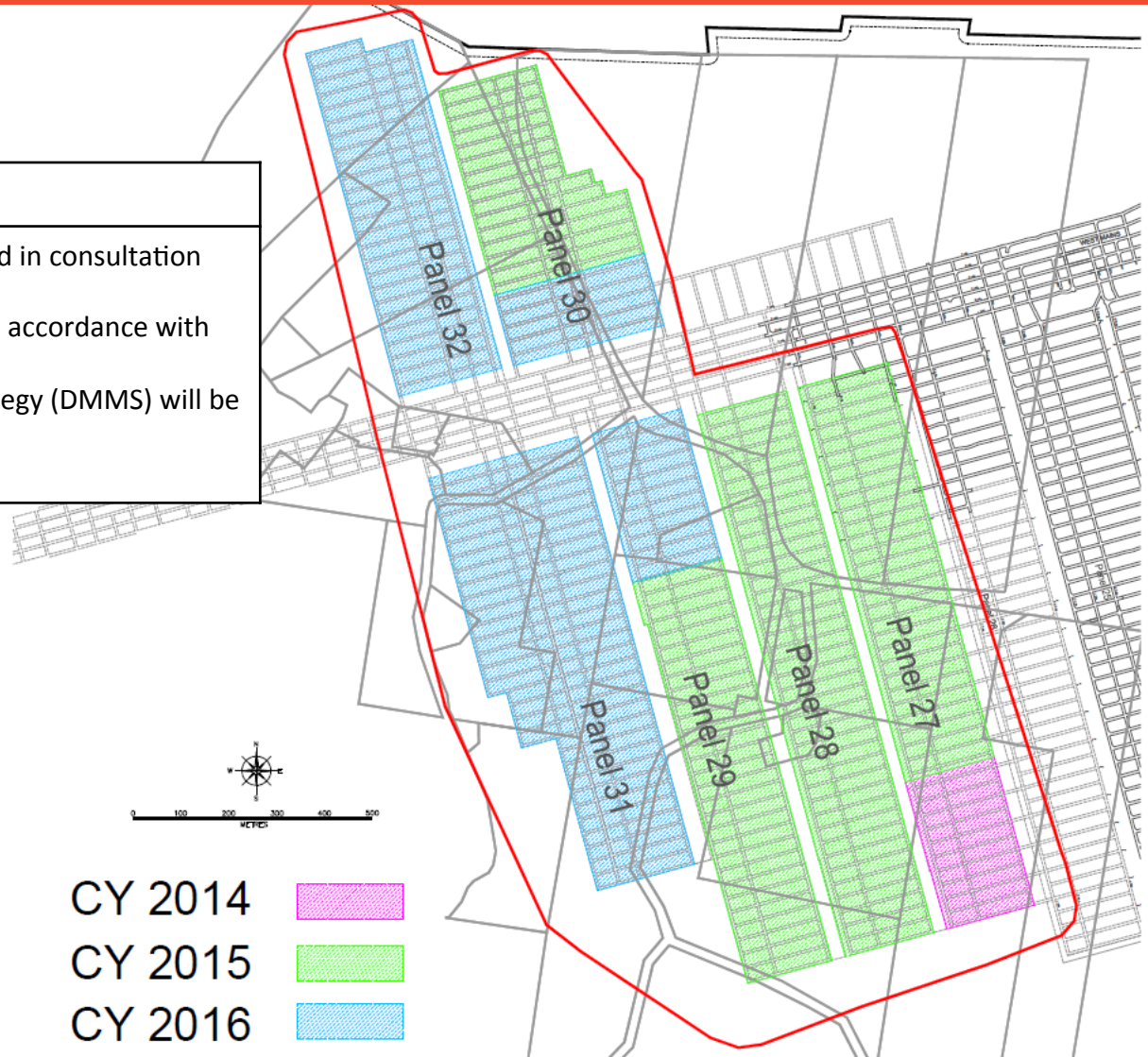


## Property Subsidence Management Plan (PSMP) - Flowchart

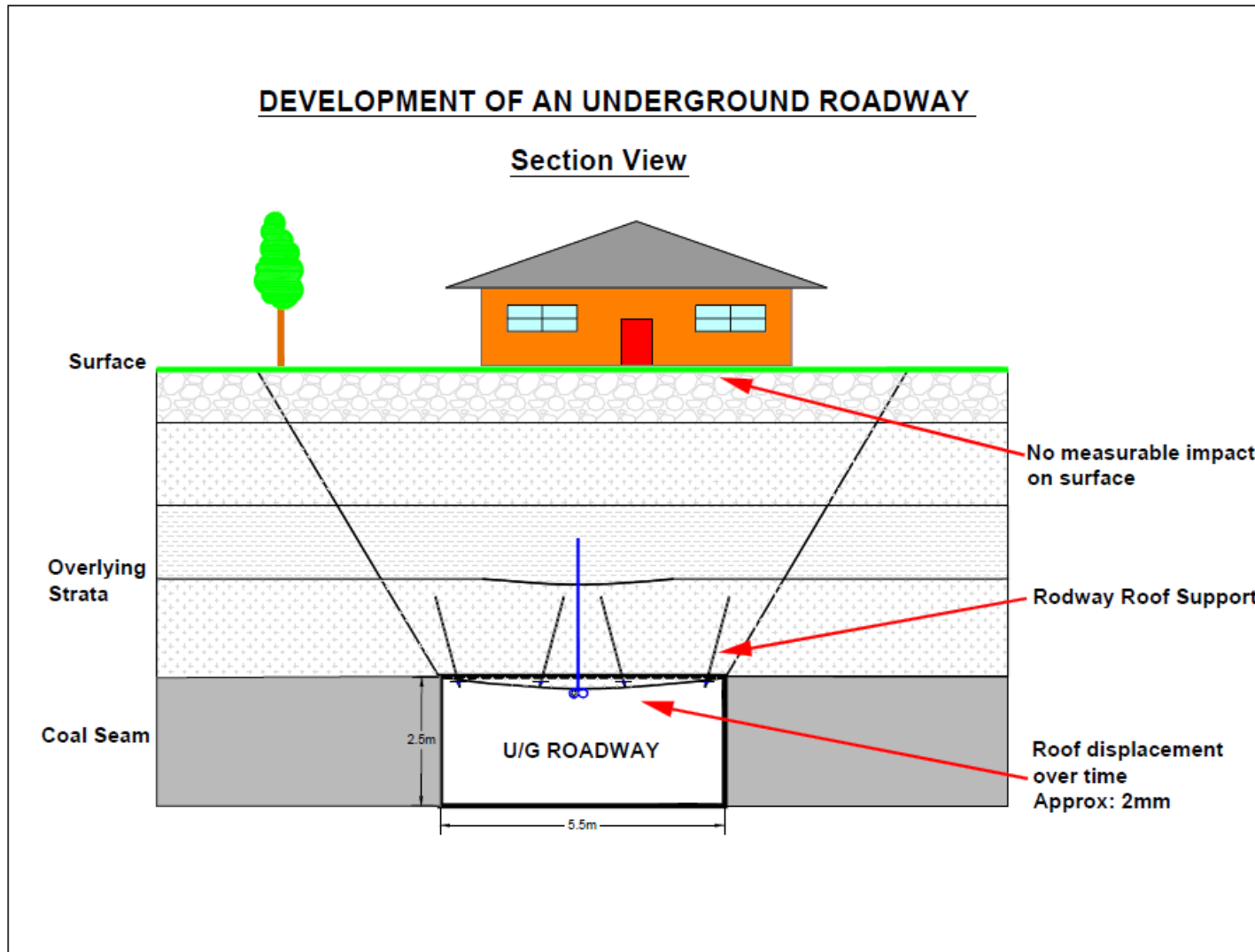


# Private Properties

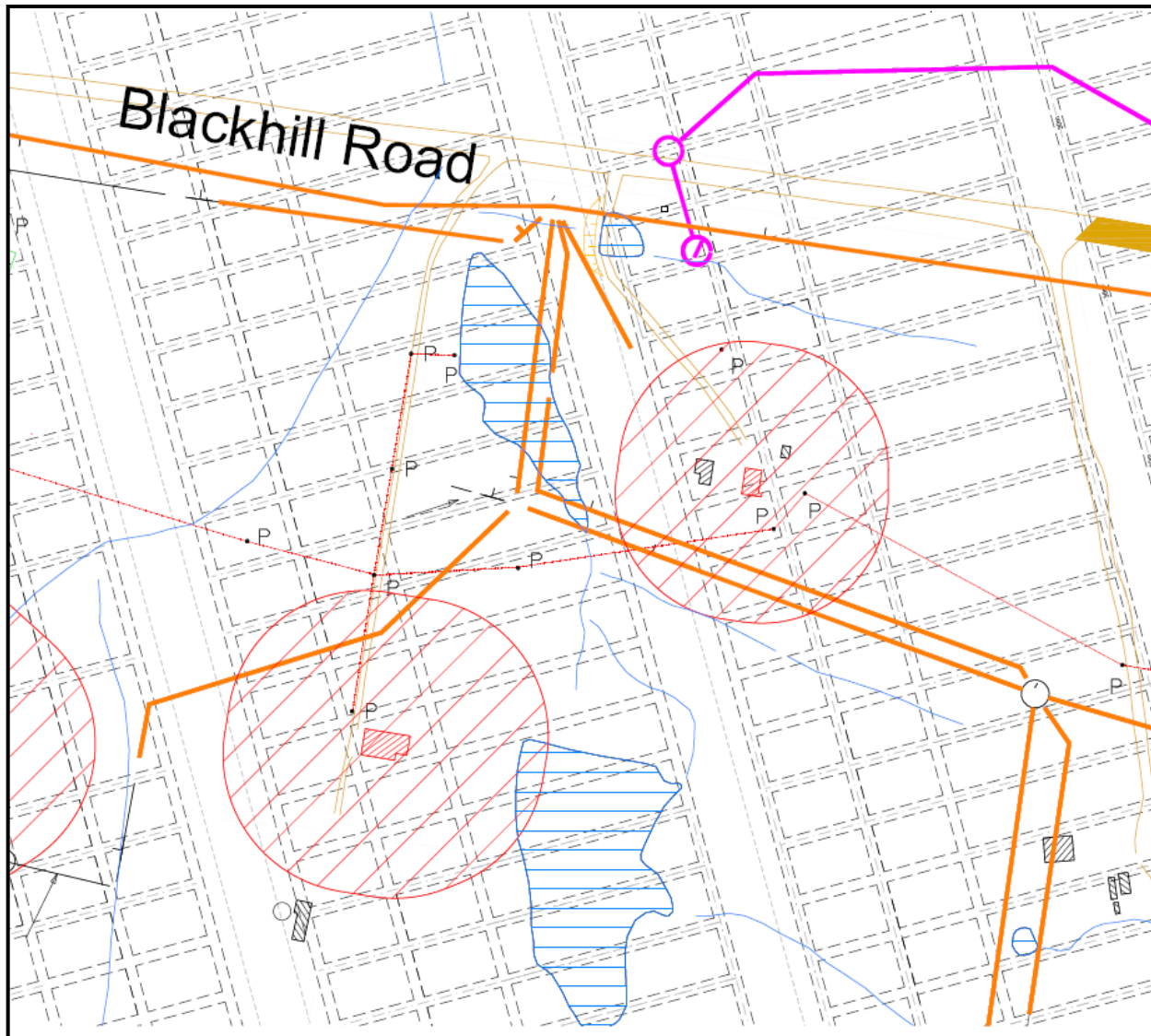
Timing	Panels 27 - 32
Detail	Property Management Plan to be prepared in consultation with Property owner and MSB. Any Principal Residences to be assessed in accordance with Project Approval A Dam Monitoring and Management Strategy (DMMS) will be developed if required.



