Caulfield to Dandenong: transformation toward sustainable development

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LXRA and Project Overview

James David
Senior Planning and Environment Specialist, LXRA
Today

- Introduction to LXRA and the project
- Sustainability and environmental management
- Contamination
- Noise
- Consultation
LXRA?

- Level Crossing Removal Authority
- Scope
  - Remove 50 level crossings by 2022, with 20 by late 2018
  - Mernda Rail Extension Project
  - Hurstbridge Duplication (Stage 1)
  - Kananook Stabling and Maintenance Facility
- Our responsibilities:
  - Project planning (options, designs, assessments, approvals)
  - Stakeholder engagement
  - Procurement
Where are we at?

Status:

• 10 removed
• 11 in design/construction, plus Mernda and Hurstbridge
• 16 in tender
• 13 in planning
Program benefits

- Removing the crossings will:
  - deliver significant **safety improvements** for drivers and pedestrians
  - **improve travel** around Melbourne, regardless of mode of travel
  - get people home safer and faster
  - make **our roads more reliable**, enabling people to better predict their travel times
  - **stimulate economic growth** by creating thousands of jobs during construction
  - **revitalise local communities**, with many areas benefiting from station rebuilds
  - enable **more trains to run** more often and on time.
Caulfield to Dandenong: Project Objectives

- Maintain an acceptable level of service for road and rail users during delivery;
- Improve the reliability and efficiency of the transport network to improve productivity;
- Promote appropriate land utilisation around rail corridors to facilitate value capture development rights opportunities;
- Provide better connected, more vibrant activity centres and improved urban amenity for all users; and
- Create safer communities.
Caulfield to Dandenong

- Area 1:
  - **Grange, Koornang, Murrumbeena, and Poath** Roads (~4km elevated rail)
  - Carnegie, Murrumbeena, Hughesdale Stations
- Area 2
  - **Clayton, Centre** Roads (~1.8km elevated rail)
  - Clayton Station
- Area 3
  - **Corrigan and Heatherton** Roads (~1km elevated rail)
  - **Chandler** Road (~800m elevated rail)
  - Noble Park Station
Project video

Available online at: https://www.youtube.com/watch?v=SYT5F-gcr40
Rail systems

- Communication systems
- Signal upgrades
- Power upgrades
  - New and upgraded substations
  - Upgrades to gantries and overhead power cables
- Platform extensions
- Partial duplication of Cranbourne Rail Corridor
- Interfacing with
  - High Capacity Metro Trains Project (incl East Pakenham depot)
  - Melbourne Metro Project
Project Approvals

- *Planning and Environment Act 1987*
  - Planning Scheme Amendment (GC37) across nine planning schemes
  - Native vegetation offsets
- *Aboriginal Heritage Act 2006*
  - Cultural Heritage Management Plan
- *Heritage Act 1995*
  - Permit and exemptions
- *Flora and Fauna Guarantee Act 1988*
  - Permits
- *Water Act 1989*
  - Works on waterways
Environment & Sustainability

Paul O’Connell
Environment and Sustainability Manager – CTD Alliance
Agenda

- The Alliance players
- Approach to and opportunity for sustainability
- Construction methods
- Environmental challenges
Project Structure Overview
Key members of CTD’s Team:

- CTD’s NOP’s and key partners shown in the diagram above.
- CTD is engaging VSL under a Sub-Alliance for the Area 1 Viaduct
Commitment to Sustainability

- The project is all about sustainability - Improving safety, capacity and community connectivity
- Provide for 42% increased capacity - 11,000 extra passengers in the peak
- Make our roads and rail line more reliable and more efficient
- Creates 2,000 jobs
- Environmental and social benefits associated with the elevated design
  - Shared user path – health and wellbeing
  - Community activation spaces
  - 5 new station rebuilds
  - Revitalise local communities
- Continuous improvement focus
- Client and senior management and leadership resolve
Approach to Sustainability

ISCA’s IS Framework

• Achieve an IS Rating of Excellent

• Common national language for sustainability in infrastructure
• Consistent application and evaluation of sustainability in procurement, construction and operational processes
• Scoping whole-of-life sustainability aspects
• Promotes resource efficiency and waste reduction, reducing costs
• Fosters innovation and continuous improvement
Highlights to date

