Healthy Coorong, Healthy Basin
On-Ground Works
Lake Hawdon North Restoration

Stephen Whitehead (DEW), Sarah Murphy (DEW)
Mark de Jong (Limestone Coast Landscape Board)

SOUTH AUSTRALIA
Government of South Australia
Department for Environment and Water
LANDSCAPE SOUTH AUSTRALIA LIMESTONE COAST

DC Robe update

- Introductions
- Healthy Coorong Healthy Basin Program
- Lake Hawdon North restoration project
- progress to date
- Implementation activities and timeframes

Healthy Coorong, Healthy Basin

Stephen Whitehead, Program Leader
Coorong Infrastructure Investigations

Up to $70 million from 2019 to 2026

To support the long-term health of the Coorong, with a focus on the South Lagoon

Support the site to be a healthy, productive and resilient wetland system that maintains its international significance.

SOUTH AUSTRALIA
Government of South Australia
Department for Environment and Water
Australian Government

Background

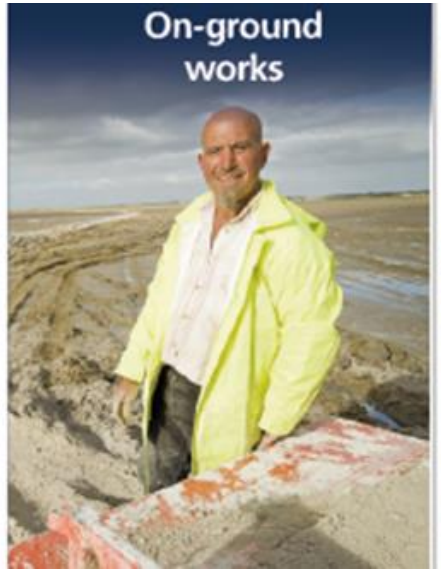
- Millennium Drought (2006-2010)
- CEWO (2009 –)
- CLLMM Recovery & SE Flows (2009-2019)
- Basin Plan (2012 –)
- Coorong Summit (2018)
- Goyder Expert Panel Review (2018)

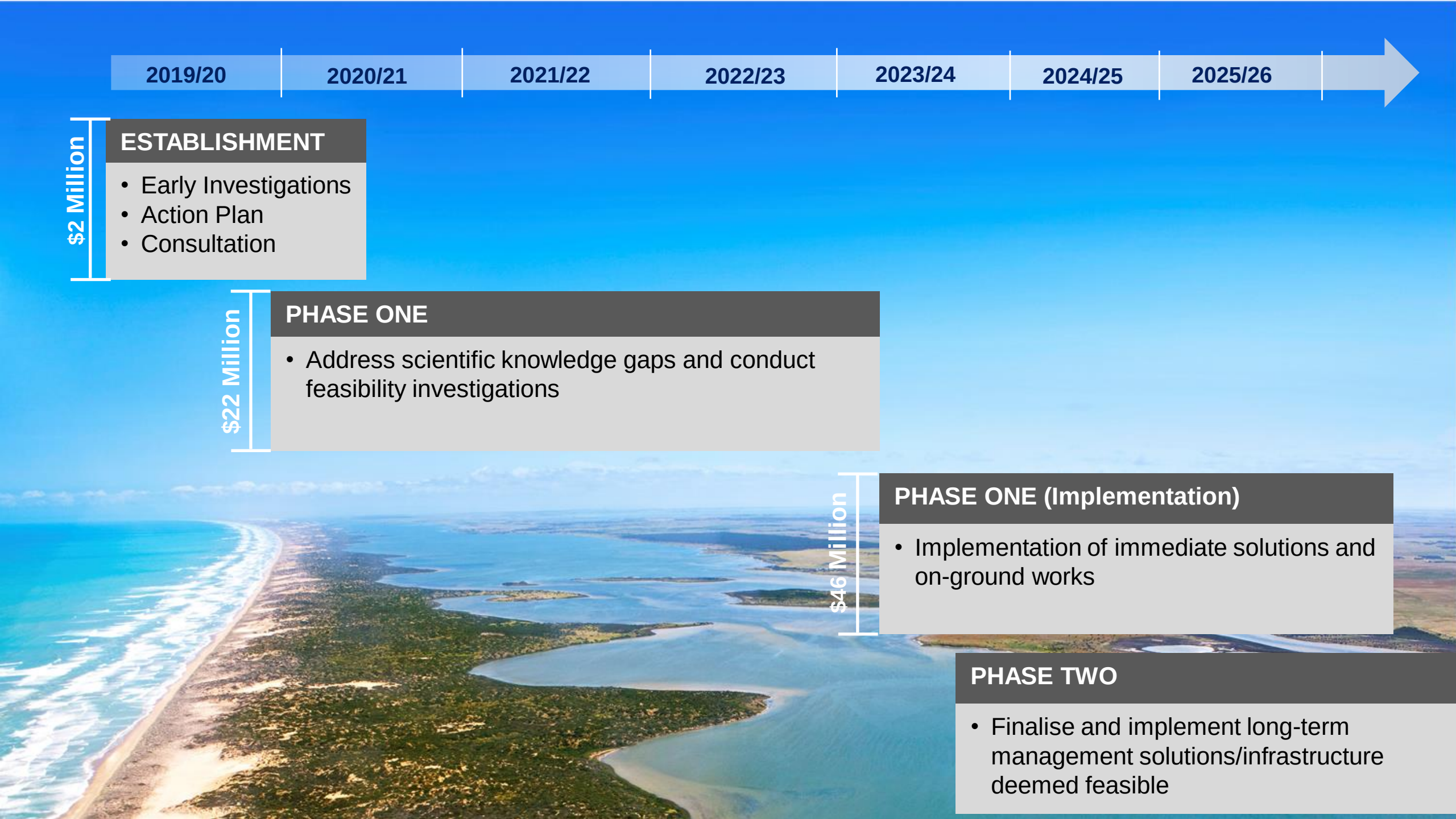
Why we need to take action…

- Symptoms of system imbalance include high nutrient conditions, leading to:
  - Monosulfidic black ooze
  - Algal blooms (filamentous + blue-green)
  - Loss of food sources
  - Dramatic declines in key species (fish, invertebrates, water birds and aquatic vegetation)
- The system is vulnerable – with little capacity to absorb continued and cumulative stress.

HCHB Action Plan

- Presents a working vision to help restore the health of the Coorong through short, medium and long-term actions.
- 6 inter-related projects.
- 28 individual components.




2019/20
2020/21
2021/22
2022/23
2023/24
2024/25
2025/26
$2 Million
ESTABLISHMENT
• Early Investigations
• Action Plan
• Consultation
$22 Million
PHASE ONE
• Address scientific knowledge gaps and conduct feasibility investigations
$46 Million
PHASE ONE (Implementation)
• Implementation of immediate solutions and on-ground works
PHASE TWO
• Finalise and implement long-term management solutions/infrastructure deemed feasible

Issue

The Coorong

- One of the most important refuges for shorebirds in the Murray-Darling Basin
- Habitat condition and availability decline
- Losing migratory shorebirds faster than 79 other shorebird wetland locations across the country.

Opportunity

- **Manage water levels** at key wetlands for regional bird refugia
- Extend the duration of the **migratory shorebird season**
- Improve the area of **preferred habitat** and food resource availability
- Focus on seven target waterbird species, including four *EPBC Act* listed migratory species.

Project aims

On-Ground Works 2020-2022

- Undertake feasibility assessments and implement on-ground works to support key Coorong species
- Improve availability and quality of habitat for migratory and non-migratory shorebirds in the Lower Lakes and South East of South Australia
- Develop detailed designs in consultation with stakeholders at three priority wetlands.

Regional Waterbird Refugia Project

- Small-scale infrastructure providing 2,668 ha of shorebird habitat*
- Water level management
- Provide shallow foraging habitat for shorebirds at critical time
- Regional improvements have local benefits

Tolderol

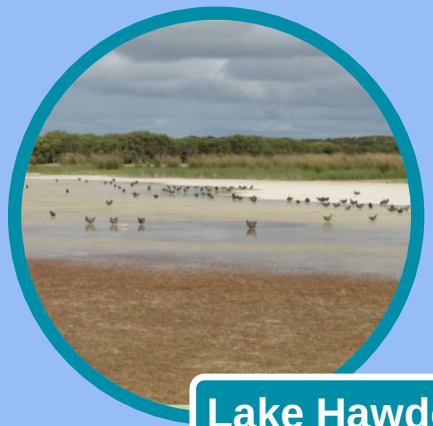
163 ha)

Teringie

40 ha)

Goolwa

*Total of Approximately 73% of preferred shorebird habitat area in the Coorong South Lagoon (3,636 ha)



2465 ha)

Lake Hawdon North

Kingston SE

Robe

Nora Creina

On-Ground Works
Lake Hawdon North Investigations

Mark de Jong

Senior Project Officer

SOUTH AUSTRALIA

Government of South Australia
Department for Environment and Water

Regional Bird Refugia On-Ground Works
Lake Hawdon North

Improve availability and quality of habitat for migratory and non-migratory shorebirds in the Lower Lakes and South East of South Australia

Selected as a priority 2,400ha site, with high restoration potential (Tolderol 163ha, Teringie 40ha)

LHN is a large site, on Crown Land, with secure water availability - Rare opportunity


Common Greenshank: Mary-Ann van Trigt


Curlew Sandpiper: Mary-Ann van Trigt


Sharp-tailed Sandpiper: Bob Green

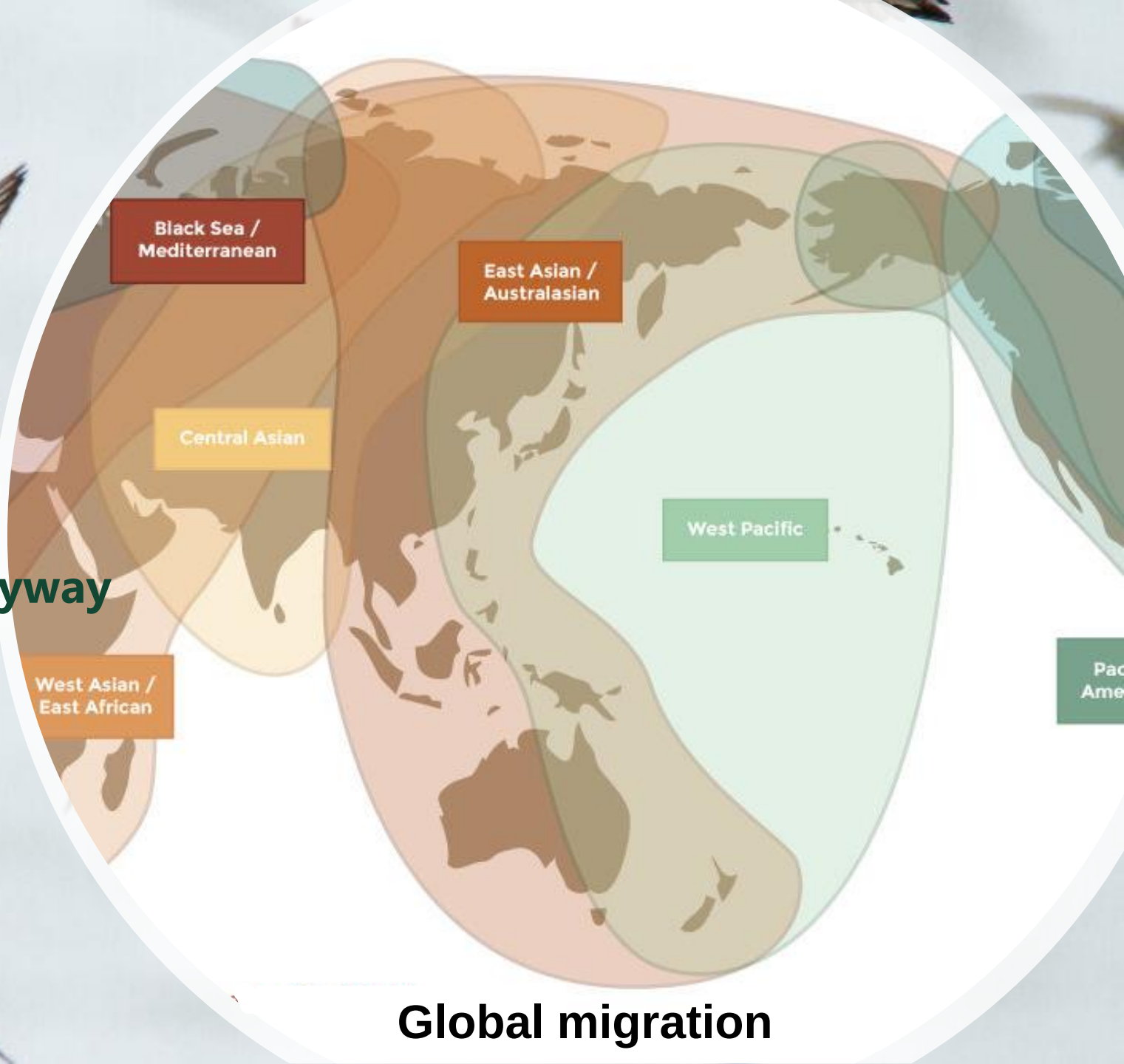

Red-necked Stint: Mary-Ann van Trigt

SOUTH AUSTRALIA

Government of South Australia
Department for Environment and Water

About migratory waders…

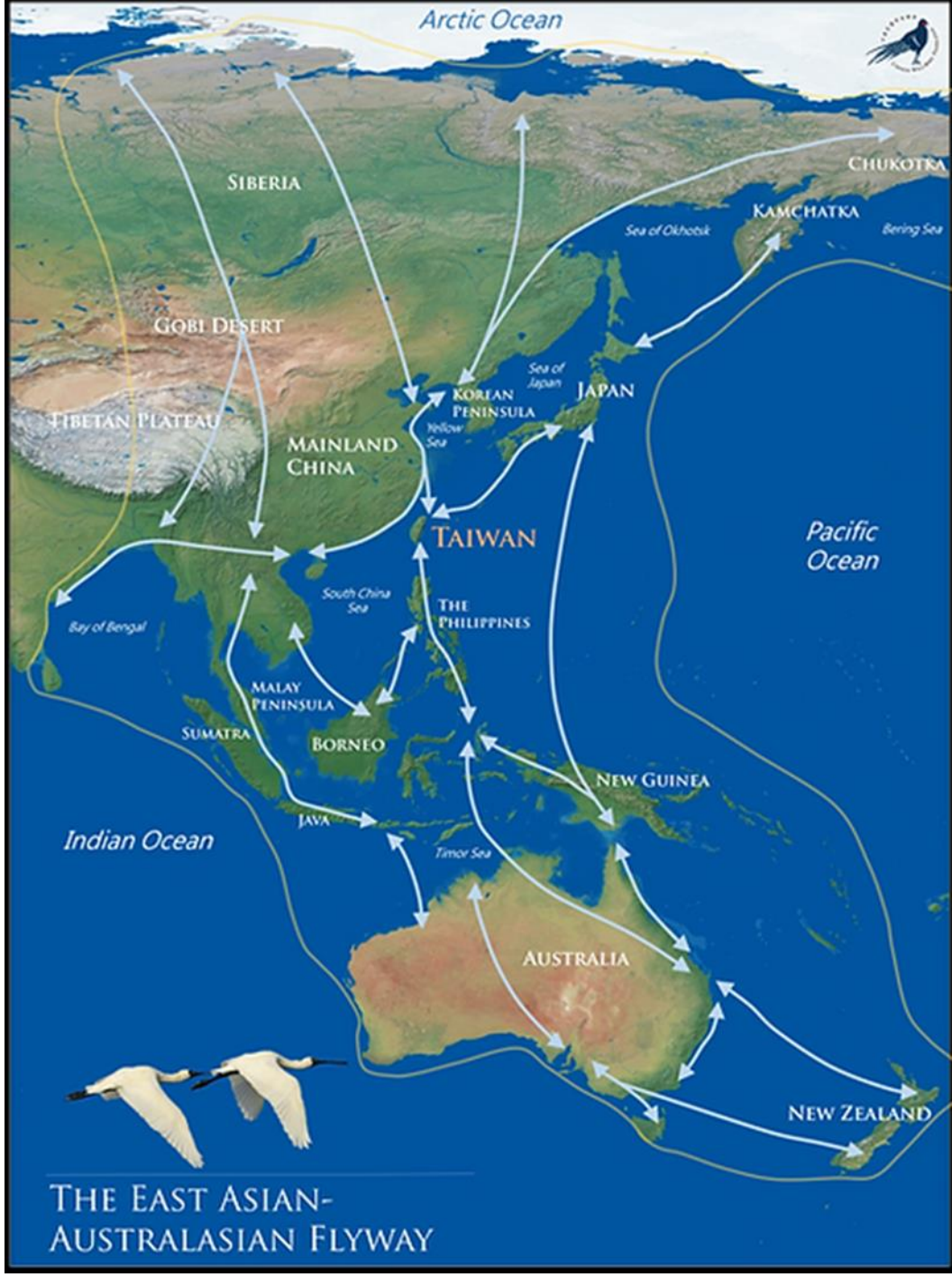
The Coorong and LHN
are part of the
East Asian/Australasian Flyway