# Development of Underground Roadway



# Typical Private Property Infrastructure



Principal residence

Dam

Power lines

Other Features e.g.  
Sheds

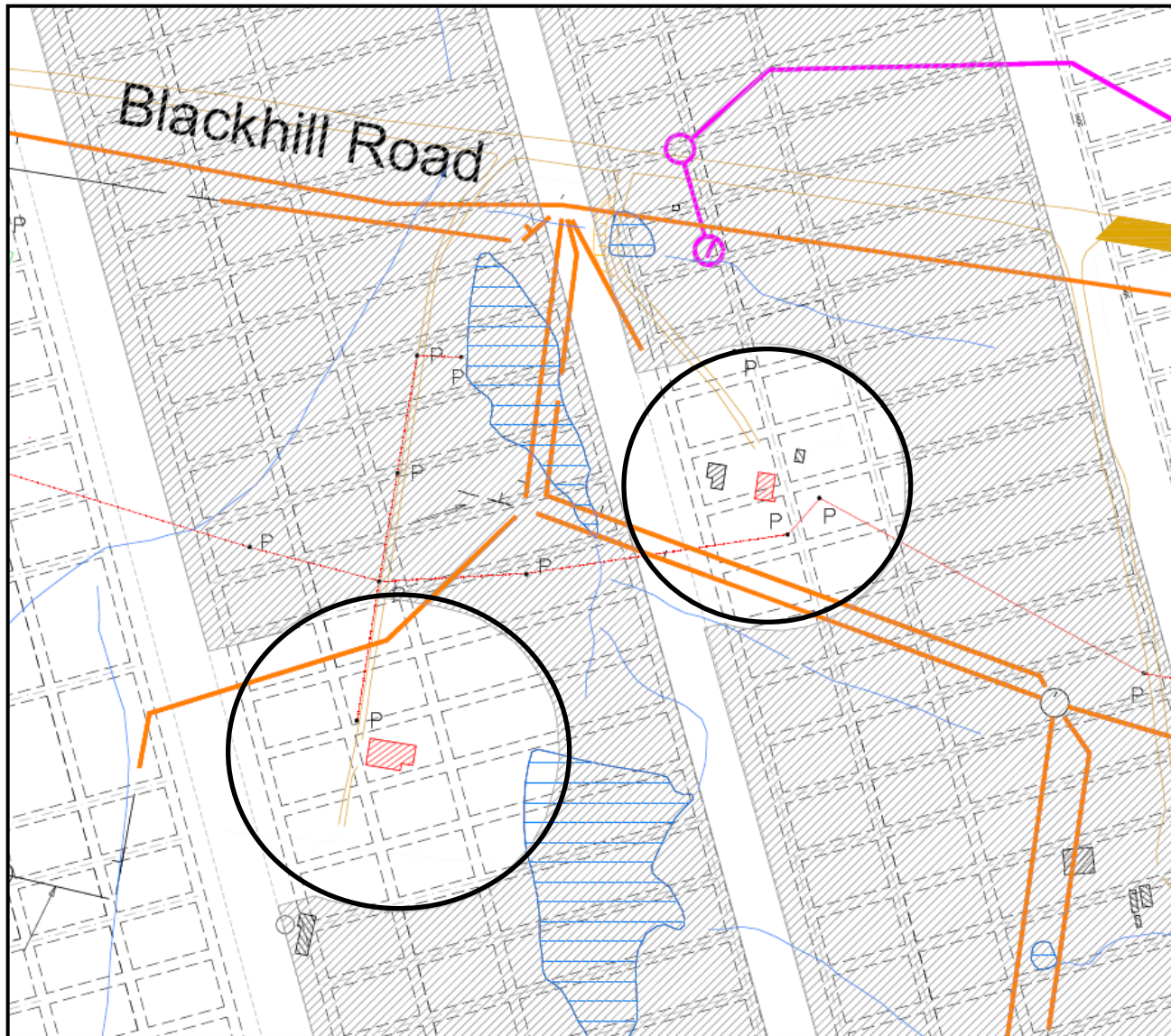
Comms cable

Access tracks

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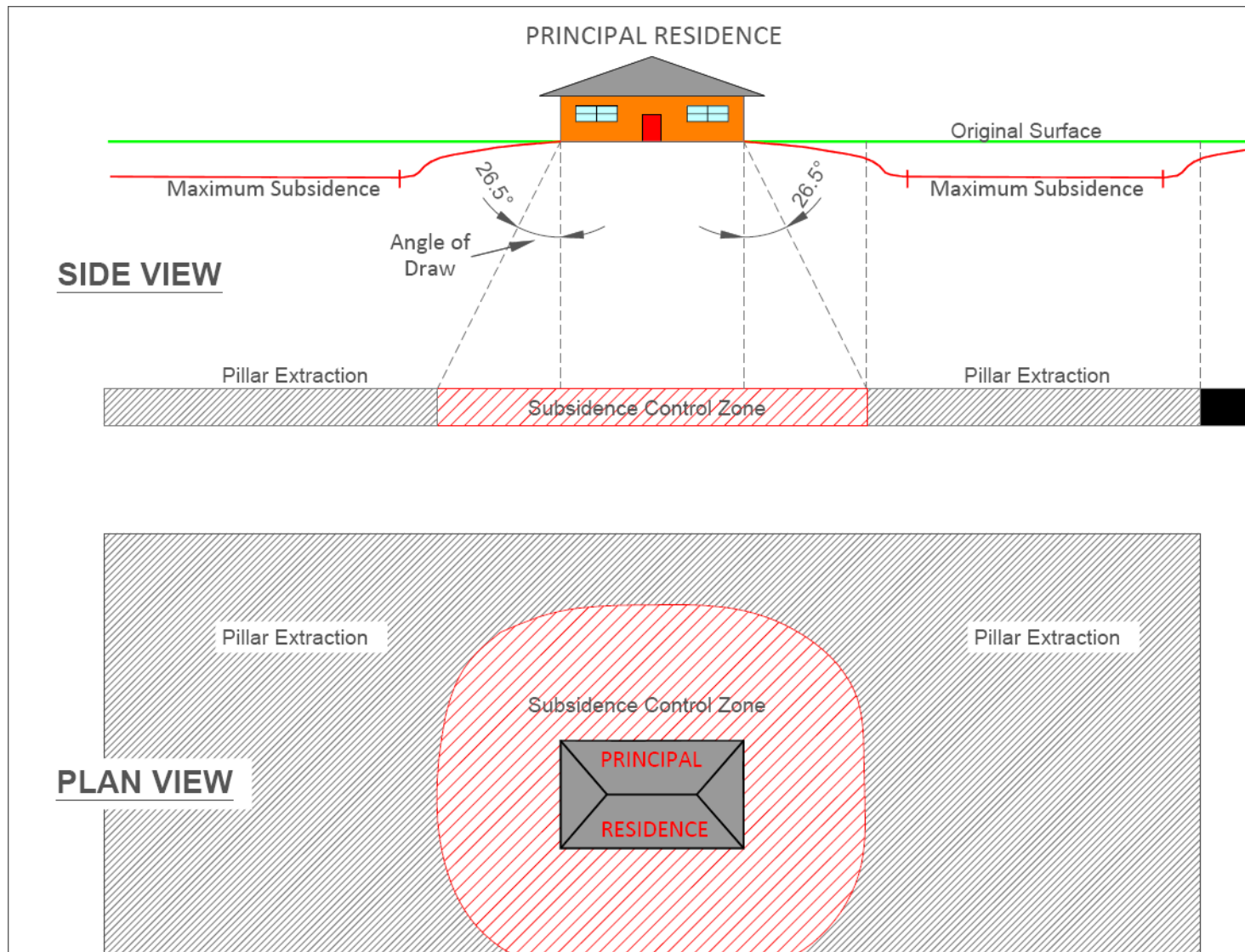
# Typical Private Property Infrastructure