- 22.5Ha of new parkland
- ECOLOGY: translocations, seed collection, habitat linkages
- 75,000 reduction in local truck movements due to less excavation
- Community involvement in design (COSEP)
- 50,000 cubic metres of contaminated material diverted from landfill
- 4 NEW CROSS CORRIDOR ROAD CONNECTIONS
- 74 NEW APPRENTICES, TRAINEES, CADETS
- 4 star Green Star
- 17km shared use path
- Reuse and repurposing of salvaged materials, new avenue of honour planting
- $150,000pa
- Up to $68m of immediate Continuous Improvement for the remaining Level Crossing Program
- Social inclusion of disadvantaged groups
  - Current indigenous employment - 2.46%
  - "Being Well" resilience training - 450+
  - Mental first aiders - 60
  - Social enterprises
- 9.7 million LITRES SAVED
- 21% cement replacement product in precast concrete
- Up to $40m in savings in utility relocation and protection
22.5ha linear park
17km bike path
Increases community connectivity
Noise and privacy screens
Split decks - Visual/light permeability between structures
WSUD elements
Landscape and planting opportunities
Architectural OHW masts
Activation areas
Cross sections

AREA ONE - TYPICAL CROSS SECTION THROUGH STATION AND PUBLIC REALM

AREA ONE - TYPICAL CROSS SECTION

AREA TWO - TYPICAL CROSS SECTION

AREA THREE - TYPICAL CROSS SECTION

LEVEL CROSSING REMOVAL PROJECT
Managing community and environment

Key challenges

- Minimising disruption on busiest line
- Tight corridor, working in live train environment
- Out of hours and Night works - Occupations
- Brownfields environment
- Maintaining traders, community interface at stations
Construction methodology – Area 1 (Grange to Poath Rd)

Available online: https://www.youtube.com/watch?v=IGtIIIDAgni4
Construction Update

- Piling for piers: commenced August 2016
- Pier erection: commenced February 2017
- Gantry arrival: February/March 2017
- Gantry crane operational: April 2017
- Carrier operational, 1st span: April 2017
- Piling Complete
- Track signalling installation on deck by late 2017
- Bicycle & pedestrian path complete by mid 2018
- Open space landscaping complete by mid/late 2018
Construction methodology – Area 2/3 (Clayton)

(video)
Spoil & Contamination Management

- Limited space/area to handle materials on site – narrow corridor/live rail
- Challenges with the ideals waste hierarchy and context in linear infrastructure
- No structured approval pathway for reuse
- Temporary storage for materials – existing rail land
- Site Determination - in collaboration with EPA developed a guidance for assessing site determination
- **Opportunity** - Gear legislation with consideration of major projects and linear infrastructure
Noise & Vibration

- The perception of elevated rail and noise
- Out of hours work that is unavoidable – works within operating rail corridor
- Don’t have the long extended occupations typically seen on other LX project
- Challenges with current guidelines as a framework for infrastructure projects
- Determination of avoidable and unavoidable - Not measurable, not specific
- Approach – predictive modelling, scheduling of activities and monitoring
- Community engagement process triggered through internal procedure
- Critical in managing expectations, notifications and the provision of respite measures
Tree Removal and Retention

- Significant removals required – community concerns and angst
- Assessment of existing conditions and tree health/retention value
- A tree retention plan – publicly released
- Feedback from community information sessions – key for them to see some progress
- Construction procedures for managing removals
- Implemented rare plant salvage, seed collection for reuse in linear park
Heritage & Adaptive reuse

- 59 Heritage sites across the corridor
- Carnegie and Murrumbeena Stations
- Local council view around full retention of station buildings
- Heritage interpretation plan
- Salvage and adaptive reuse of materials
Contaminated Soil Management Strategy

Brigid Moriarty
Senior Associate - Coffey
Introduction

- Project context and constraints
- Project solution
- Regulatory framework
- Site determination principles
- CTD Site Determination application and approval
- Sustainability and industry advancement
Project Context – Spoil Management

Project context:
• 100,000 m³ of spoil generated during construction
  o > 50,000 m³ potentially contaminated – typically metals and PAHs
  o ~ 5,000 m³ PASS
• 40,000 m³ ballast
• Project goal to minimise waste generation – including spoil

Project commitments:
• Minimal shut-down of active rail corridor during construction
• Minimal disruption to commuters and the community including minimal use of surrounding public open spaces for laydown and stockpiling
Project Constraints

- Narrow project boundary
- Maintaining live rail corridor during construction
- Limited area to stockpile/manage on site
- Linear alignment with multiple land titles within Project boundary
  - movement of contaminated soil across title boundaries ordinarily = offsite disposal
Project Solution – EPA granted Site Determination

The Land SEPP (2002) gives EPA the ability to determine a “Site” under Clause 32

“site” means a parcel of land and other elements of the environment associated with the land, identifiable –

(a) by reference to volume and folio numbers of a title registered with the Registrar of Land Titles in accordance with the Transfer of Land Act 1958 or a parcel of land a memorial of the conveyance of which, containing a description of the said land, has been registered with the Registrar of Land Titles in accordance with the Property Law Act 1958; or

(b) where determined by the Authority as applicable, by—

(i) Australian or global geographical coordinates of latitude and longitude to the third decimal place; or.