Global migration

Migration cycle

- Breed in arctic tundra
- Migrates to Australia every summer
  - Arrives in August to October
  - Leaves February to April
- Individuals can fly ~5,000km non-stop
- Requires significant food consumption for energy reserves
- 50% of their body weight can be gained in the last few weeks before their return migration



Migratory Waders

Sharp-tailed Sandpiper

- Our most common and abundant migratory wader.
  - 17-22cm long and 36-43cm wingspan
  - 65g in weight
- Flexible in habitat choice
- Forages and roosts in a variety of coastal and inland wetlands from fresh to hypersaline
- Tolerant of grassy vegetation and samphire than most other waders

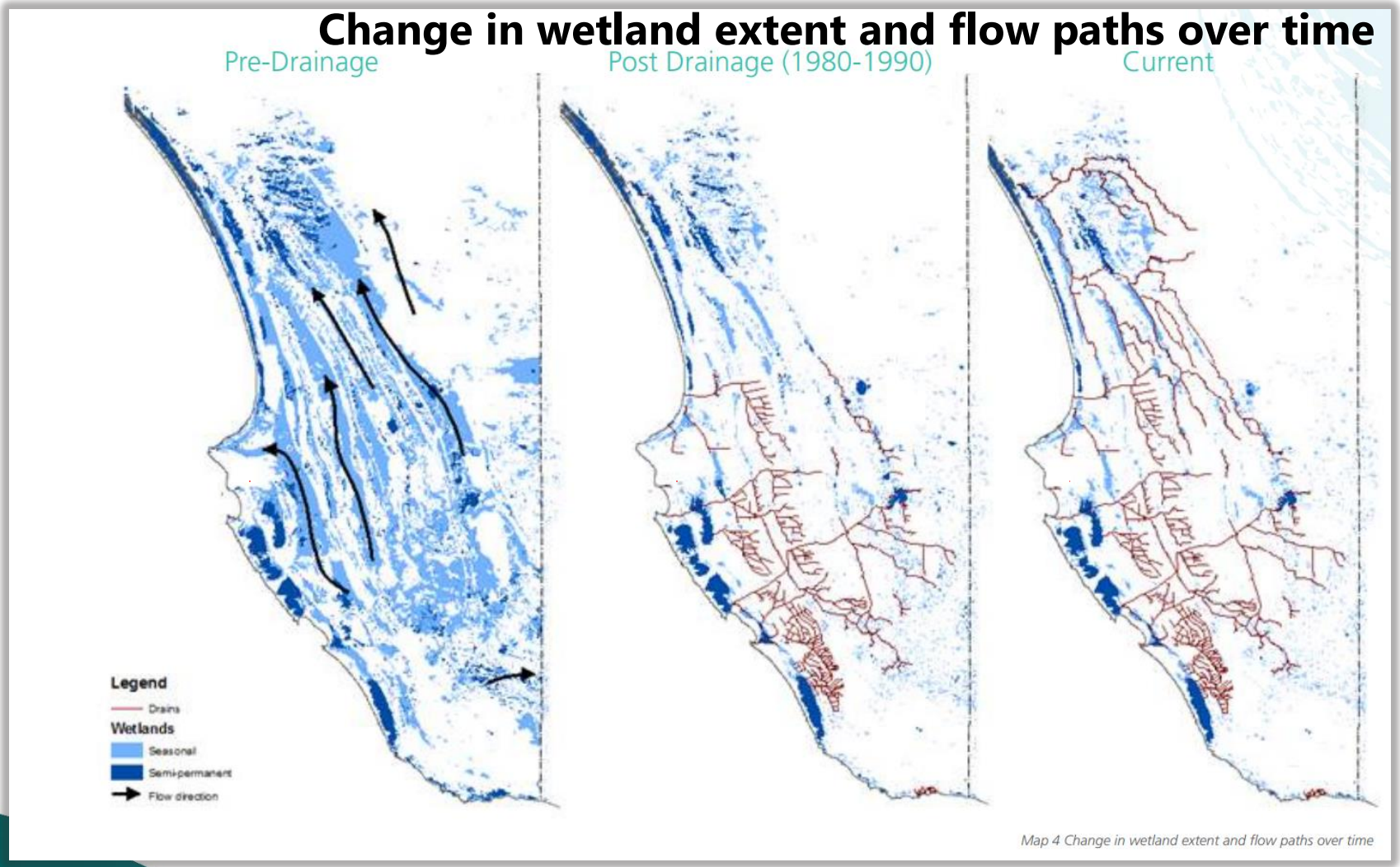
Habitat is critical to survival

- Listed vulnerable under the *EPBC Act* in January 2024, due to population decline
- 91% of the population occurs in Australia
- LHN supports>1% of the population under current conditions. Meeting the criteria as a nationally important wetland for the species
- **LHN restoration seeks to provide foraging habitat at the critical time Feb-March**

LHN – priority for restoration

Regional surface water change

- Pre-agriculture, wetlands covered over half of the region
- Availability, quality and natural movement of surface water changed
- Only 1.5-2.5% of regional wetland remnants still exist.
- LHN is a large wetland remnant



Source: https://www.landscape.sa.gov.au/files/sharedassets/limestone_cost/water/2019_se_drainage_wetlands_strategy.pdf

Lake Hawdon system

Lake Hawdon South

- Tenure: Conservation Park (Proclaimed 2010)
- 3,183 Ha

Lake Hawdon North

- Tenure: Unallocated Crown Land
- 4 annual grazing licenses
- 237 Ha mining lease
- 2,465 Ha

Combined

- 5,648 Ha
- Seasonal water regime, inundated annually
- Ecological values of international, national, state and regional significance

Drain L – secure water source

- Highest yielding drain in South East
  - Mean 59,010 ML/year
- Provides the majority of inflows into Lake Hawdon North; dissects the lake bed
- Larger inflow than outflow capacity
- Provides all freshwater flows to the Robe Lakes
- Discharges likely to have marine impacts

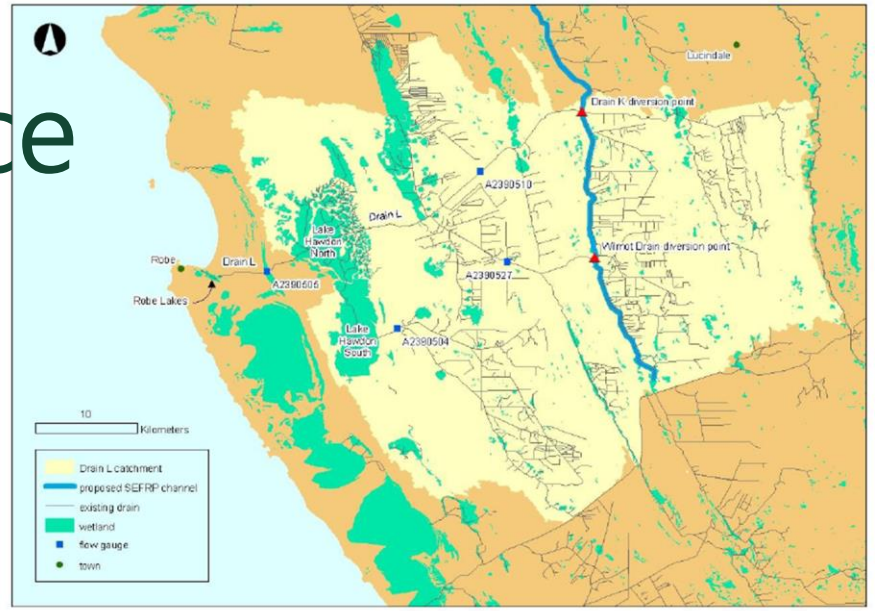
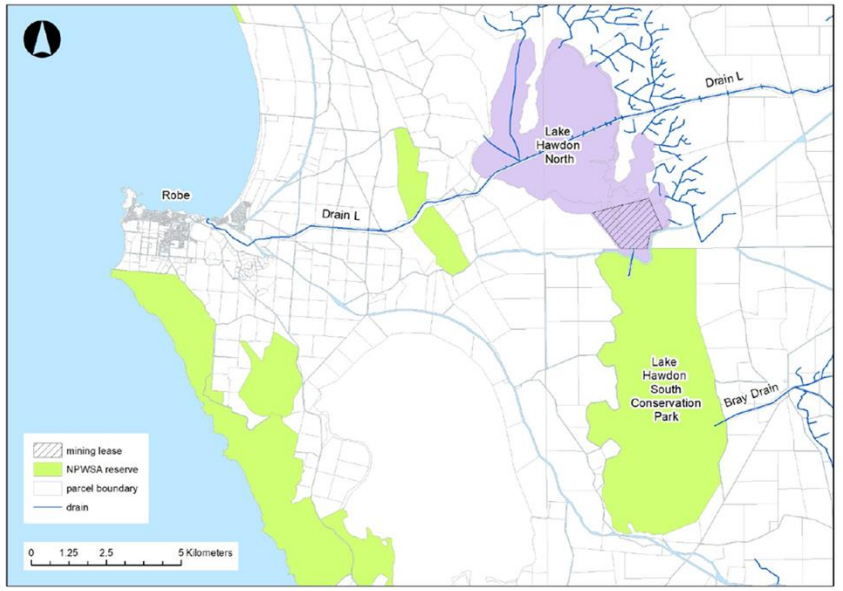


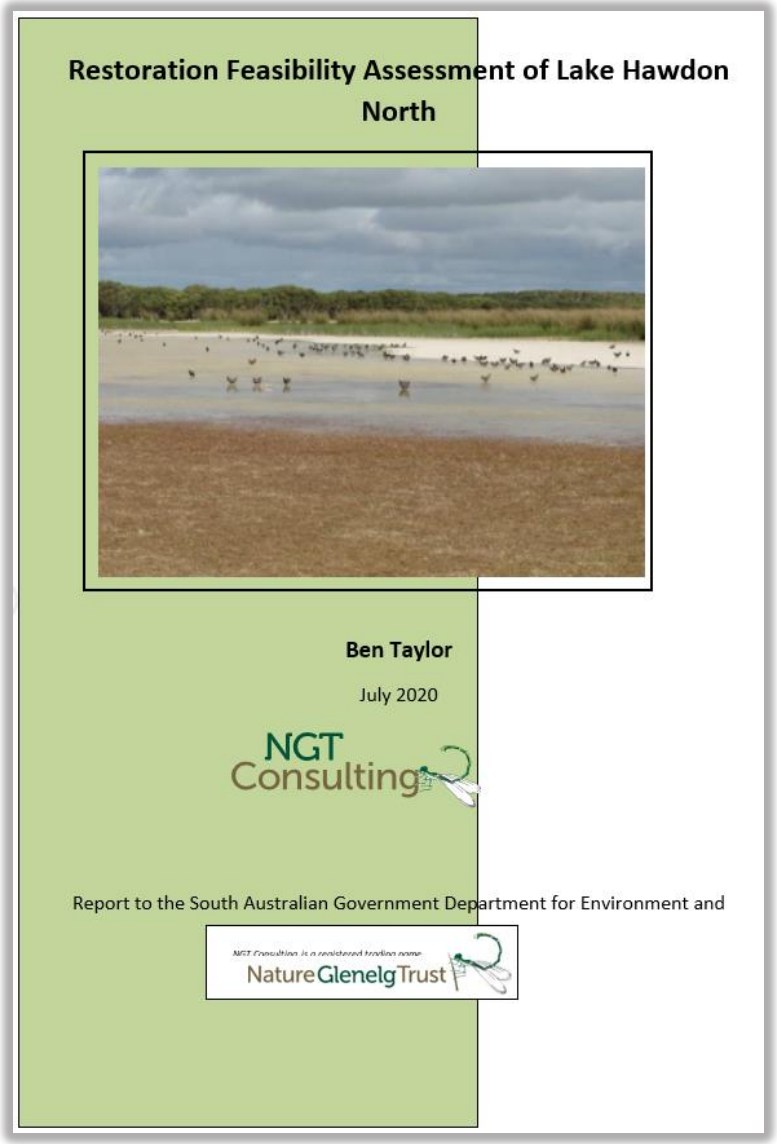
Figure 38. The catchment of Drain L is comprised of an extensive drainage network draining an area of 1642km².



Restoration feasibility assessment

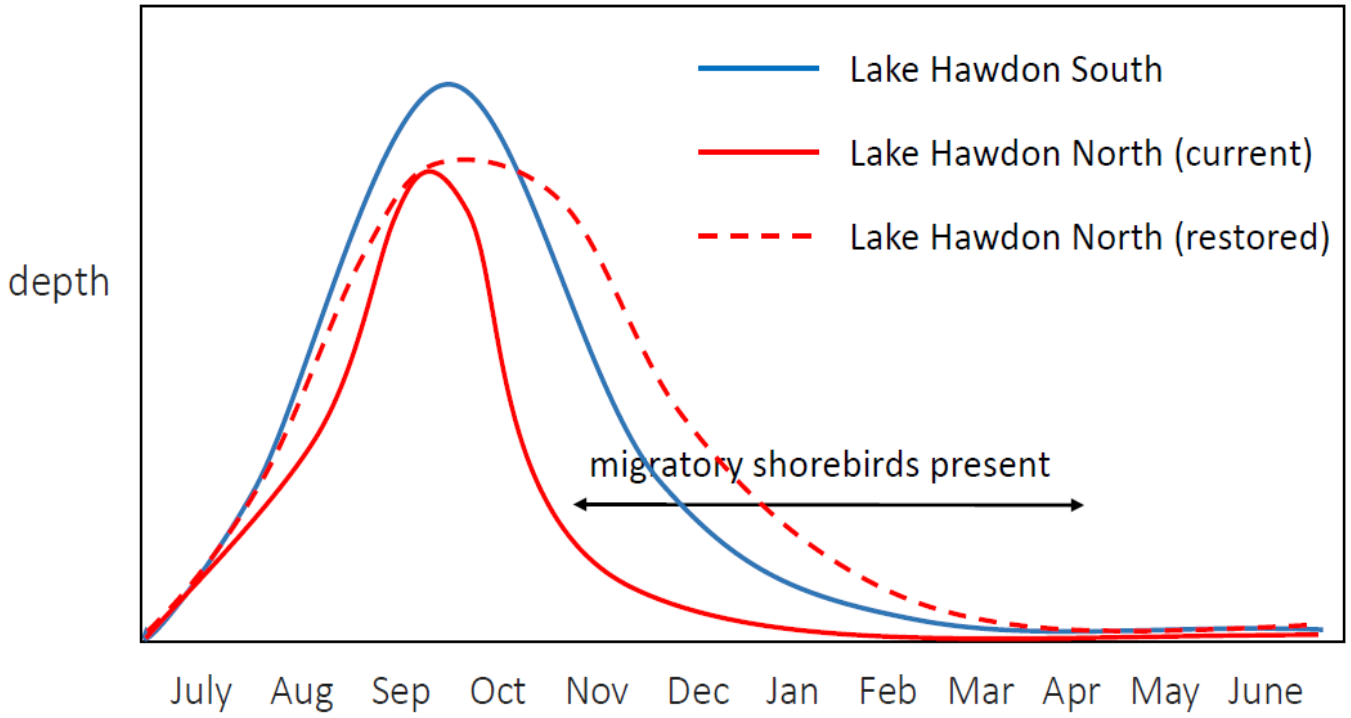
Recommendations

- Construct Regulator (and fishway) for water level control and fish passage
- Clear encroaching vegetation to reinstate ‘open-pan’ aquatic habitat
- Maintain grazing and develop fire regime
- Re-examine target hydrograph and impacts on salinity and water level within Robe Lakes
- Investigate impact on the mining tenement and grazing.



Environmental benefits

- Extend duration of inundation
- Increase shorebird habitat extent and quality, and availability by 531%
- Increase shorebird abundance
- Support ecological health for the water course, Robe Lakes and marine areas.



Lake Hawdon North project objectives

- Increase the duration and extent of shorebird habitat availability
- Enable controlled water level management to achieve ecological objectives at both Robe Lakes and Lake Hawdon North
- Minimise the impact of inundation to upstream and adjacent landholders, during the winter months
- Coordinate Lake Hawdon North regulator operations with the Lake Hawdon South regulator

Construct regulator and fishway

Restore open mudflat habitat

Maintain grazing

Grazing exclosure (left of fence) and adjoining control (grazed) site (right), Lake Hawdon North, 27th Feb 2002 (photographer unknown).