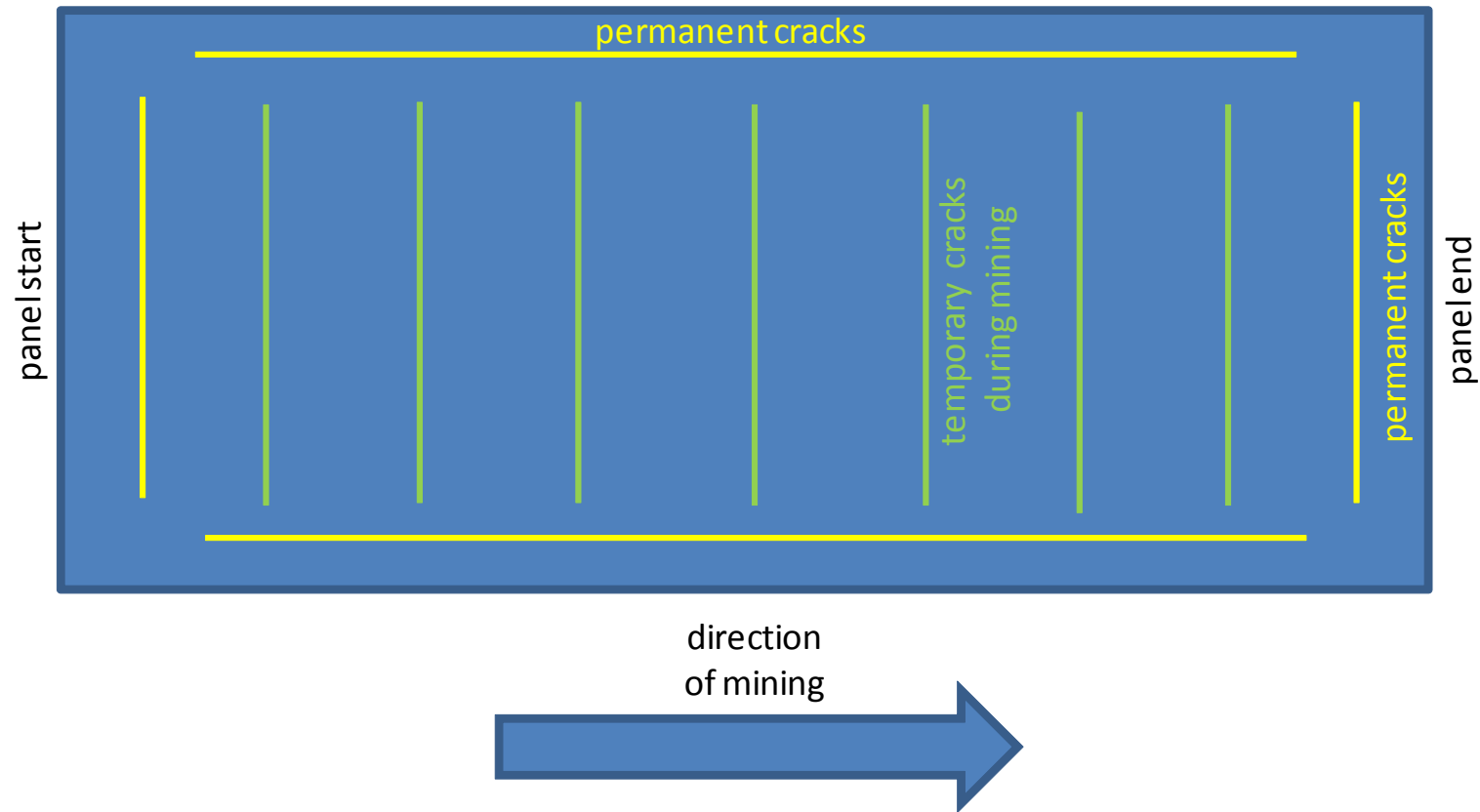
Subsidence Control Zones (SCZ) to provide protection to the Principal Residence

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# SCZ around Principal Residences



# Impacts – surface cracking





# Typical Crack Repairs



1. Excavator digs down to base of crack



2. Area compacted and re filled



3. Area re seeded



4. Rehab completed



# Dams

- A Dam Monitoring and Management Strategy (DMMS) will be developed for all dams prior to any mining impact.
- The DMMS provides for
  - Individual inspection of each dam by qualified Engineer
  - Pre and post Mining photos
  - Dam water levels, ph and EC will be monitored
  - In the event that subsidence monitoring indicates a potential for dam wall failure, dam water will be managed by different methods, for example
    - Pumped to an adjacent dam to lower the water level to a manageable height
  - An alternate water supply will be provided to the dam owner until the dam can be reinstated