(ii) Australian Map Grid reference to the nearest centimetre.
Project Solution – EPA granted Site Determination

- Temporary movement and management and final re-use of contaminated spoil within a defined boundary …..without being offsite disposal

- Process managed under an independently audited site-specific Environment Improvement Plan

- Strategy of re-use in accordance with EPA waste hierarchy
Precedent

• The most recent relevant example is Regional Rail Package B
  o EPA approved site determination boundary
  o Non-statutory review and approval of EIP by EPA auditor to allow re-use
  o Different site/project setting:
    ▪ Primarily industrial than residential setting ⇒ fewer sensitive receptors
    ▪ Short transport distances / transport within rail corridor
• EPA consider the acceptability and applicability of this approach on a case-by-case basis
• There is no formal application process to follow
Site Determination Principles

<table>
<thead>
<tr>
<th>EPA Principle</th>
<th>CTD application</th>
</tr>
</thead>
</table>
| 1. A net environmental benefit will be achieved | - Will reduce spoil to landfill, use of public land, emissions and energy consumption  
- Contribute to project sustainability credits |
| 2. Separate management of soils with different geological and geochemical characteristics and contaminant profiles | - In-situ categorisation of soil  
- Segregation of surficial fill and clean natural material  
- Controlled temporary management area |
| 3. The process will not spread or mobilise contamination such that this could create future legacy contamination issues | - Re-use in accordance with pre-approved scenarios  
- Close material tracking to validate suitability of material  
- Excess spoil disposed to landfill |
| 4. Where long-term management is required, responsibility is assigned to a person or entity | - Management and re-use on VicTrack land only — signed agreement  
- Not approved where there would be onerous, ongoing management requirements |
## EPA key concerns

<table>
<thead>
<tr>
<th>EPA concern</th>
<th>Project solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Environmental Justice”</td>
<td>Multiple site determination areas: re-use only allowed in area from which soil was sourced</td>
</tr>
<tr>
<td>Material transport and temporary stockpile management</td>
<td>EPA auditor oversight of this process</td>
</tr>
<tr>
<td>Contiguous boundaries</td>
<td>Inclusion of transport routes in site determination boundaries</td>
</tr>
<tr>
<td>Re-use in public open space</td>
<td>No re-use in POS regardless of contaminant concentration suitability</td>
</tr>
<tr>
<td>Precedent for major infrastructure projects</td>
<td>Worked with EPA to develop robust, consistent framework that can be applied to other projects</td>
</tr>
</tbody>
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CTD Site Determination

Site Determination granted by EPA CEO in October 2016

• 3 x Site Determinations to account for distance of Project

• Temporary management of spoil at a site in Dandenong deemed best option
  o Within project boundary
  o Existing industrial/commercial zoning
  o Existing use by rail operators for temp. management of soil and ballast

• Site determination approvals include transport corridor boundaries and temporary management area
Site Determination boundaries
CTD Site Determination (cont.)

- Audit of site assessment, spoil management, movement and re-use process, plus end-use scenarios
- EPA licensed vehicles for transport, and only via the defined transport routes
- Re-use only permitted in defined end-use scenarios
  1. Backfill in retaining walls, abutments and embankment - restricted public access
  2. Fill beneath carpark hardstands

No re-use within public open space areas
Retaining wall and embankment end-use scenario

- Restricted public access planted embankment fill area
- Tied retaining wall fill area
.... the “artists” impression ....
Sustainability and industry advancement

- On-track to re-use 40,000m$^3$ of contaminated spoil, diverting this from landfill
  - ISCA LAN credit ratings
  - Reduced import of new material to site
  - Substantial project cost saving

- Collaboration with EPA to advance towards a Site Determination framework
  - Consistent application process
  - Consistent outcome/approval expectation
  - No statutory approvals timeframe – perhaps an opportunity
Key Considerations

- Airborne train noise*
- Structure borne re-radiated train noise
- Fixed infrastructure noise (such as substations)
- Station noise
- Station vibration
- Construction noise and vibration*
- Concrete batching plant noise
- ...