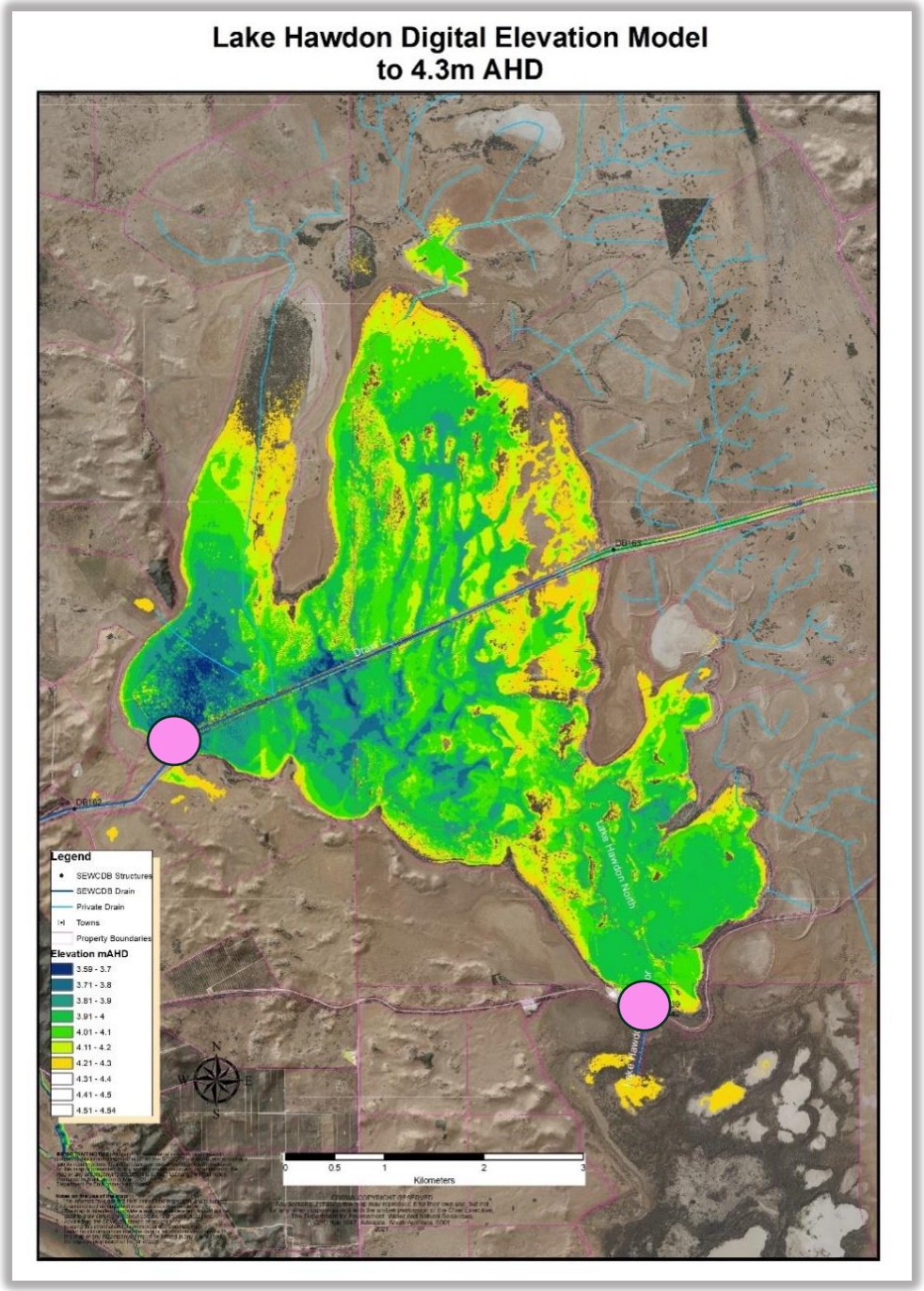
Develop fire regime




Lake Hawdon South, 28 May 2021 prescribed burn, Ross Anderson.

Target water levels

- Regulator operations at:
  - Lake Hawdon South
  - Drain L
- Proposed regulator operations aim to achieve a water level of 4.3 metres Australian Height Datum (m AHD) from late August in an average year.



Shorebird season and preferred habitat

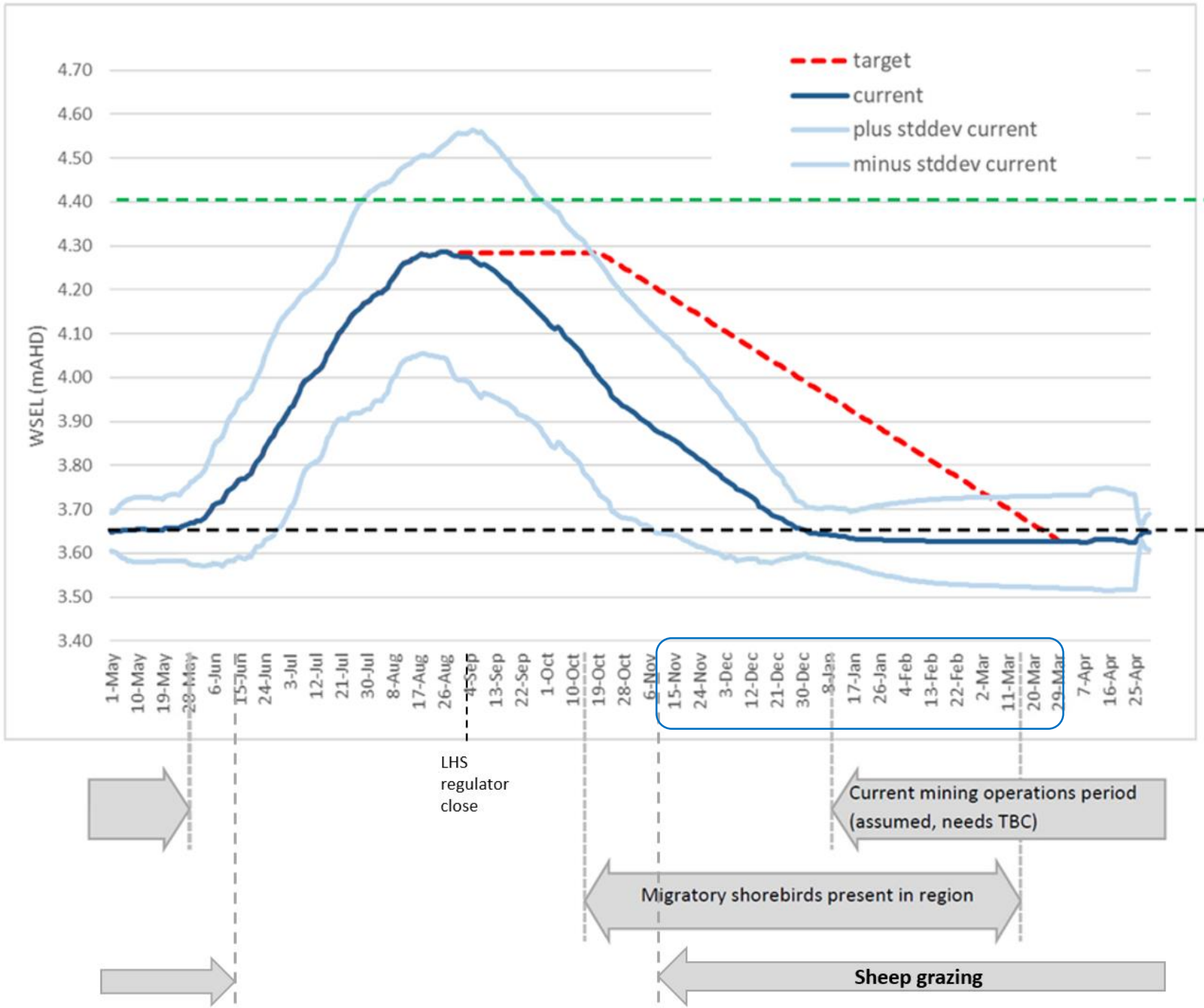
Migratory shorebird season

- October - March

Preferred habitat

- Shallow mudflats
- Water depth 0-10cm.

Sharp-tailed Sandpipers on LHN Nov 2023

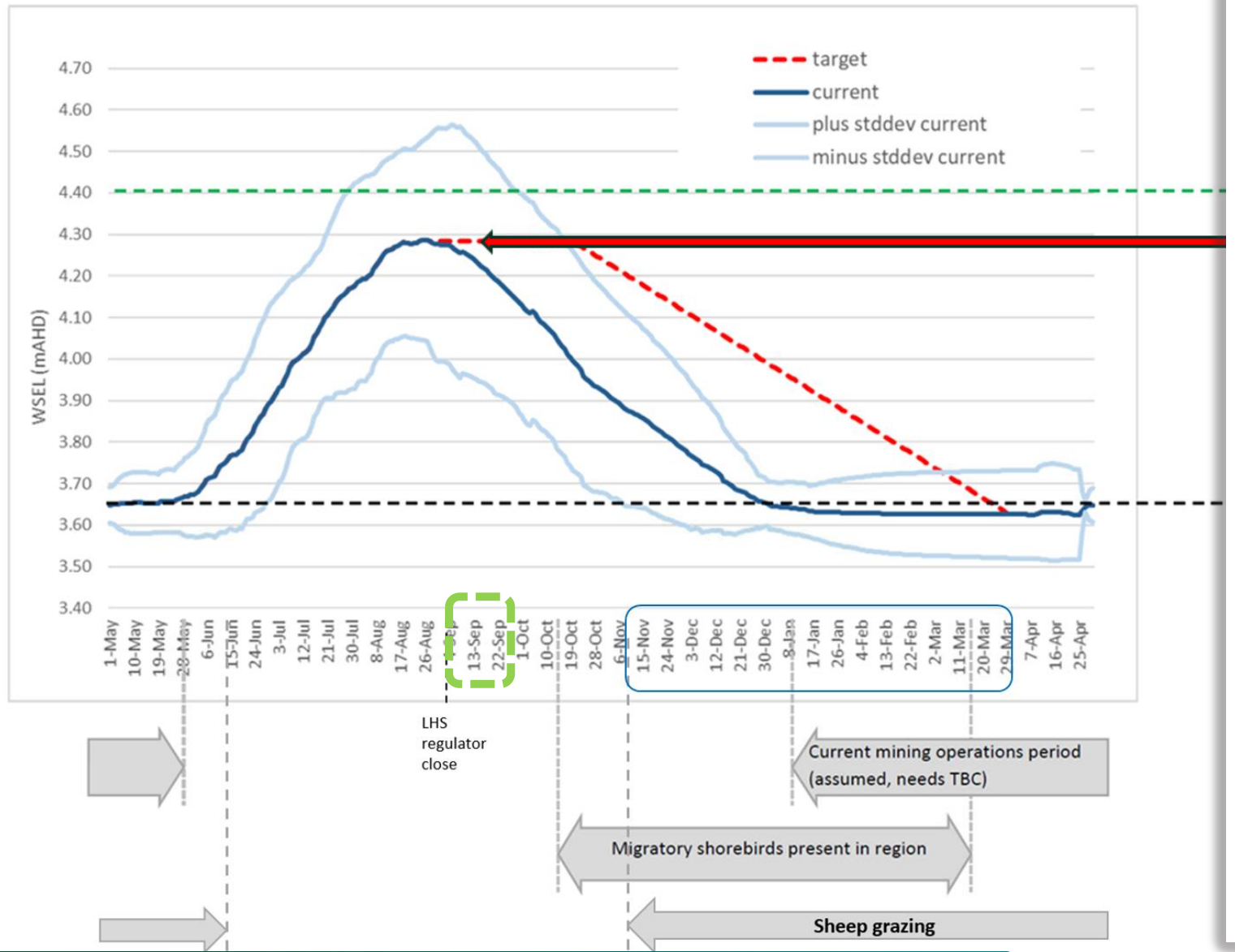


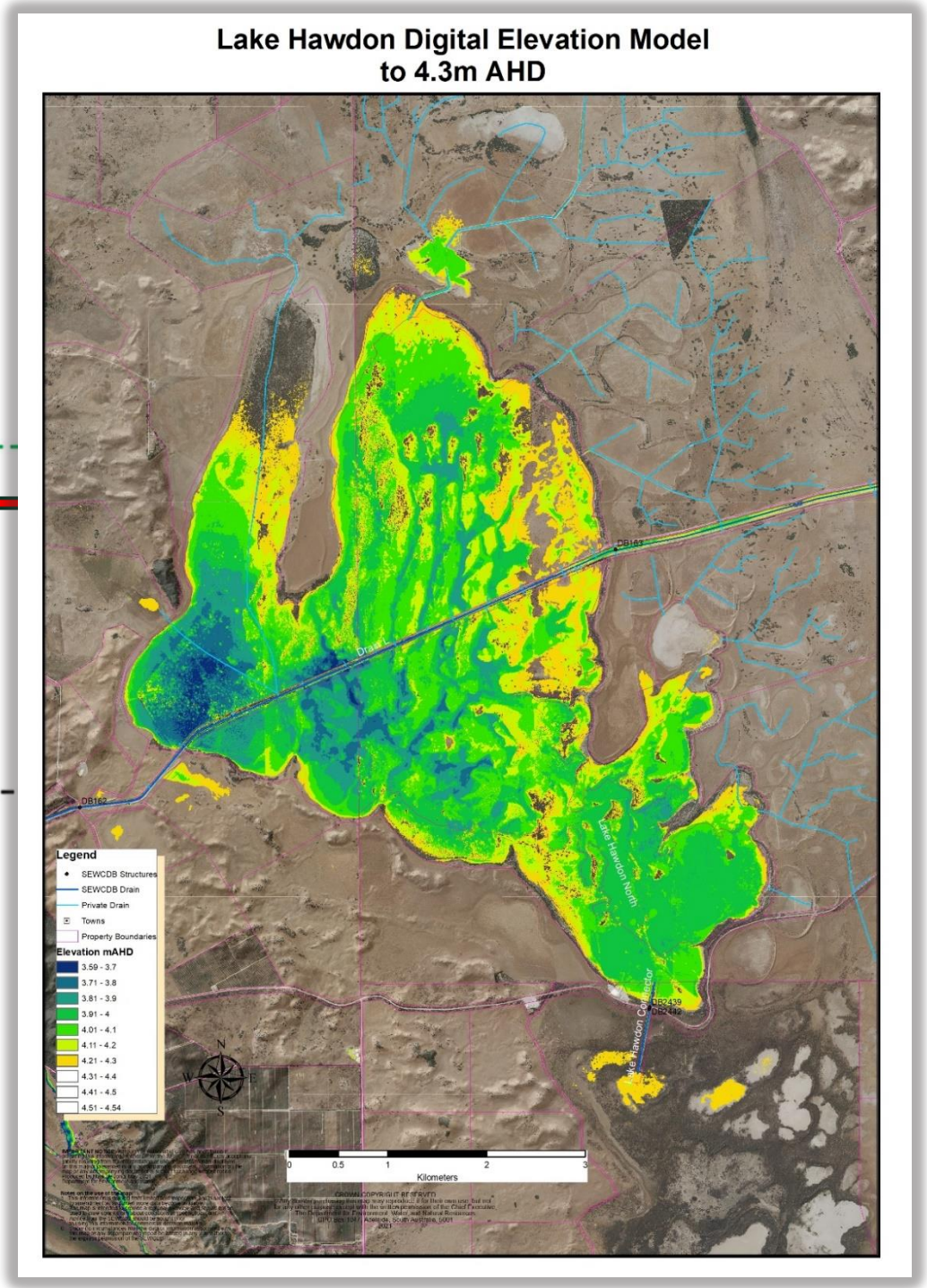
Lowest elevation of most surrounding paddocks (TBC)

Lowest elevation of bed of Lake Hawdon North

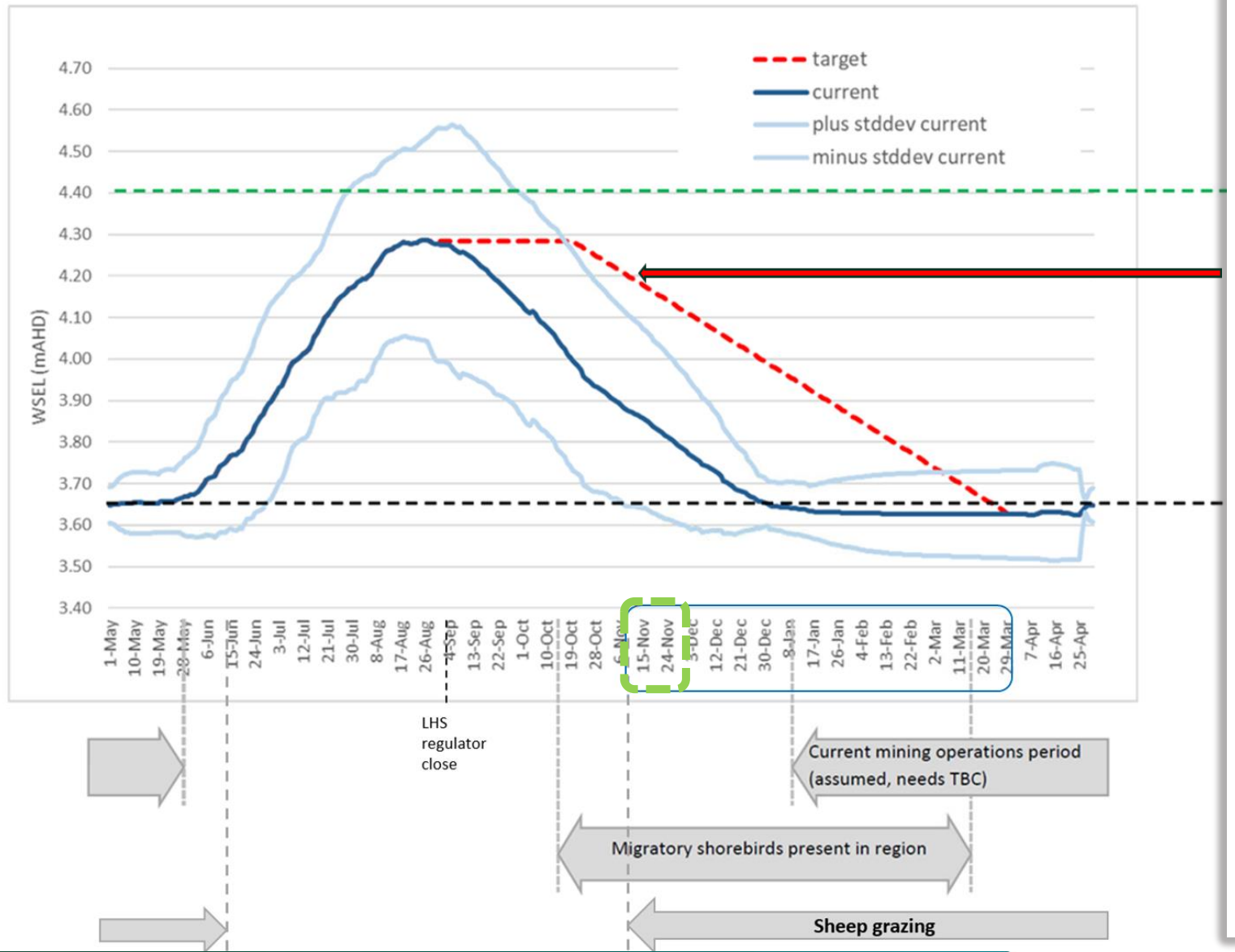
- Overlapping land use interests from mid-Nov to Late March.