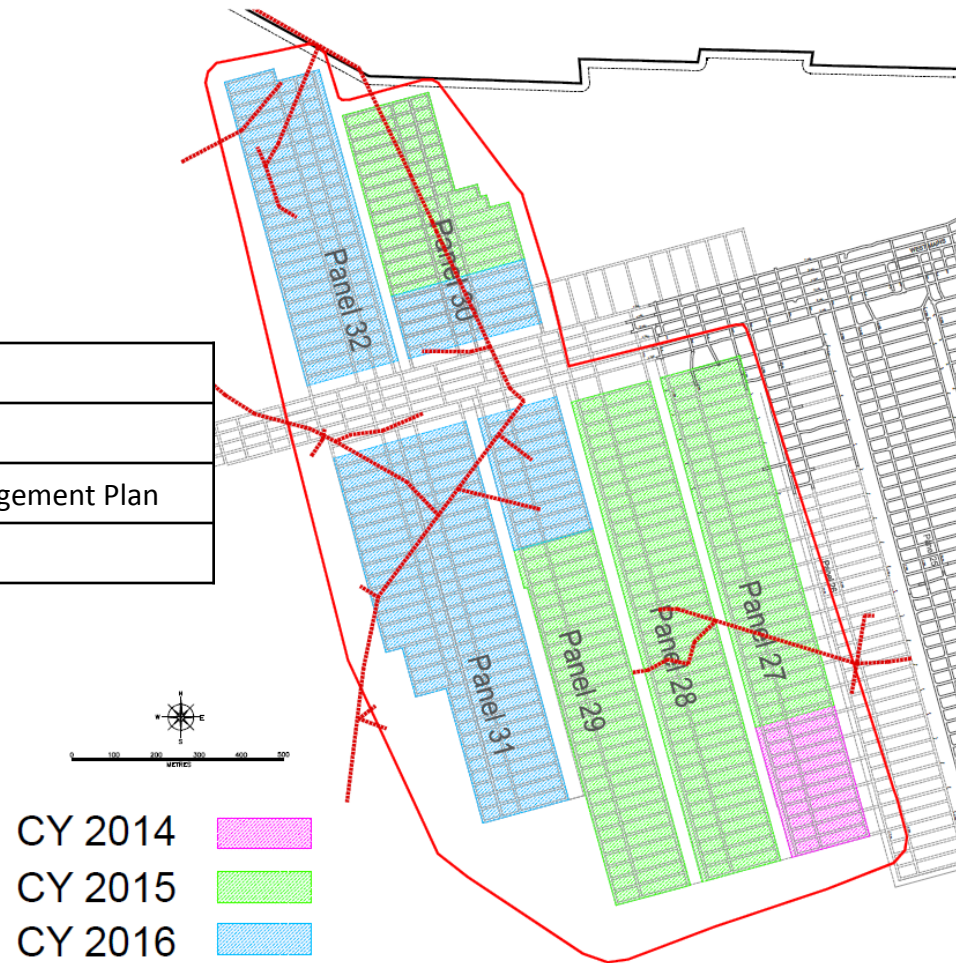


# Infrastructure

- The Built Features Management Plan will include sub plans (Infrastructure Management Plans) addressing management of important individual built features including:
  - Transmission lines
  - Telecommunications
  - Public roads

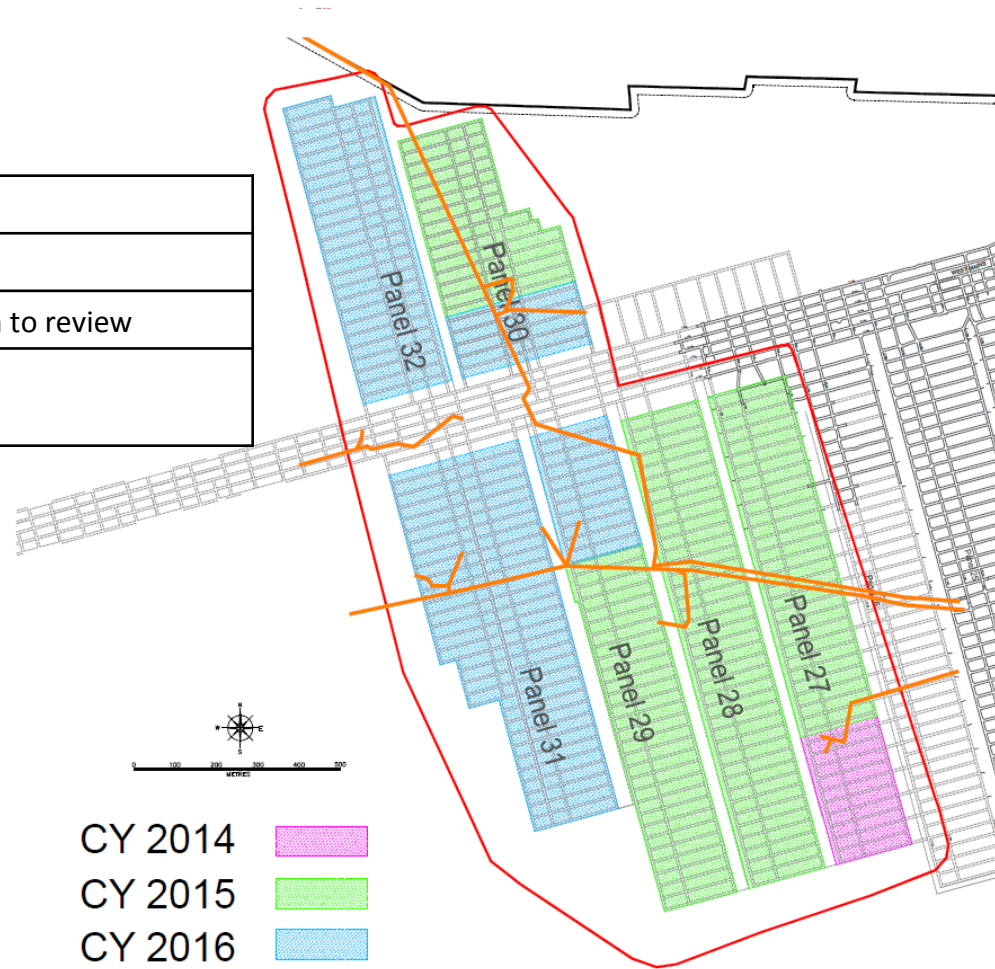
# Ausgrid Power Lines – Rural 11kV

Timing	Panels 27 - 32
Detail	11kV Feed to Black Hill area
Management Plan	Review existing Ausgrid Management Plan
Consultation/Inspection	Continuing



