NOTE:
1. Mr Buono (Submitter 646) is a member of the NELP Northern Community Liaison Group and has been in communication with NELP since midway through 2018 concerning alternative designs for the northern part of the Project. His preferred design for the Project is known as the ‘S.M.A.R.T. Taxpayer Design’ and is shown in Attachment A.

2. NELP’s Part A submission indicated that it had considered longer tunnel options in the development of the reference project, but that these options were not pursued on account of the significant impacts that they would have including in respect of project costs, the duration of construction, and land acquisition. This technical note has been prepared to provide context as to why a longer tunnel was not proceeded with and to assist the IAC understand the implications of the ‘S.M.A.R.T. Taxpayer Design’. It should be read in conjunction with technical note 30.

REQUEST: N/A

RESPONSE:

Description

1. The ‘S.M.A.R.T. Taxpayer Design’ differs from the reference project in the following key respects:
   - The TBM ‘Bored Twin Tunnels’ would extend north of Lower Plenty Road by 3.2 kilometres in place of the cut and cover, open trench and surface road components of the reference project.
   - The Lower Plenty Road interchange would be deleted with provision made for a ‘possible future’ tunnelled interchange (if and when required).
   - The northern tunnel portal would be located a short distance south of Grimshaw Street.
   - The northern tunnel ventilation structure would be relocated to an unspecified location. The drawings show a ‘possible location’ in Barracks’ land adjacent to Sydney St.
   - Greensborough Road south of Grimshaw Street would be diverted above the rail corridor, thereby extending the rail tunnel from the existing Hurstbridge Rail overpass through to Grimshaw Street.
   - Some in-tunnel gradients would be reduced when compared to the reference project.

Feasibility

2. There are various reasons why the ‘S.M.A.R.T. Taxpayer Design’ is not feasible.
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Removal of the Lower Plenty Road Interchange

3. By not providing an interchange at Lower Plenty Road, the ‘S.M.A.R.T. Taxpayer Design’ does not preserve the functionality of the Project. It is therefore not considered a feasible design alternative by NELP. For information purposes, a summary of the consequences of not including this interchange is provided in the ‘other information’ section below.

The Southern Section of the Additional Tunnel Component

4. The S.M.A.R.T. Taxpayer Design incorrectly assumes that a future interchange, adjacent to Sydney Street, can be readily constructed without major disruption to the operating roadway at a later date. This is not the case.

5. The industry-accepted method of merging lanes into or out of a segmentally-lined TBM tunnel is to create an underground cavern/merge at the time of the initial tunnelling works (and in advance of the passage of the TBMs). This, in turn, allows the construction of ‘stub’ tunnel connections to the underground cavern, which can be connected to the surface, via ramps, at an appropriate time in the future. The underground caverns can either be ‘mined caverns’ (i.e. tunnelled) or ‘cut and cover’ structures. If the former method was adopted there would be surface disturbance at the time of the main works program for the North East Link Project (including works to construct shaft or ramp/adit accesses associated with the construction of the caverns). If the latter method was adopted, there would be considerably more surface disturbance at the time of the North East Link Project, in order to construct the cut and cover structures. The level of surface disturbance, in this scenario, would be similar to that required to construct the reference project.

6. If no such caverns and stub tunnels are provided as part of the initial construction program, and a decision is subsequently made to provide the interchange at a later date, the mainline NELP tunnels/roadway would need to be shut down for more than 12 months to facilitate construction. Any such works would also result in considerable surface disturbance.

The Northern Section of the Additional Tunnel Component

7. The ‘S.M.A.R.T. Taxpayer Design’ would increase the complexity of the project south of Grimshaw Street by realigning Greensborough Road above the Hurstbridge rail corridor and increase the length of the rail tunnel by approximately 250 metres when compared to the reference project. These works would require that the rail line be shut down for significantly longer than in the case of the reference project.

8. The provision of the tunnel ventilation structure in an unspecified location remote from the northern tunnel portal (potentially 2 kilometres to the south of the northern portal) would introduce considerable complexity and would compromise the efficient operation of the ventilation system. This may also have consequences in respect of further land acquisition and/or tunnel structures to accommodate large volume ventilation ducting. For a tunnel of this size and length, a ventilation facility in the proximity of the northbound tunnel exit portal is almost certainly required. It is further likely that the existing ventilation facility at Blamey Road would still be required in some form, albeit functioning as both air intake and an outlet for vitiated air.

Program

9. The ‘S.M.A.R.T. Taxpayer Design’ would extend the duration of construction by approximately 1.5 to 2 years later than the reference project.

Beneficial and Detrimental Environmental Effects by Comparison to the Reference Project

10. The broad environmental consequences of extending the tunnels north of Blamey Road are
described in technical note 30. This section of this technical note accordingly focusses on those environmental effects relating specifically to the S.M.A.R.T. Taxpayer Design.

11. Notwithstanding that the removal of Lower Plenty Road Interchange would result in the Project not meeting its fundamental objectives, the following environmental effects are noted in respect of this aspect of the design -

12. Potential Beneficial Environmental Effects:

- There would be substantially less vegetation removal in the Simpson Barracks and Borlase Reserve due to the deletion of the Lower Plenty Road interchange. It should be noted, however, that if the interchange was constructed at some later date, there would still be substantial surface disruption required, including vegetation clearance.

- Constructing the tunnels with a TBM would result in less groundwater drawdown/movement, when compared to the conventional cut and cover tunnelling as proposed in the reference project. This could reduce the impact on groundwater dependent ecosystems.

13. Potential Detrimental Environmental Effects:

- Increasing the tunnel length and having a ventilation station 2 kilometres from the northern portal would have a very significant impact on electricity consumption and would compromise the efficient functioning of the ventilation system over the life of the Project.

- Increasing congestion by deleting the Lower Plenty Road Interchange will lead to an increase in vehicle-related emissions in the immediate area and more broadly.

Other Information:

14. The traffic and transport consequences of not providing the interchange at Lower Plenty Road are described below.

Traffic impacts – existing road network

15. The impact of removing the Lower Plenty Road interchange on total daily traffic volumes is shown in Figure 1.

16. Approximately 65,000 vehicles per day are predicted to use these ramps by 2036. These vehicles would be forced onto the arterial road network in the absence of this interchange. Traffic volumes would increase on nearby parallel arterials including Plenty Road, Rosanna Road, Para Road, Waterdale Road and Waiora Road, with some trips modelled to divert to routes as far as Chandler Highway and Burke Road. Traffic volumes would also increase near the Grimshaw Street and Manningham Road interchanges, which would incur additional demand under this scenario.

17. The removal of the interchange, and the resultant diversion of traffic onto the arterial road network, would also likely deteriorate the Project’s projected travel time savings. Traffic modelling indicates that this scenario would lead to an additional 30,000 vehicle kilometres travelled per day on existing road networks in Banyule and Manningham.

Traffic Impacts – North East Link

18. The removal of the interchange would increase traffic demand, and deteriorate operational performance, at the Grimshaw Street and Manningham Road interchanges. Approximately 16,000 additional vehicles per day are forecast to use the Grimshaw Street and Manningham Road
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interchanges (approximately 8,000 additional vehicles each) in 2036.

19. A consequence of these impacts is that the Project will not deliver the same degree of network improvements, connectivity, and job accessibility as in the reference project.

Figure 1 – Impact of removing Lower Plenty Road interchange on total daily traffic volumes, 2036 ‘with project’

CORRESPONDENCE: N/A

ATTACHMENTS: A – SMART Taxpayer Design