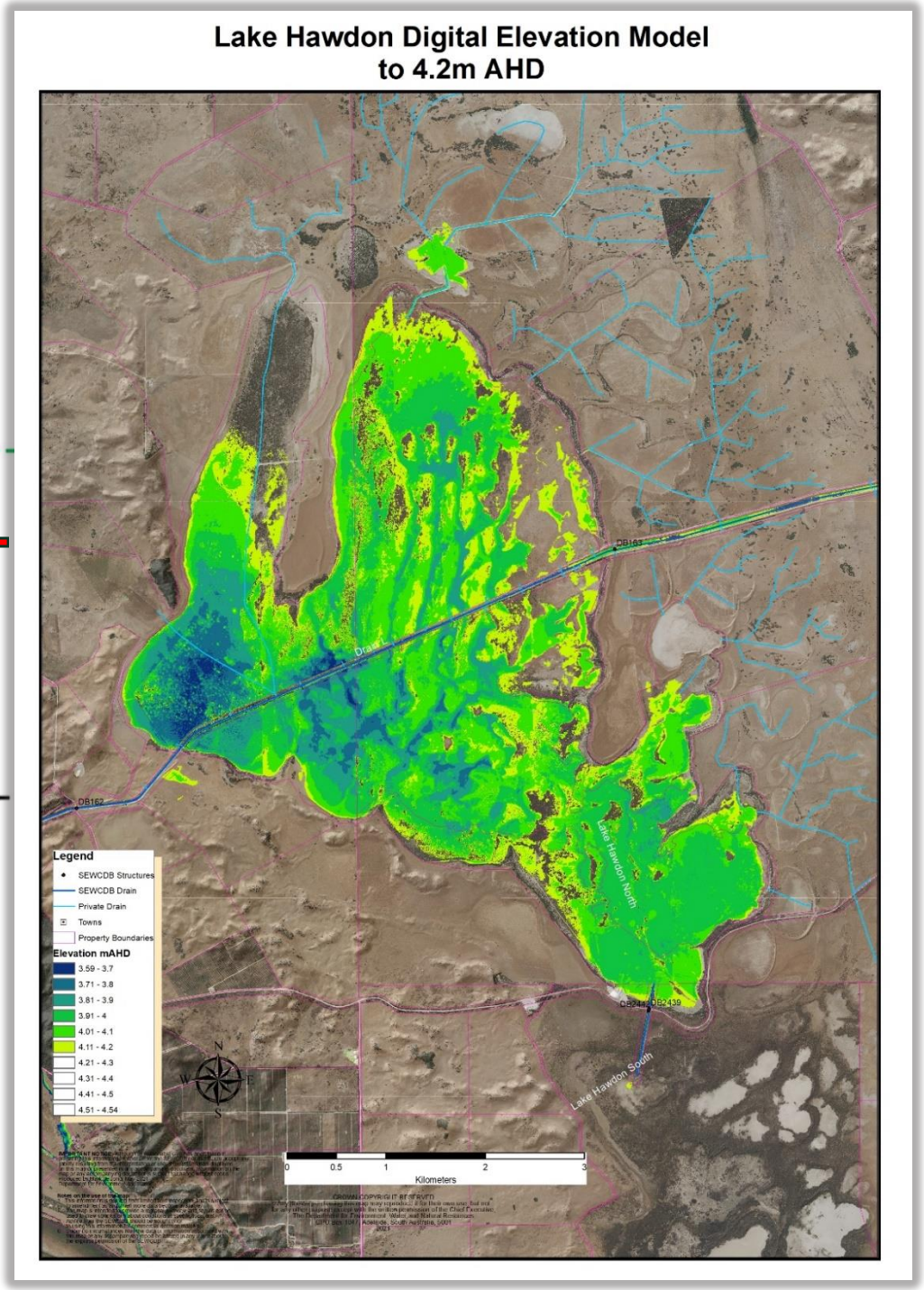
Target Hydrograph and Land Use



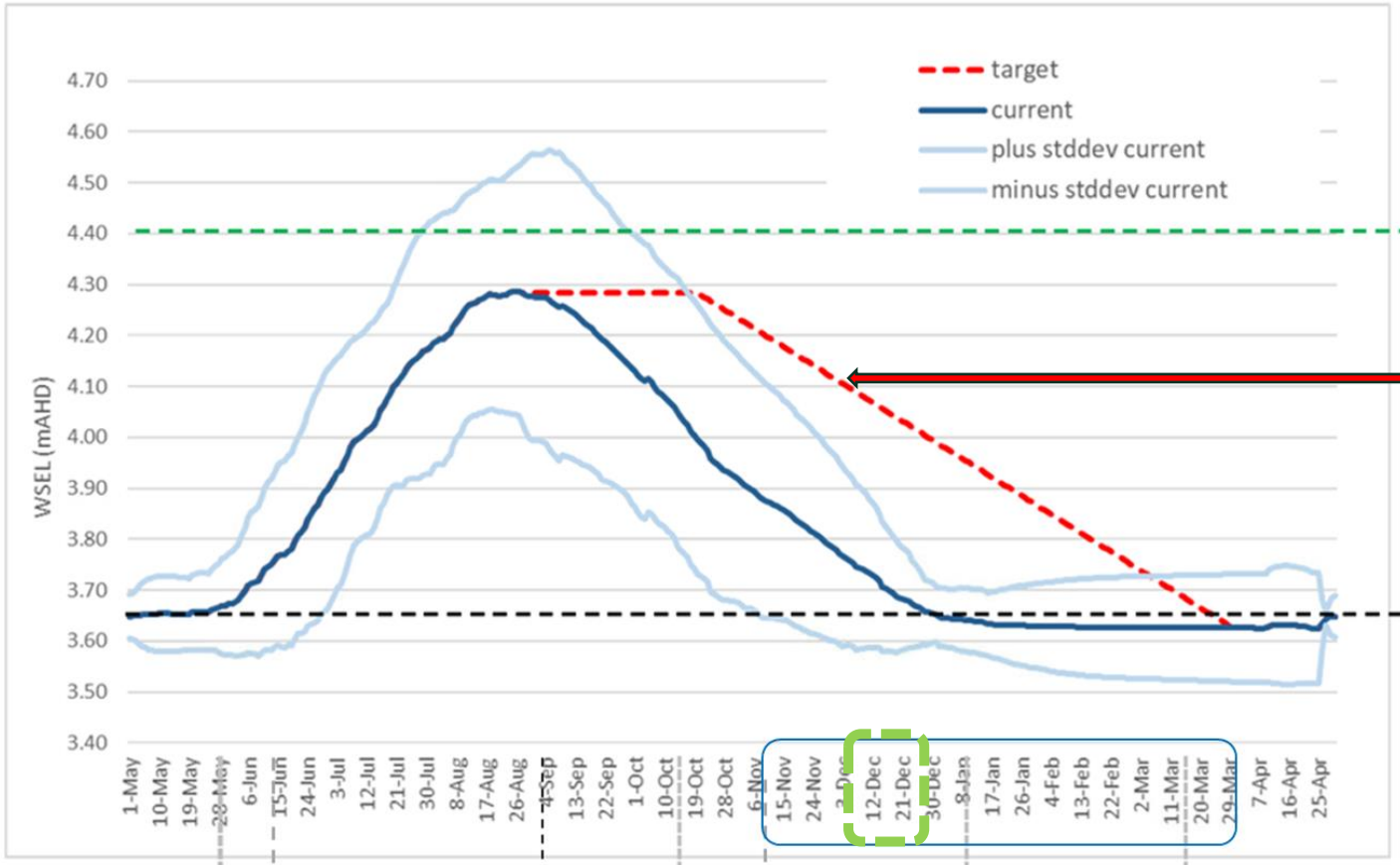


Target Hydrograph and Land Use





Target Hydrograph and Land Use

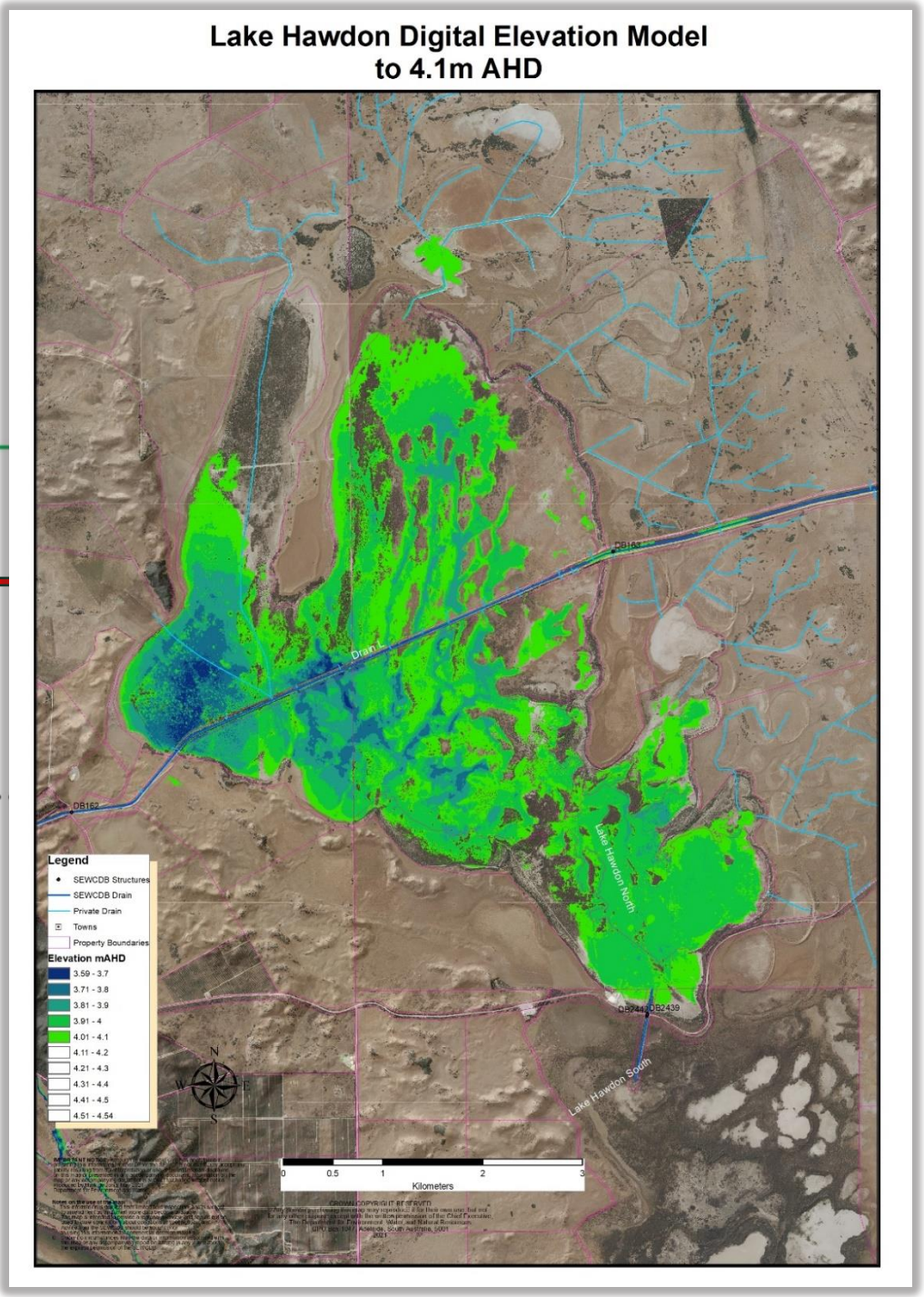


LHS regulator close

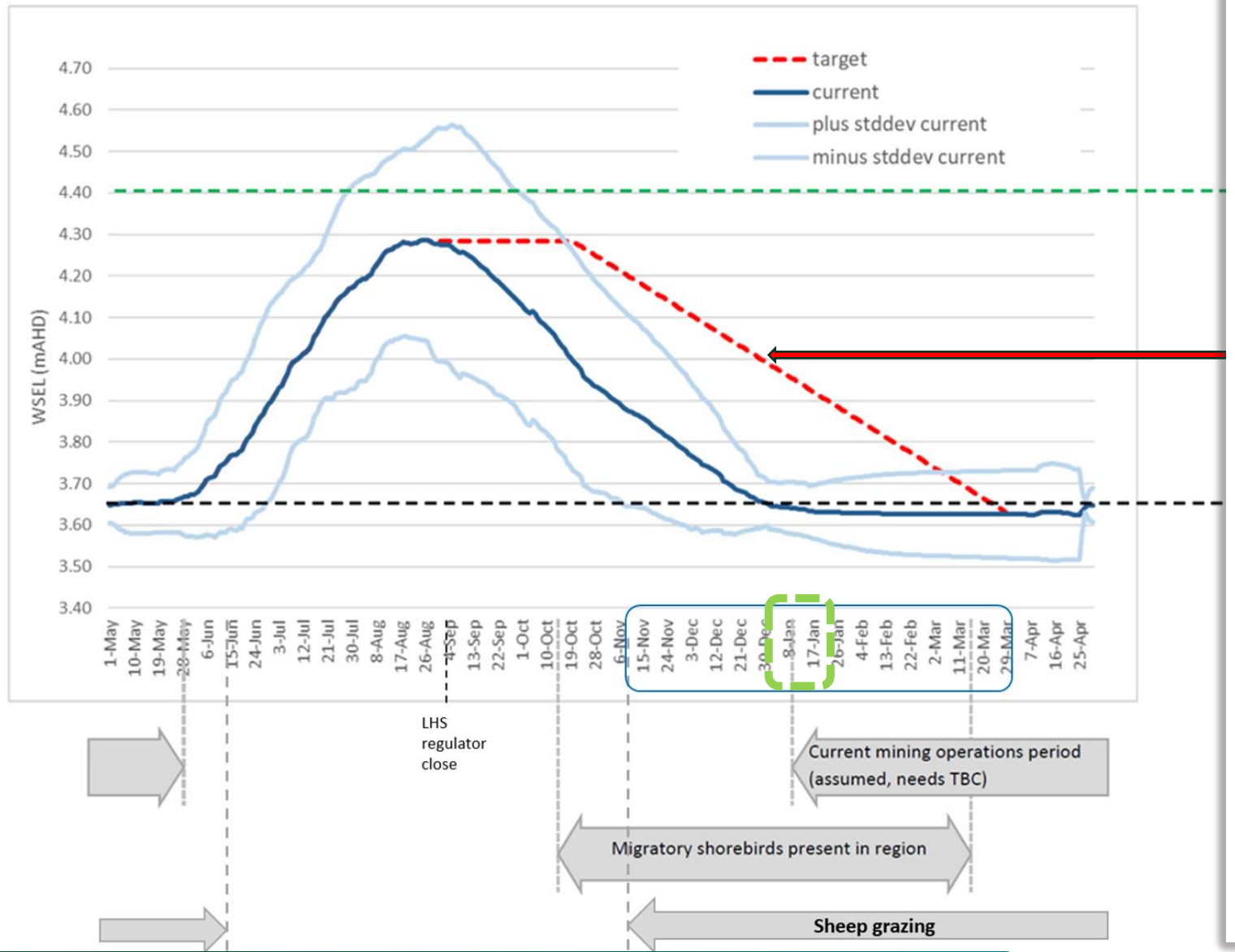
Current mining operations period (assumed, needs TBC)