# Telstra Comms cables

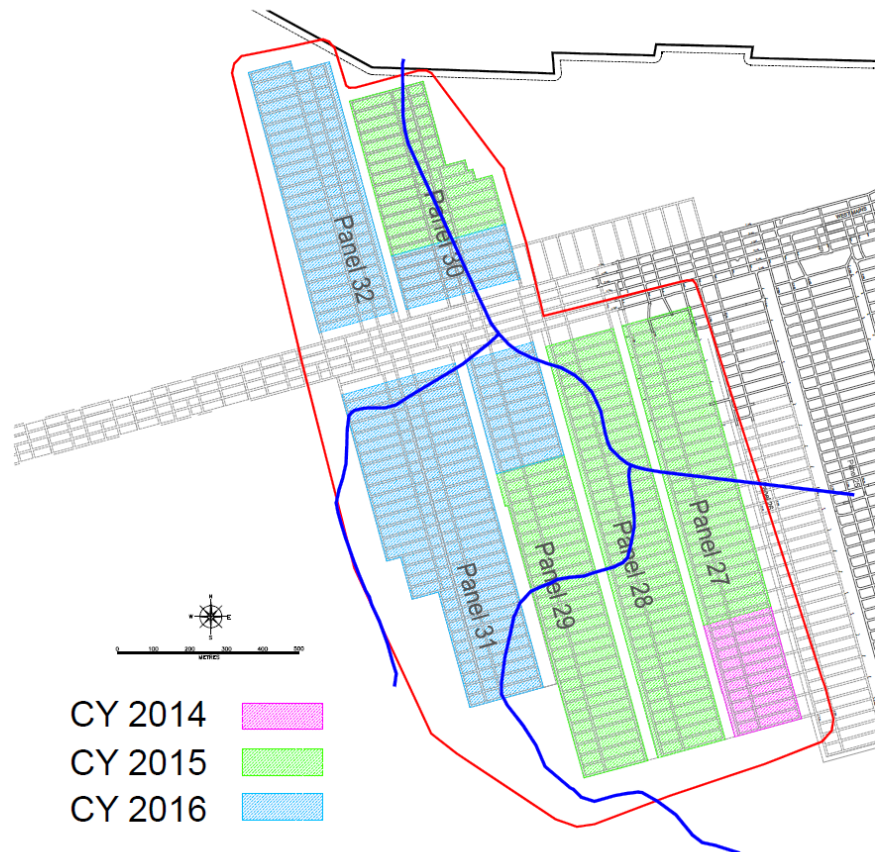
Timing	Panel 27, 28, 29, 30, 31
Detail	Local Copper network
Management Plan	Existing Management Plan to review
Consultation/Inspection	Continuing with Telstra





# Public Roads

- The Company shall prepare and implement a Management Plan in consultation with Cessnock City Council. This plan of management will ensure the safety and serviceability of public roads



<b>Timing</b>	Panel 27, 28, 29, 30, 31
<b>Detail</b>	Public Road
<b>Management Plan</b>	Existing Management Plan to review
<b>Consultation/Inspection</b>	Continuing with Cessnock Council and local community

# Proposed Monitoring

- Subsidence monitoring consisting of surveys, photographic and visual monitoring, including Principal Residence inspection and surveys;
- Dam and other improvement monitoring, pre and post mining surveys;
- Ecological monitoring, fauna and flora (as part of EMP)
- Surface and groundwater monitoring;
- Infrastructure monitoring, survey, photographic and visual.
- Subsidence surveys
- Visual inspections
- Photographic records

# Proposed Subsidence Monitoring

## Typical Subsidence Monitoring Program for Pillar Extraction Panels

- Approved by DTIRIS
- Centre and cross line survey marks typically at 10m centres
- Feno survey markers used in open areas
- Star pickets used in timbered areas
- Removed after effective subsidence completed with approval by the PSE



Feno survey markers

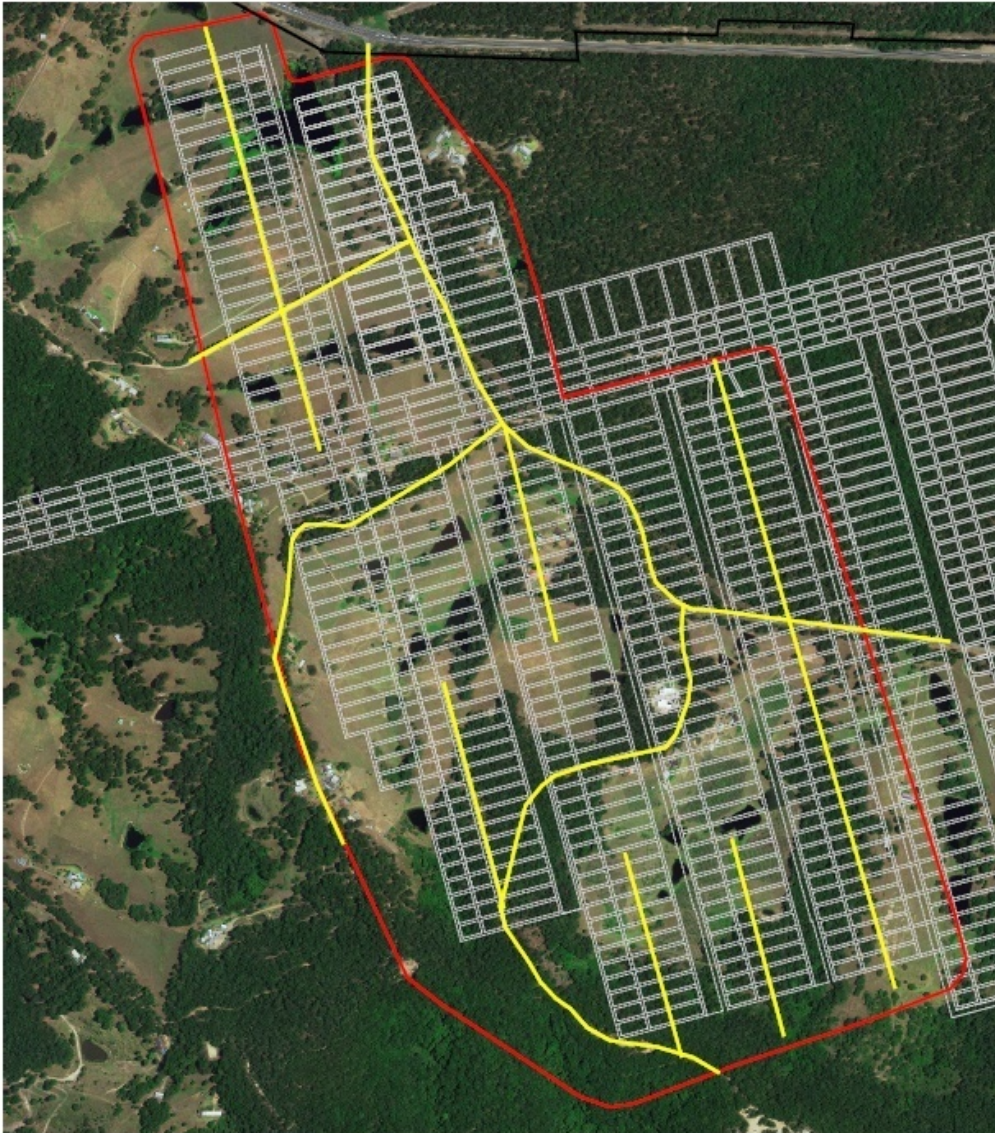


Star Pickets with conduit





# Proposed Subsidence Monitoring Lines



- Centre Line of Panels
- Public Roads
- Principal Residence
- Dams
- Other Structures