* indicates critical considerations
Taking a different approach...
# Operational Noise

<table>
<thead>
<tr>
<th>Design Feature</th>
<th>Predicted Change in Noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>New continuously welded rail track</td>
<td>5dB reduction</td>
</tr>
<tr>
<td>Direct fix using resilient pads</td>
<td>6dB reduction</td>
</tr>
<tr>
<td>New stations</td>
<td>0-5dB reduction</td>
</tr>
<tr>
<td>Removal of level crossings</td>
<td>6-8dB reduction</td>
</tr>
<tr>
<td>Reduction in horn soundings</td>
<td>3-6dB reduction</td>
</tr>
<tr>
<td>Noise wall</td>
<td>5-15dB reduction</td>
</tr>
<tr>
<td>Vibration isolation</td>
<td>0-10dB reduction</td>
</tr>
<tr>
<td>Change in gradient</td>
<td>4dB reduction to 1dB increase</td>
</tr>
<tr>
<td>Elevated structure</td>
<td>0dB increase</td>
</tr>
</tbody>
</table>
Key Considerations

Figure 1: 3D model of at-grade and elevated scenarios
Key Considerations

Figure 4: SPR $L_{eq,16hr}$ results for at-grade and elevated scenarios
Key Considerations

Figure 5: $L_{\text{max}}$ results comparison between Kilde and Nord 2000
Nord 2000

• Most up to date modelling algorithm
• Calibrated inputs
• Multiple source heights
• Accounts for shielding of bridge structures
• Rail-specific source directivity
• Frequency dependent source inputs and propagation
• Aligns well with international literature (i.e. Japan)
Construction Noise

Scheduled night period works identified

Predictive noise modelling undertaken:
- Equipment
- Location
- Duration
- Localised attenuation
- 3D modelling of terrain
- Predicted noise impacts

Review of predicted impacts:
- Reschedule?
- Respite?
- Engineering controls?
- Relocation?

Revise and modify construction activities

Implementation of agreed actions:
- Engineering controls
- Relocation
- Respite

Attend monitoring during construction

Update Modelling Scenarios

Improve modelling inputs and assumptions
Key Considerations
Consultation

Michael Arpula
Senior Communications & Stakeholder Relations Adviser
During tender phase

- 1,471 doorknocks and letter drops to residents closest to the rail corridor
- 7 interactive community sessions with feedback provided directly to bidders
- 4 trader workshops
- 4 four community tender advisory panel sessions
- 140 trader survey responses
- 16 community catch up sessions at festivals and community events, shopping areas and school fetes
- 12 council briefings and CEO meetings
- 9 community billboards for each level crossing removal site
- 25 pop-up information sessions at train stations, shopping strips
- 310,000 newsletters distributed
- 1,529 pieces of community feedback from workshops, interactive sessions and Social Pinpoint (online)
On proposed design

<table>
<thead>
<tr>
<th>600</th>
<th>60</th>
<th>77,444</th>
<th>558</th>
<th>225,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pop Ups at Train Stations, Libraries and Shopping Strips</td>
<td>Website Hits</td>
<td>Caulfield to Dandenong Pages &amp; Your Suburb, Your Say Portal</td>
<td>Email Responses</td>
<td>Newsletters Distributed to Residents and Traders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resident Phone Surveys</th>
<th>2,200</th>
<th>2,207</th>
<th>349</th>
<th>1,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendees at 'Your Suburb, Your Say' Community Sessions</td>
<td>1170</td>
<td>181</td>
<td>Calls Received through 1800 762 667</td>
<td>Formal Submissions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>170 1:1 Resident Engagement Meetings, Discussing</th>
<th>925 181</th>
<th>80</th>
<th>4,034</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Trader Briefings &amp; Workshops</td>
<td>Properties in Community Spaces</td>
<td>Trader Face-to-Face Interviews</td>
<td>Comments on Designs for Website and Community Sessions</td>
</tr>
</tbody>
</table>
On-going
Open space video

Available online: https://www.youtube.com/watch?v=c0Dbkl8aw70
Community Open Space Expert Panel

Membership

Chair: Professor Tim Entwisle, Chief Executive of the Royal Botanic Gardens Victoria
Victoria Police
Bicycle Network
Universal Design
Landscape Design Architects
Victorian Government Architect
Councils and
Local community representatives
Open Space Ideas Hub

New public space and parkland

The Caulfield to Dandenong Level Crossing Removal Project’s innovative design centers on three sections of modern elevated rail, which will create 22.5 hectares of community open space for new parks, playgrounds, sporting facilities and a range of other uses.

A Community Open Space Expert Panel has been established to oversee plans for the new public open space. For information on the panel visit Community Open Space Expert Panel.

Tell us what you think

We want to hear what you think about some of the ideas the Community Open Space Expert Panel has generated - as well as your own creative ideas of how we can transform the rail corridor into an attractive and safe environment for Melburnians to enjoy!

Take the survey now!

Have your say by completing the survey (we will be conducting a number of surveys), contributing ideas via our Community Ideas Hub or by joining in the discussion forum.
Survey #1 feedback

Overall, would you support the pillars being used to create an outdoor art gallery?

- Yes: 210 (84.0%)
- No: 29 (11.6%)
- No opinion: 11 (4.4%)
Noble Park Station After
Open space timeline

Early 2018  Open space design finalised
2018       Open space landscaping complete
2018       Shared use path complete
Wrap up

Clayton Station