Migratory shorebirds present in region

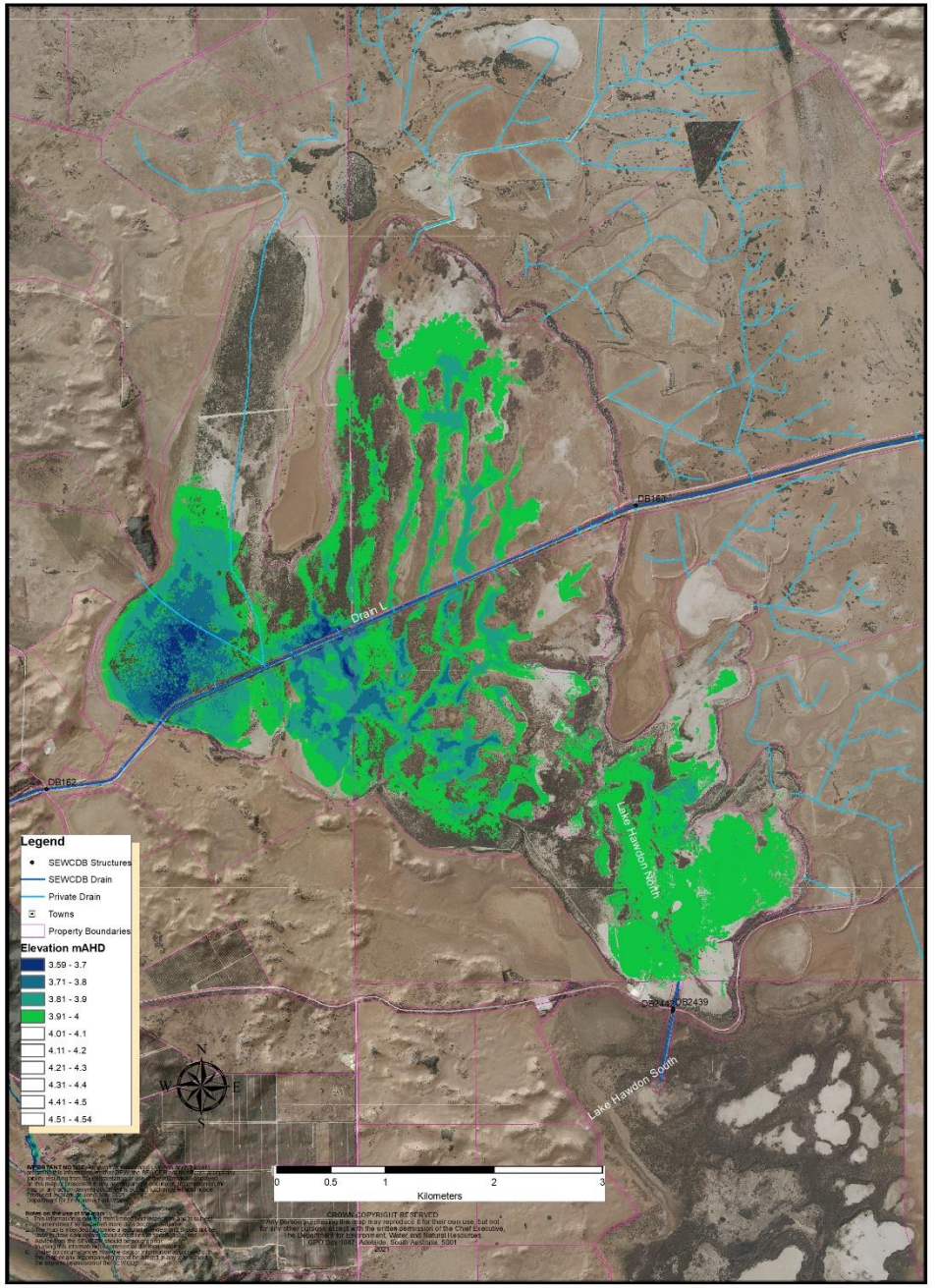
Sheep grazing



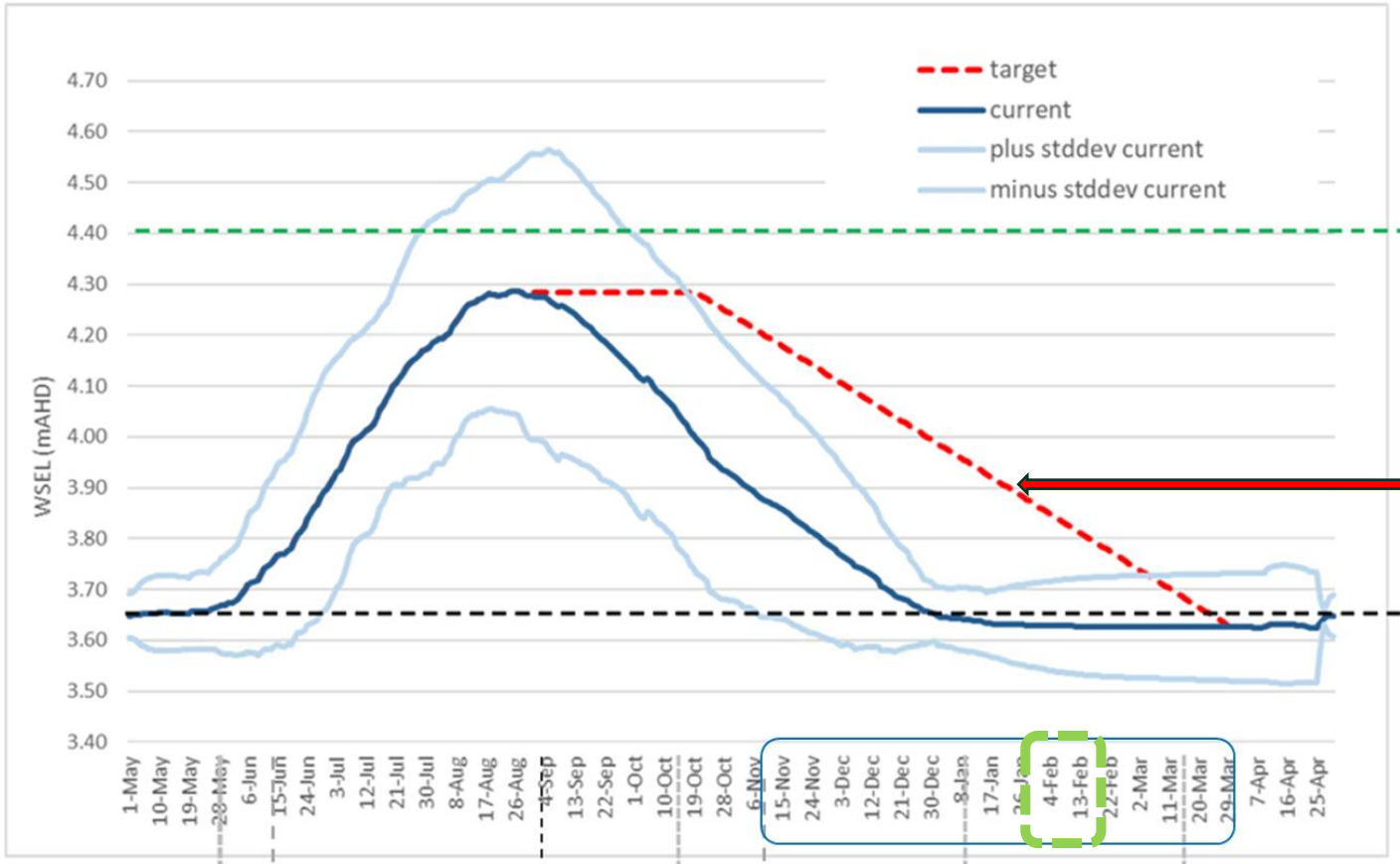
Target Hydrograph and Land Use



Lake Hawdon Digital Elevation Model to 4.0m AHD



Target Hydrograph and Land Use



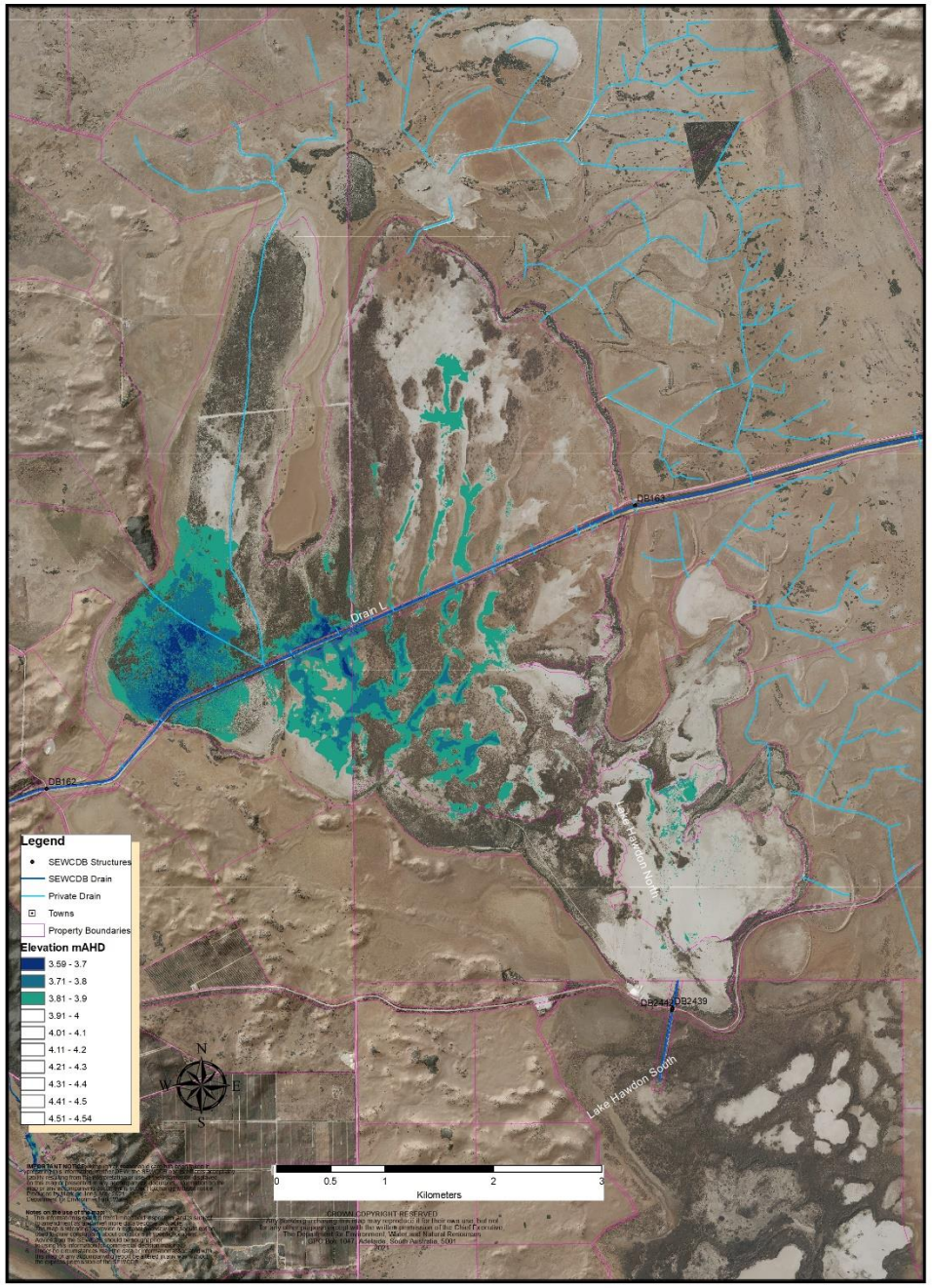
LHS regulator close

Current mining operations period (assumed, needs TBC)