# Abel Area 4 EP / SMP Schedule

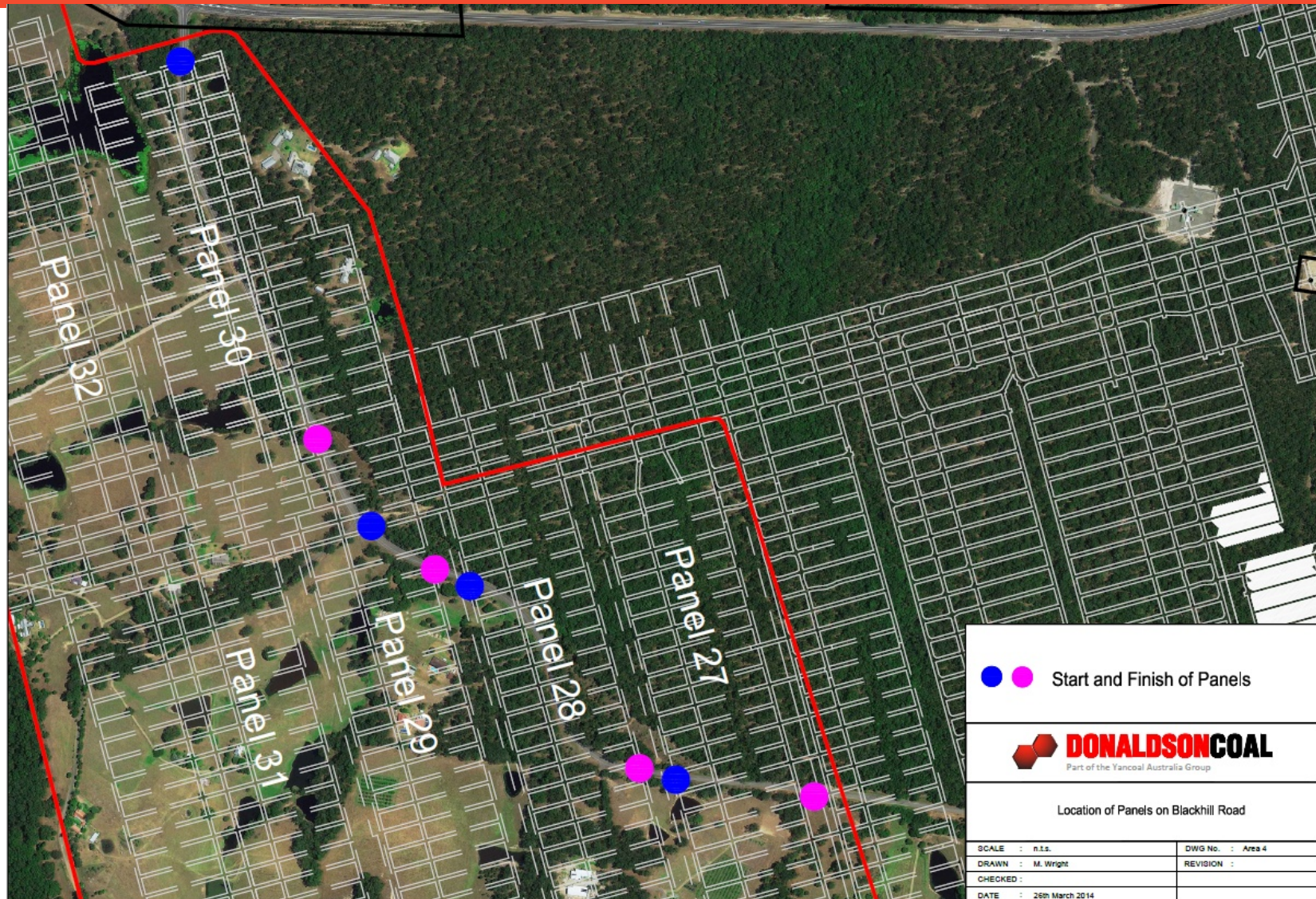
- ◆ Consultation has commenced and will continue throughout the preparation of the EP / SMP application with
  - ◆ DoPI, DTIRIS and relevant agencies
  - ◆ Abel Mine Community Consultative Committee (CCC)
  - ◆ Landholders, and
  - ◆ Infrastructure owners
- ◆ Following this presentation and field inspection a Risk Assessment will be conducted 3/4/14 to assess all risks and will include items raised from today.
- ◆ Preparation of the EP / SMP Application will then continue with the aim to lodge the document in early June 2014.

# Abel EP / SMP Area 4 Schedule

- Submit EP / SMP Application (June 2014)
- Advertise submission of EP / SMP Application
- Provide copy of application to Landholders and place on company website
- Display period and opportunity for further community input (June 2014)
- Review of application (DoPI, DTIRIS then Inter Agency Review Committee)
- Determination – approval sought for commencement of pillar extraction (September 2014)