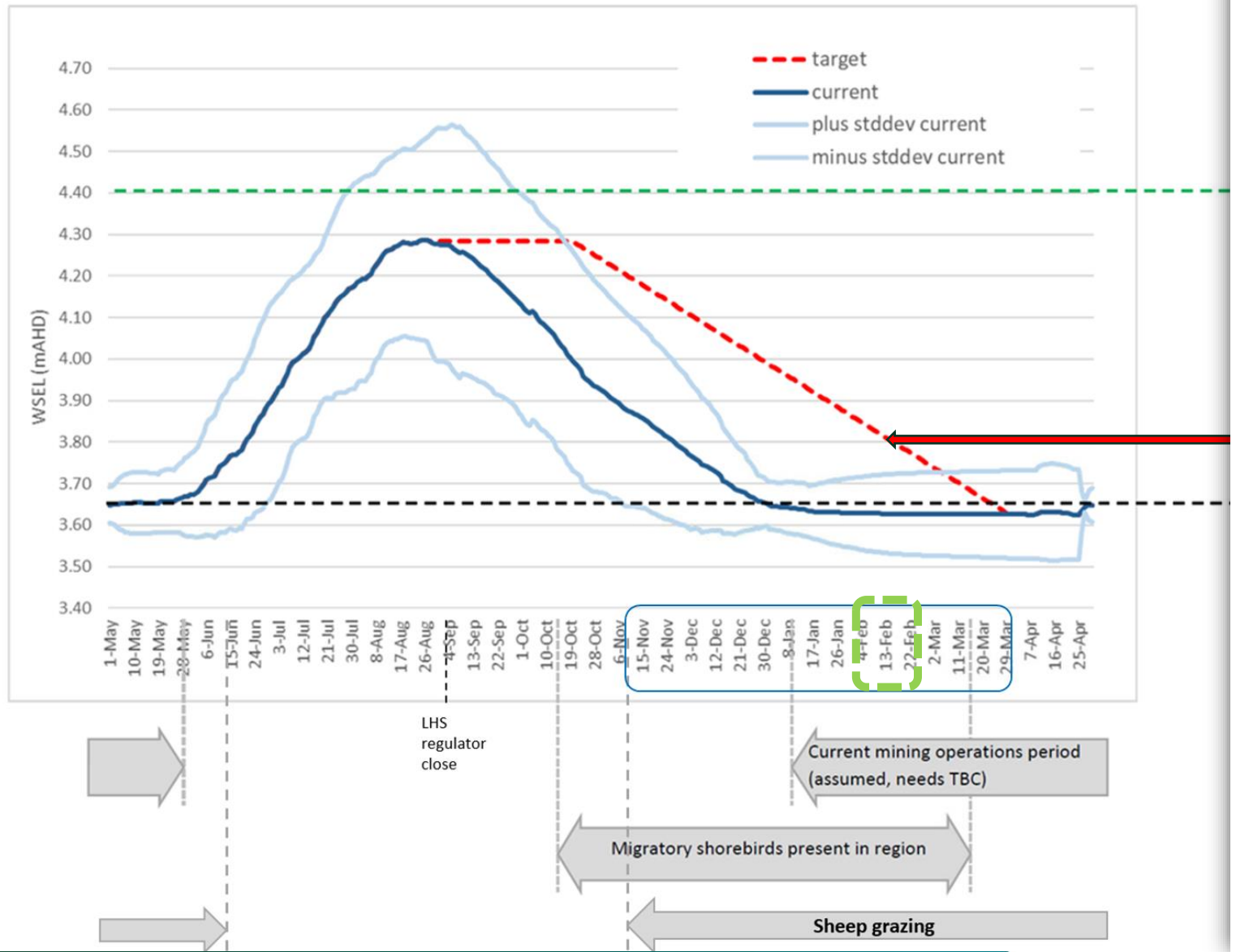
Migratory shorebirds present in region

Sheep grazing

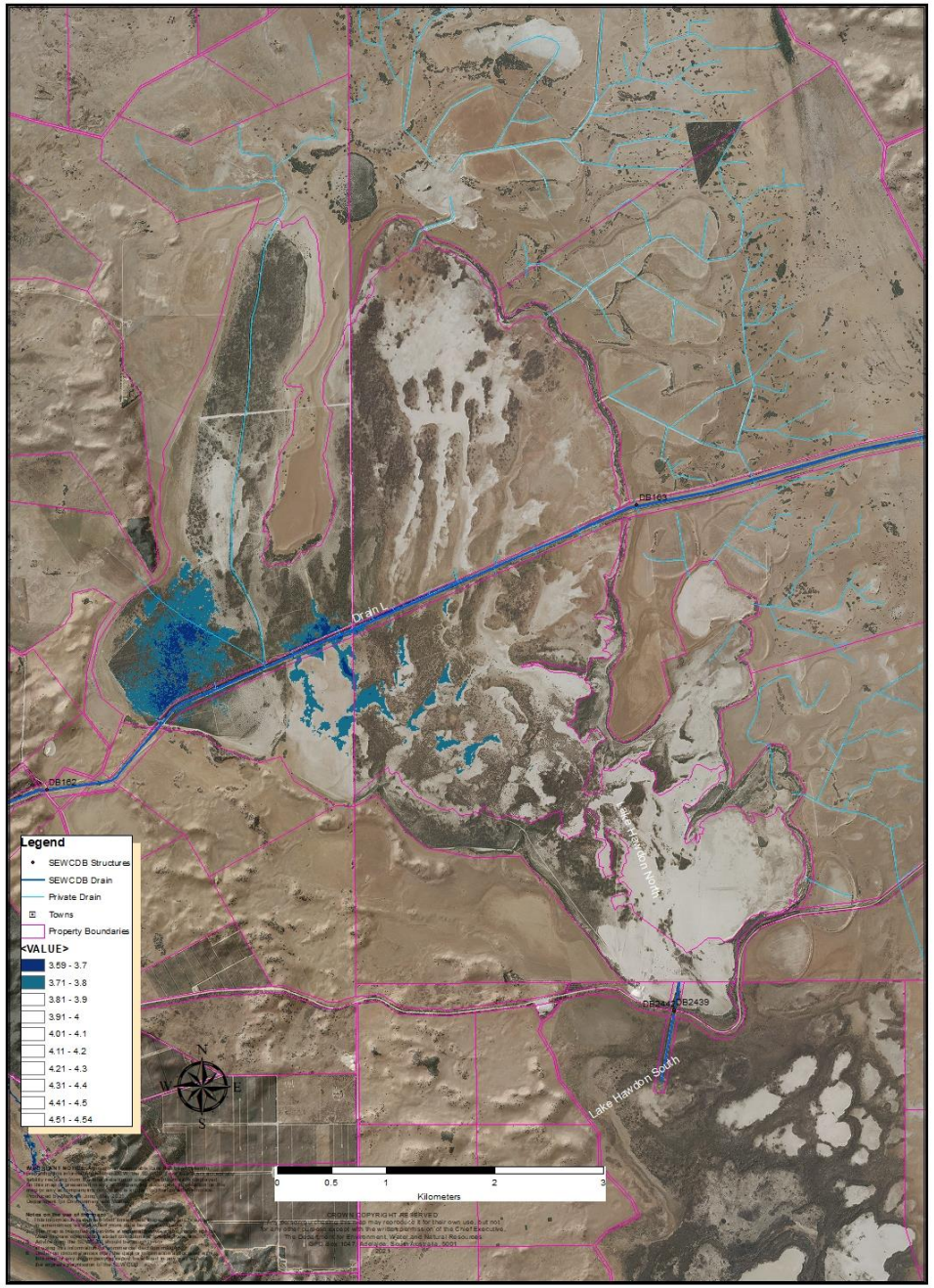
Lake Hawdon Digital Elevation Model to 3.9m AHD



Target Hydrograph and Land Use



Lake Hawdon Digital Elevation Model to 3.8m AHD



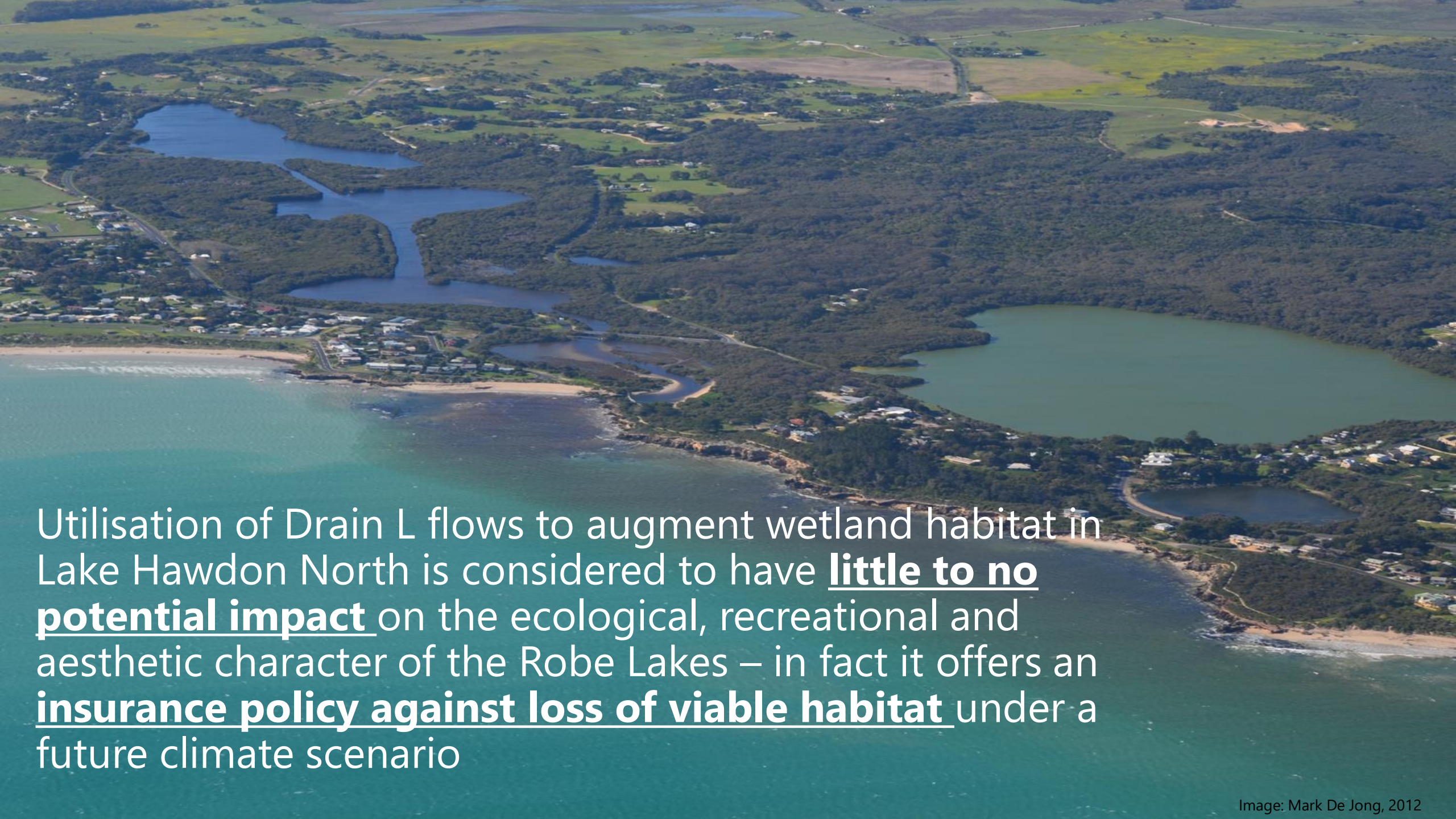
Investigations 2021-2022

- Cultural heritage surveys
- Topographic surveys
- Hydrological monitoring
- Hydrodynamic modelling
- Groundwater review/modelling
- Vegetation removal options
- Vegetation and EPBC assessment
- Geotechnical survey
- Baseline ecological monitoring

In progress | On hold | Cancelled | Complete

Will the infrastructure impact Robe Lakes?

- Minimising impact to Robe Lakes is an objective of the design
- Will the salinity change?
  - Not significantly and far less than under a future climate/sea level rise
- Will the water level change?
  - Drying down 2 to 3 weeks earlier in mid-Spring
  - No significant change during peak times of wader and shorebird occupation November to March)
- Will the system still be “flushed by inflow”?
  - Average turnover (inflow vs volume of lakes) reduced from 104 to 90 times – not a significant change
  - Nutrients will be taken up by plants in Lake Hawdon North so the water coming into the lakes should be ”cleaner”



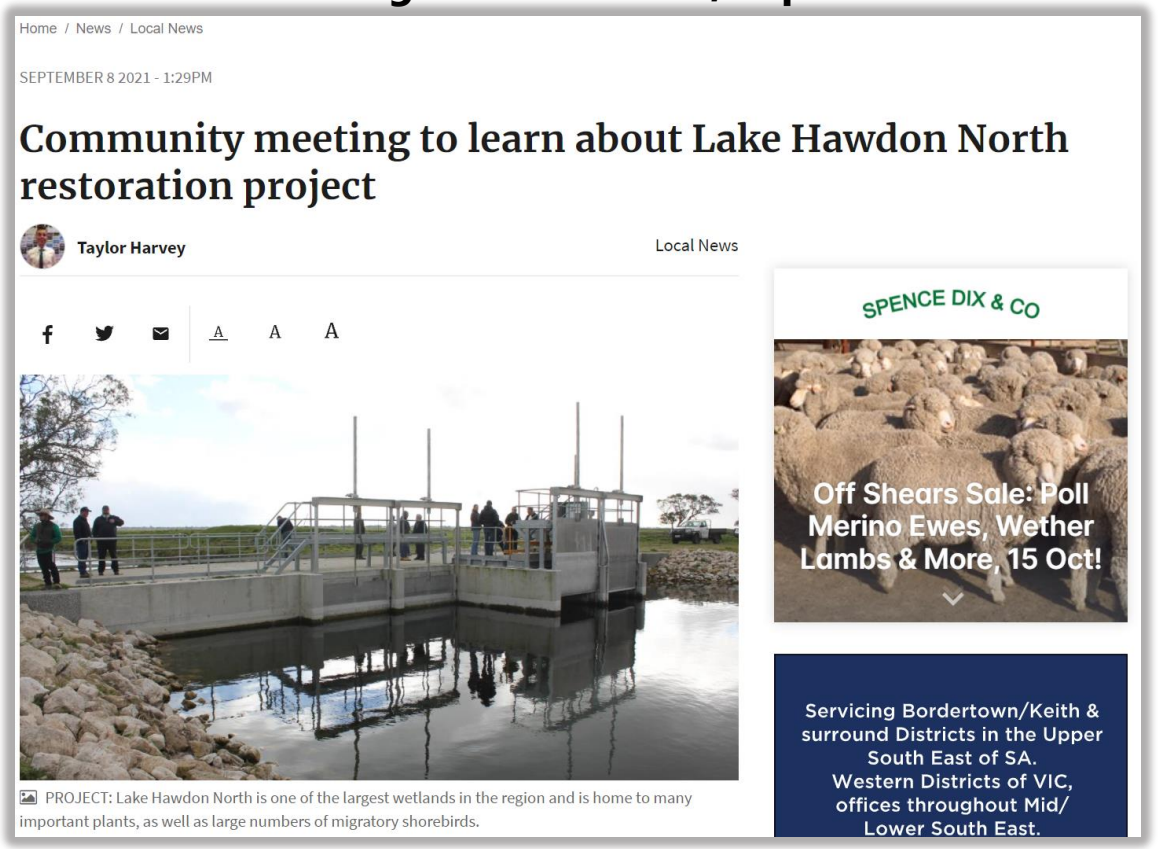
Utilisation of Drain L flows to augment wetland habitat in Lake Hawdon North is considered to have **little to no potential impact** on the ecological, recreational and aesthetic character of the Robe Lakes – in fact it offers an **insurance policy against loss of viable habitat** under a future climate scenario

Image: Mark De Jong, 2012

Engagement Approach

- 2021-2022 delivered with Limestone Coast Landscape Board
- Stakeholder meetings at Robe
- 1:1 presentations
- Site visits to Lake Hawdon North
- Site visit to Blackford Regulator

Blackford regulator site visit, September 2021



Home / News / Local News

SEPTEMBER 8 2021 - 1:29PM

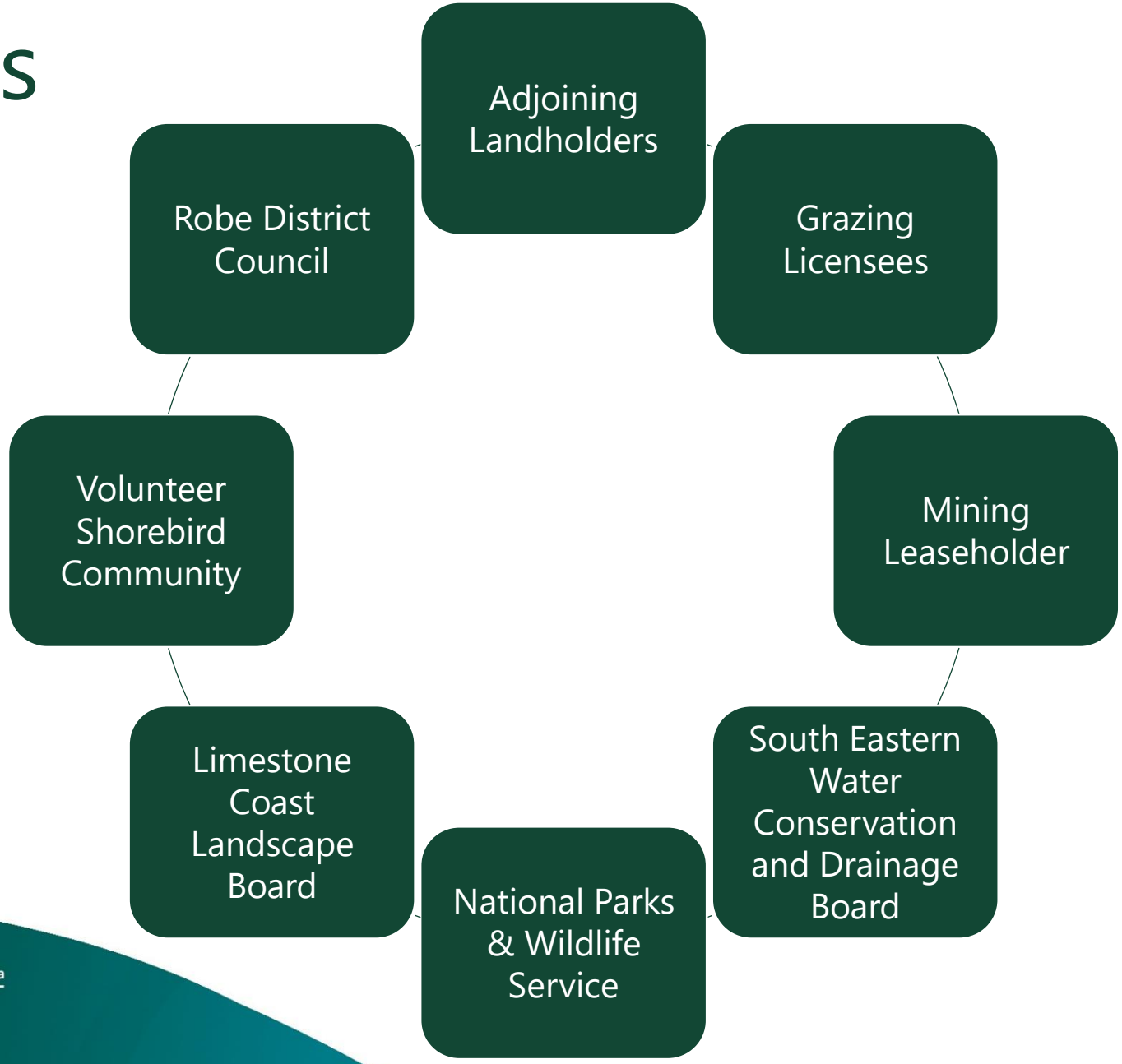
Community meeting to learn about Lake Hawdon North restoration project

Taylor Harvey — Local News

A A A

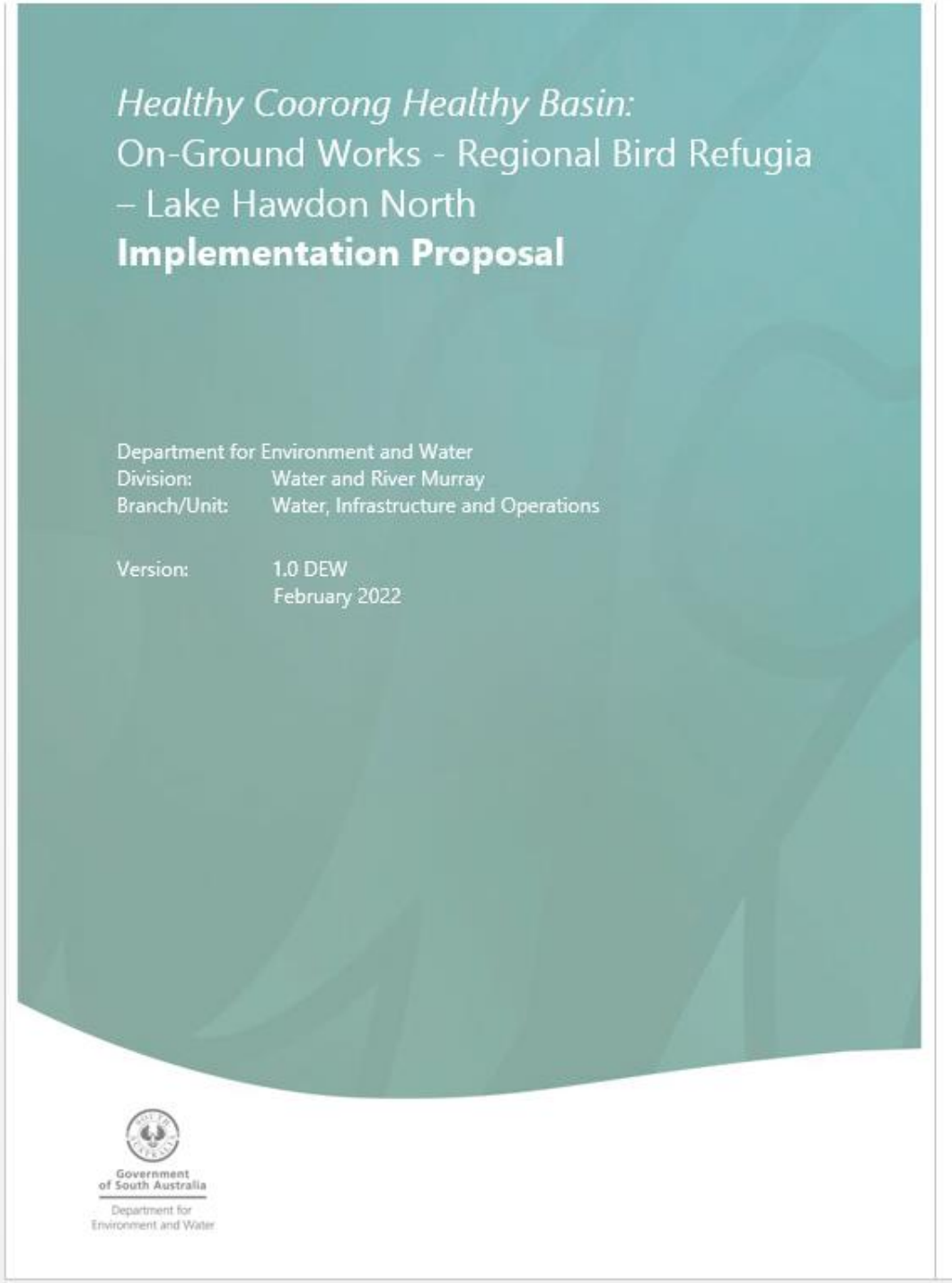
PROJECT: Lake Hawdon North is one of the largest wetlands in the region and is home to many important plants, as well as large numbers of migratory shorebirds.

Stakeholders



Implementation Proposal

- Synthesised findings of investigations
- Requested HCHB funding from Commonwealth for construction
- Submitted May 2022
- Funding approval for implementation received February 2024



Project Outcomes

- More ‘natural’ hydrological regime – extend duration of inundation
- Increase shorebird habitat extent and quality, and availability by 531%
- Increase shorebird abundance
- Support ecological health for the water course, Robe Lakes and marine areas.

On-Ground Works
Lake Hawdon North design, construction and Implementation

Sarah Murphy

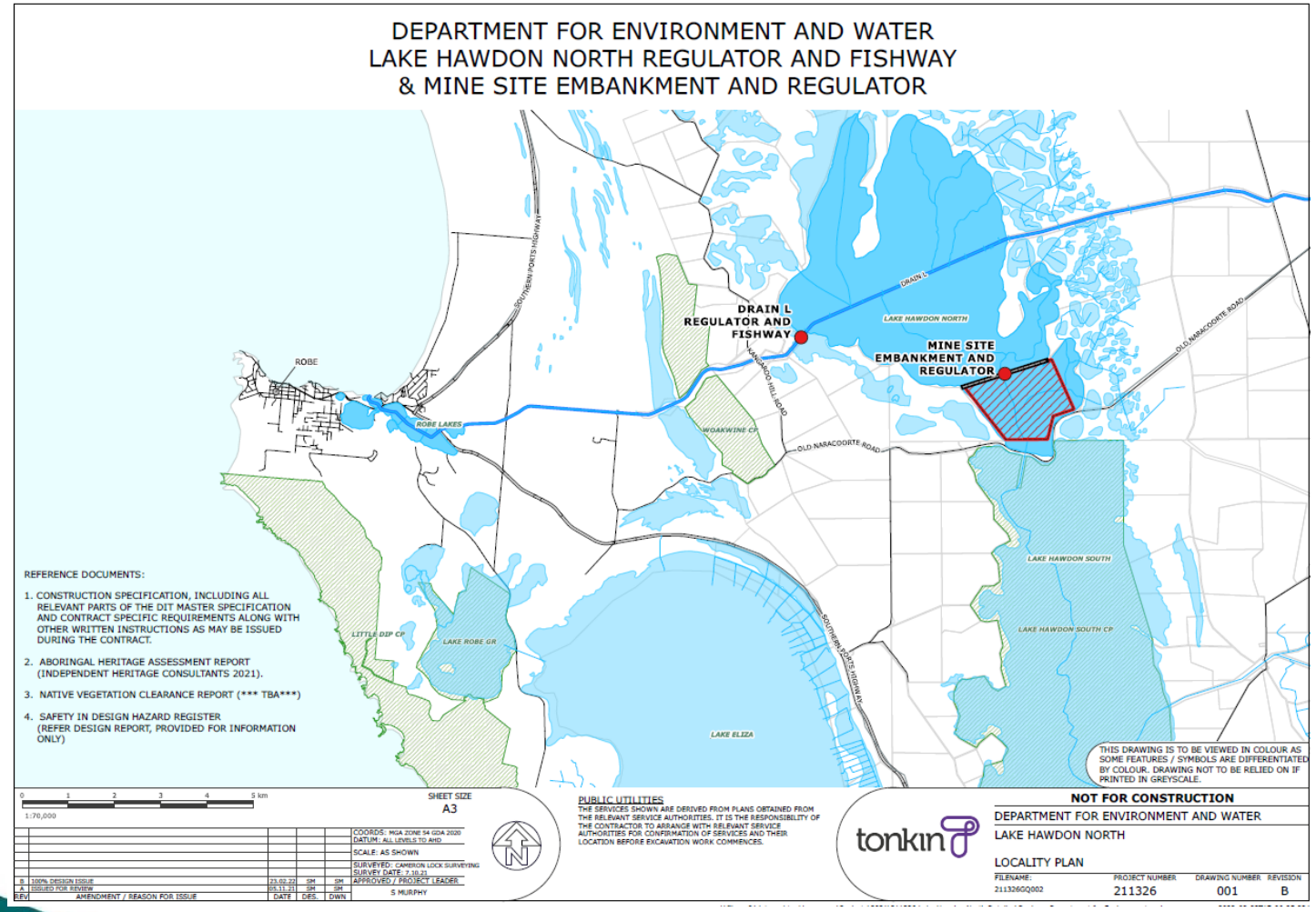
Manager, Program Delivery

SOUTH AUSTRALIA

Government of South Australia
Department for Environment and Water

LHN Infrastructure

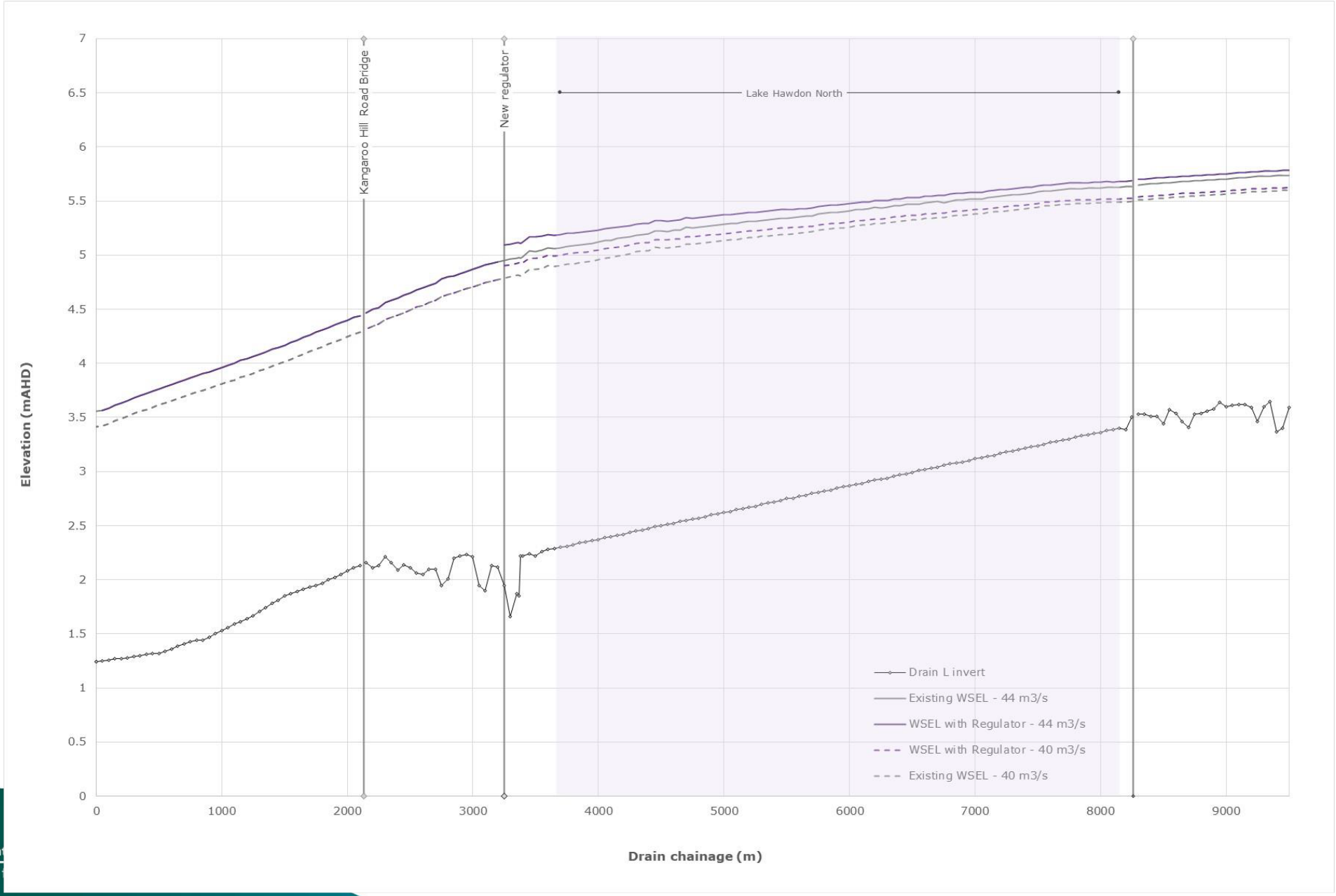
- Regulator to manage waterlevels
- Fishway to provide fish passage
- Mining tenement bund is no longer required



Basis of design

- No effect on drain hydraulics during peak winter flows
- Maintains flows to meet requirements of Robe Lakes
- Continued fish passage
- Safe operation
- Continued access to LHN
- Similar to existing designs
- Automation for responsive water level control