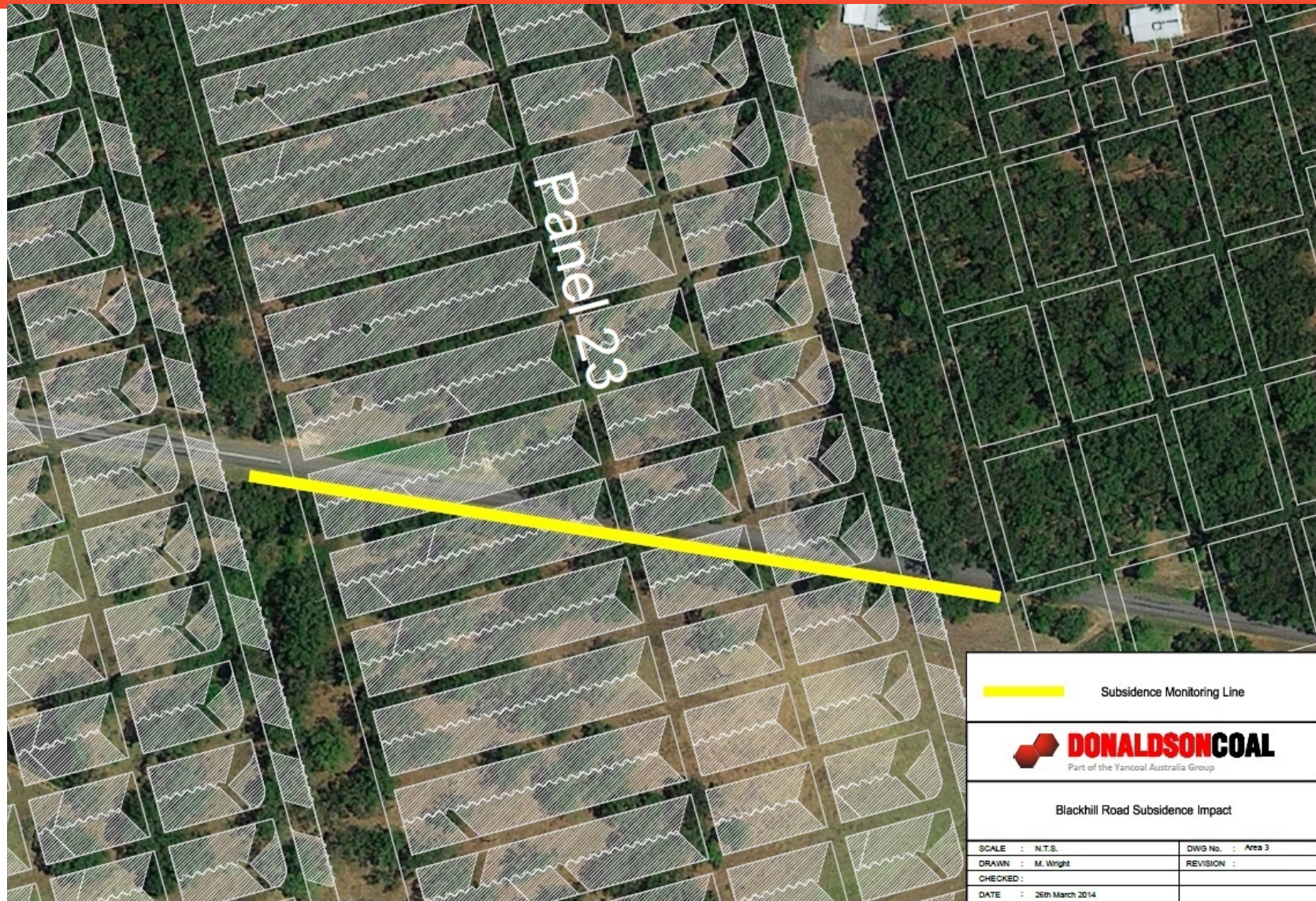


# Site Inspection



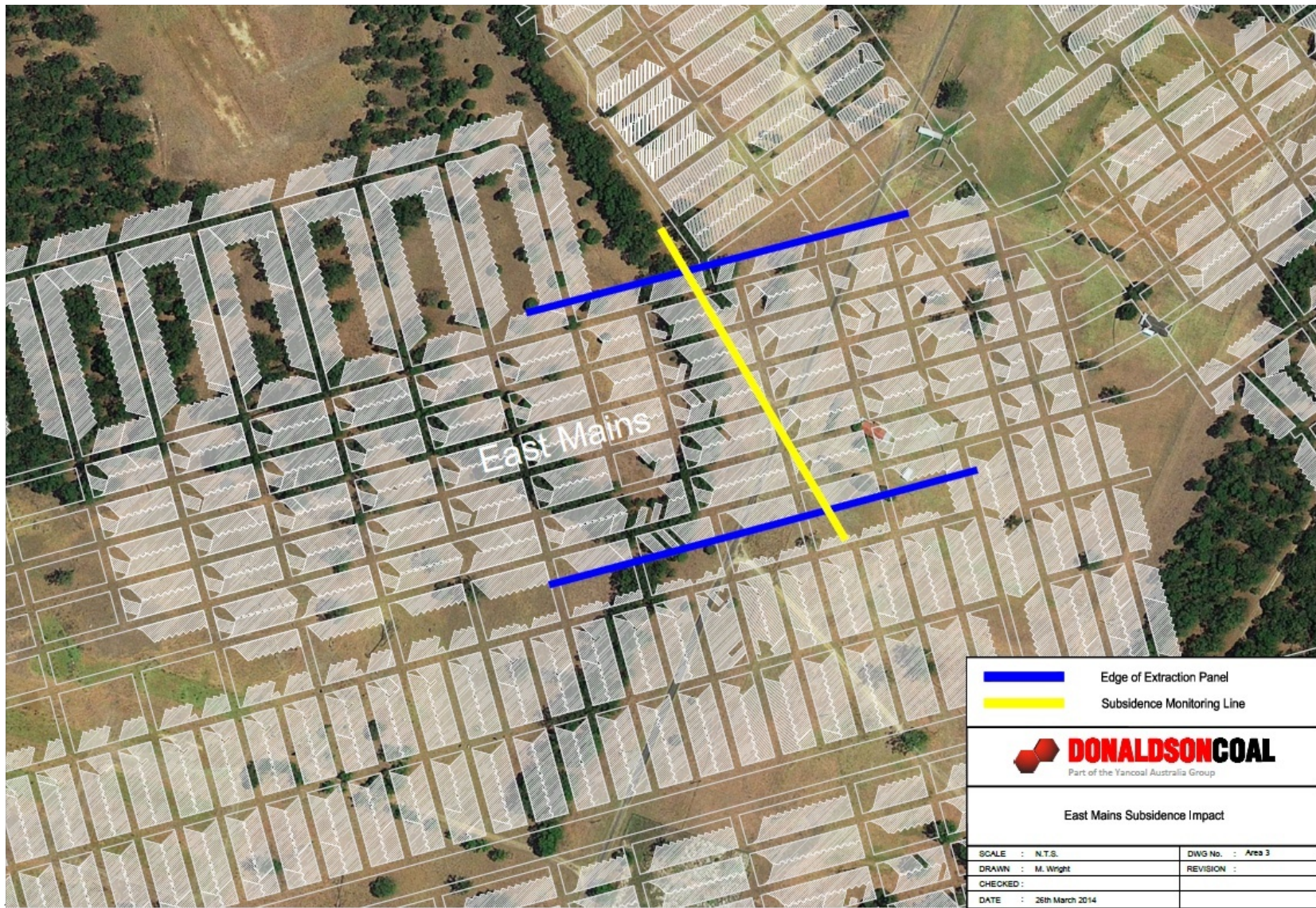


# Site Inspection SMP Area 3





# Site Inspection SMP Area 1



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