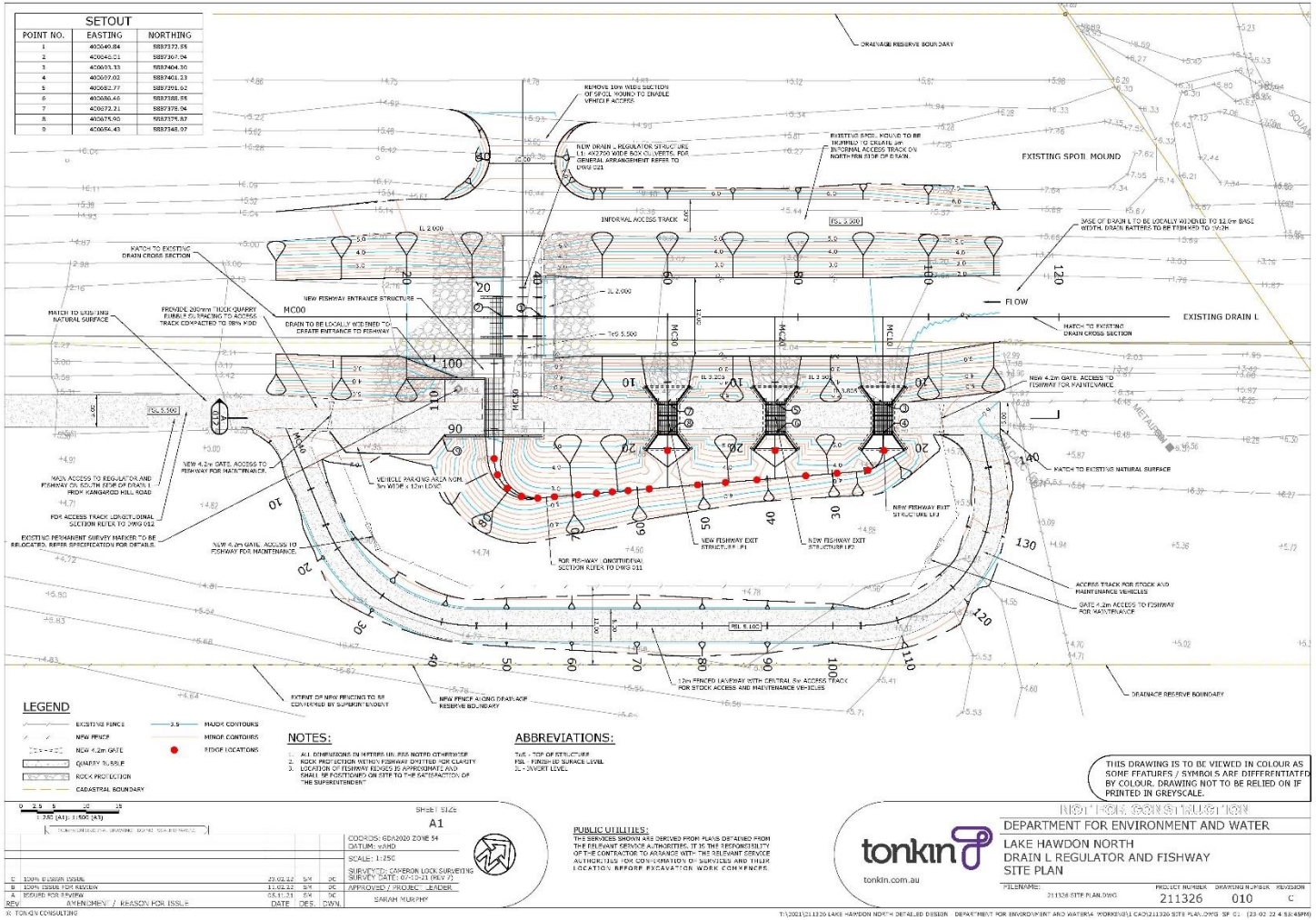
Design Hydraulics



Regulator and fishway location

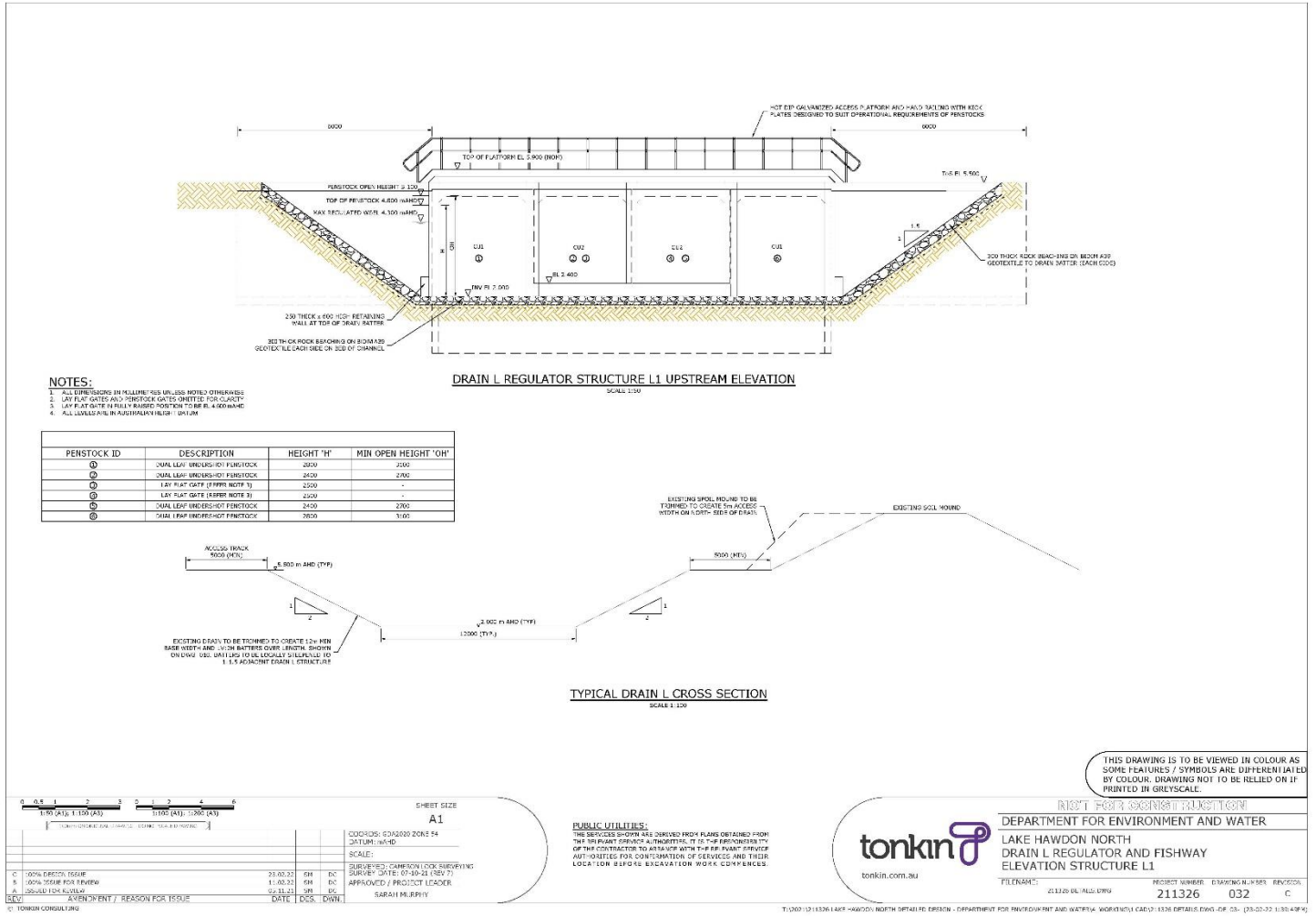
LHN Infrastructure

- Regulator and fishway placement



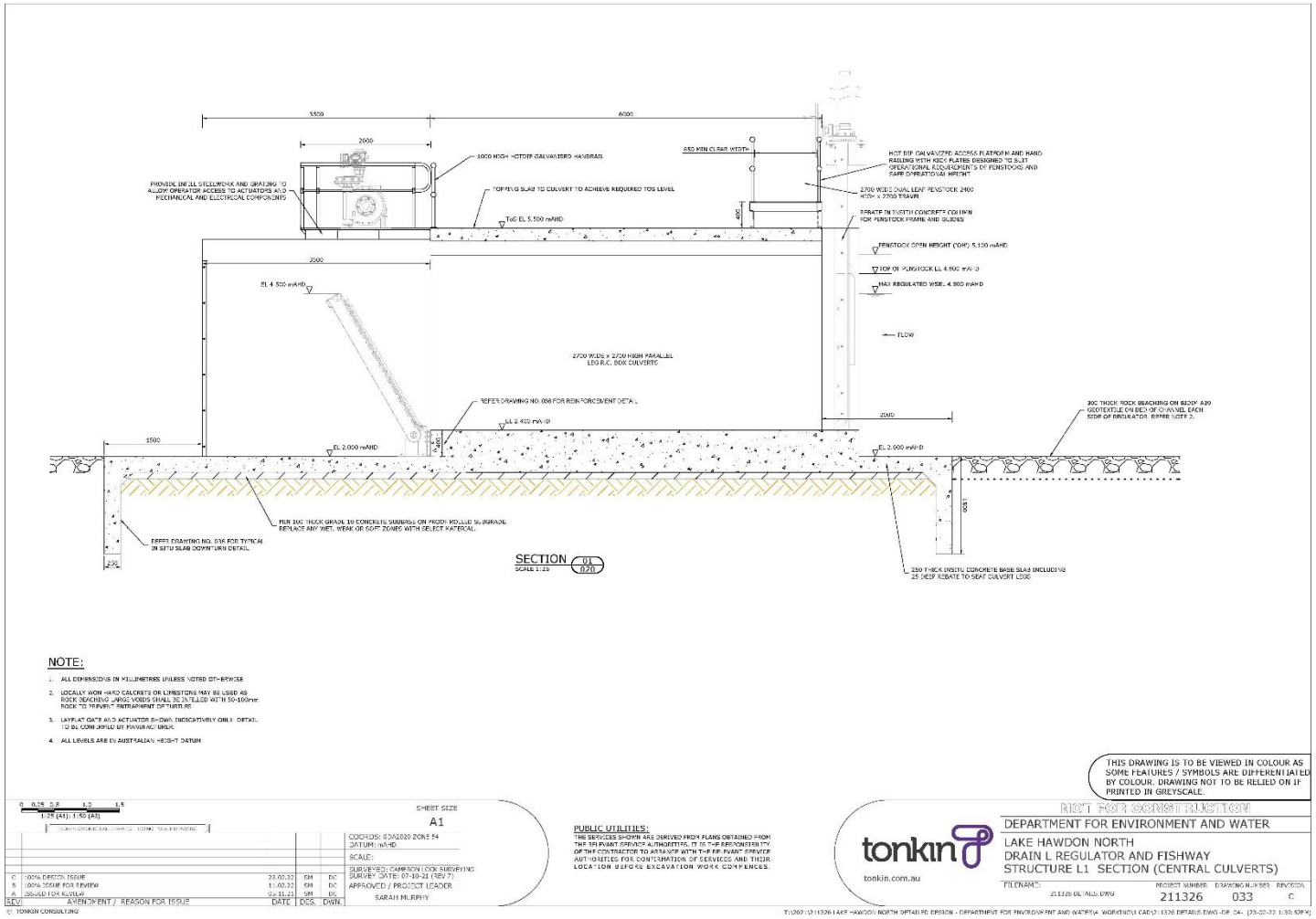
Regulator Design

- Four-cell precast concrete superstructure
- 2 automated lay-flat gates
- 2 penstock gates



Regulator Design

- Four-cell precast concrete superstructure
- 2 automated lay-flat gates
- 2 penstock gates

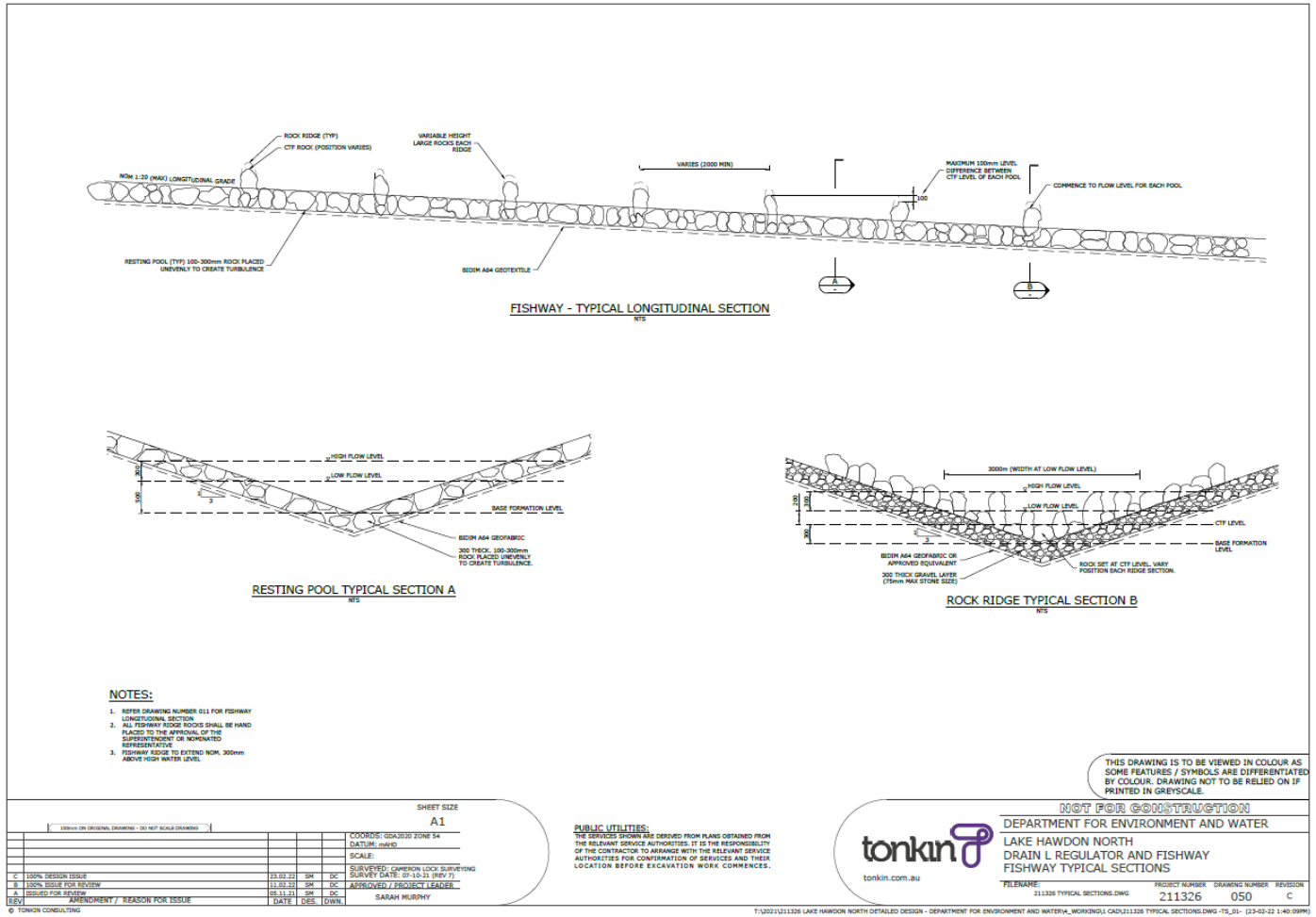


Regulator Design

- Matches existing regulators in the region
- Morella and Blackford

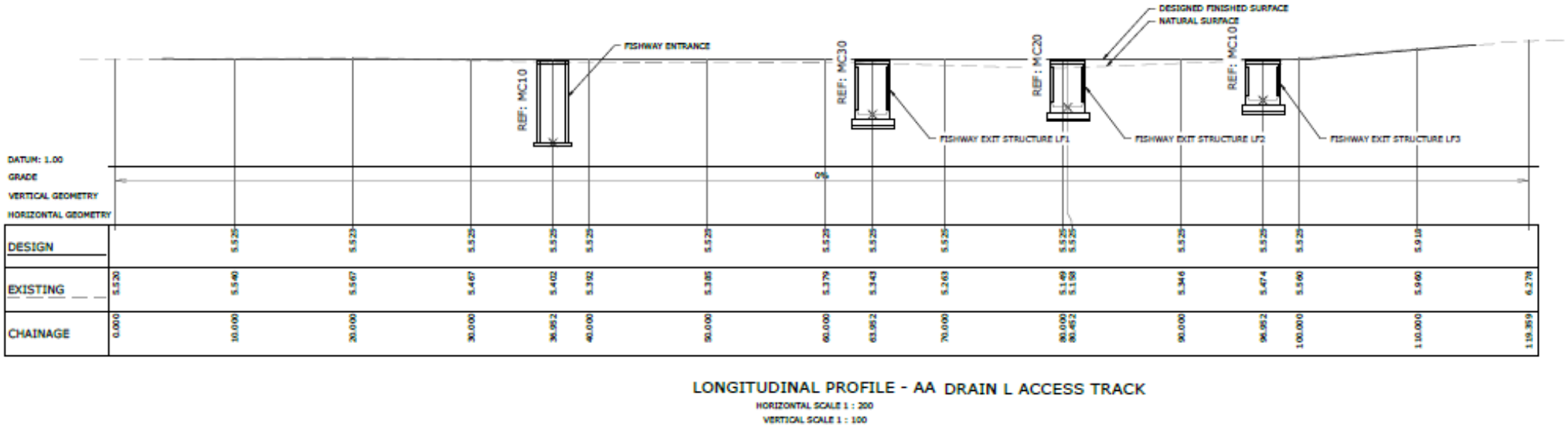
Fishway Design

- Rock-ramp fish bypass structure



Fishway Design

- 3 exits provides fish movement in a broad range of upstream water levels



Morella Regulator and Fishway

Construction timing

- construction summer – autumn 2024/25
- 6-8 month construction duration
- may span two seasons

Key dates

Deliverable	By when
Detailed design	Nearing Completion
Implementation Proposal	Approved February 2024
Approvals	Mid to late 2024
Construction Tender	Mid 2024
Implementation (construction)	Late 2024 through to mid 2025
Implementation (habitat restoration)	Late 2024 through to mid 2026

Summary

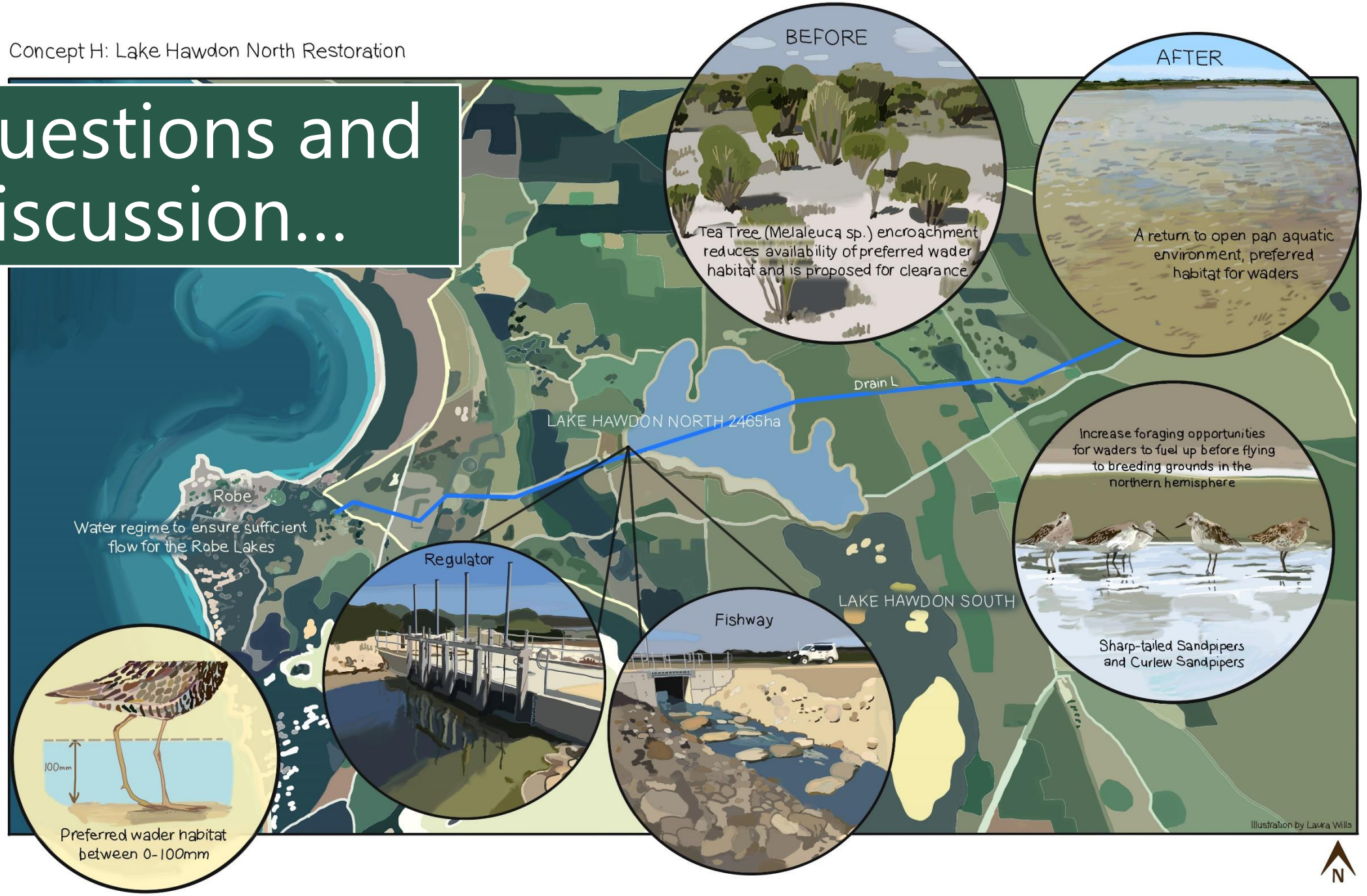
- Lake Hawdon North is a high priority wetland site for restoration in the South East
- The site is Crown Land, with a secure water source which presents a rare opportunity for large-scale wetland management
- Maintaining the water requirements of the Robe Lakes underpins the detailed design development

Image: Mary-Ann van Trigt

Summary

- Lake Hawdon complex shares shorebirds with the Coorong South Lagoon.
- The restoration of LHN will provide foraging habitat for migratory waders when not provided by the CSL
- This is most critical in summer/autumn as they prepare for migration.
- We will continue to work with the community to develop an adaptable approach to wetland water regime that balances ecological outcomes with grazing and mining operations

Questions and Discussion...



www.environment.sa.gov.au/topics/coorong/

“Healthy coorong, healthy basin”

SOUTH AUSTRALIA

Government of South Australia
Department for Environment and Water

LANDSCAPE SOUTH AUSTRALIA LIMESTONE COAST