



- Where possible heavy vehicle movements should be limited to daytime hours.
- Reversing of equipment should be minimised so as to prevent nuisance caused by reversing alarms.
- Loading and unloading should be carried out away from sensitive receptors, where practicable.
- Work should be scheduled to provide respite periods from the noisiest activities, and impacted residents should be communicated with to clearly explain the duration and noise levels for the works.
- Where all feasible and reasonable practices have been applied and noise would be more than 5 dB above the noise affected level, the proponent should negotiate with the community to determine the schedule for the works or provide respite to occupants where sleep disturbance is likely to occur.

Site specific construction noise and vibration management plans (CNVMPs) would be developed in the detailed design phase. The CNVMPs would provide a detailed assessment of potential noise levels and site specific measures to control potential noise impacts and minimise the potential for disturbance at affected receptors. A range of feasible and reasonable construction noise mitigation measures would be provided.

Additional noise mitigation measures to be explored in the CNVMPs in the event of predicted exceedances of the noise goals (particularly during out of hours works) are described in the Transport for NSW Construction Noise Strategy. This strategy includes definition of the level of noise impact that triggers consideration of each additional mitigation measure (refer Table 64 in Technical Paper 11).

The additional mitigation measures described in the Construction Noise Strategy are summarised below, with discussion of their potential applicability to the CSELR works. The objective of these additional noise mitigation measures is to engage, inform and provide project-specific messages to the community, recognising that advanced warning of potential disruptions can assist in reducing the impact. The measures include:

- *periodic notifications* – These include regular newsletters, letterbox drops or advertisements in local papers to provide an overview of current and upcoming works and other topics of interest.
- *website* – The project website would form a resource for members of the community to seek further information, including CNVPs and current and upcoming construction activities.
- *project info-line and construction response line* – Transport for NSW will operate a construction response Line and a project info-line. These numbers will provide a dedicated 24 hour contact point for any complaints regarding construction works and for any project enquiries. All complaints require a verbal response within 2 hours. All enquiries require a verbal response within 24 hours during standard construction hours, or on the next working day during out of hours work (unless the enquirer agrees otherwise).
- *email distribution list* – An email distribution list would be used to disseminate project information to interested stakeholders.
- *signage* – Signage on construction sites would be provided to notify stakeholders of project details and project emergency or enquiry information.
- *specific notifications* – Specific notifications would be letterbox dropped or hand distributed to the nearby residences and other sensitive receptors no later than seven days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works.
- *phone calls* – Phone calls may be made to identified/affected stakeholders within seven days of proposed work. For these works considering the large numbers of receptors, phone calls are not likely to be considered a reasonable mitigation measure in all cases, but could be used to inform specific receptors if requested (after notification of the works as above).
- *individual briefings* – Individual briefings may be used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Communications representatives from the contractor(s) would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Considering the large numbers of potentially affected receptors, individual briefings may not be considered a reasonable mitigation measure in all cases, but could be used for specific receptors if requested (after notification of the works as above).

- *monitoring* – Ongoing noise monitoring during construction at sensitive receptors during critical periods would be used to identify and assist in managing high risk noise events. Monitoring of noise would also be undertaken in response to complaints. All noise monitoring would be carried out by an appropriately trained person in the measurement and assessment of construction noise and vibration, who is familiar with the requirements of the relevant standards and procedures.
- *project specific respite offer* – Residents subjected to lengthy periods of noise or vibration may be eligible for a project specific respite offer. The purpose of such an offer is to provide residents with respite from an ongoing impact. An example of a respite offer might be pre-purchased movie tickets. The provision of this measure would be determined on a case-by-case basis. Project specific respite offers are unlikely to be reasonable and feasible in the City Centre Precinct. This is partly due to the impracticability of providing respite offers to large numbers of people during the proposed 24 hour works, but also reflects the existing evening and weekend noise environment in the City Centre Precinct.
- *alternative accommodation* – As described in the Construction Noise Strategy, provision of alternative accommodation for residents should be considered in the event that highly intrusive noise impacts are predicted during the night-time period (between 10:00 pm and 7:00 am). However, as the CSELR is likely to require night-time works at many locations (particularly in the City Centre Precinct), provision of alternative accommodation in all cases may not always be reasonable or feasible. Offers of alternative accommodation to residents are unlikely to be reasonable and feasible in the City Centre precinct. This is partly due to the impracticability of providing alternative accommodation to large numbers of people during the proposed 24 hour works, but also reflects the fact that the existing night-time noise environment in the City Centre Precinct means that facades of residential buildings would generally provide a high level of noise attenuation.

Other construction noise mitigation considerations

For sensitive receptors that operate outside standard construction hours, for example hospitals which operate on a 24 hour basis, reasonable and feasible noise mitigation options and measures would be developed in consultation with the receptor.

Construction vibration measures

Where vibration intensive construction activities are proposed within 100 metres of sensitive receptors, these works would be confined to the less sensitive daytime period where possible. The potential impacts from vibration are to be considered in the site-specific CNVMPs, to be developed during the detailed design phase when more information is available on the schedule for the works, the equipment to be used and the localised geotechnical conditions. In general, mitigation measures that would be considered include:

- Relocate vibration generating plant and equipment to areas within the site in order to lower the vibration impacts.
- Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment.
- Use lower vibration generating items of excavation plant and equipment (e.g. smaller capacity rockbreaker hammers).
- Minimise consecutive works in the same locality (if applicable).
- Use dampened rockbreakers and/or 'city' rockbreakers to minimise the impacts associated with rockbreaking works.
- If vibration intensive works are required within the safe working distances, vibration monitoring or attended vibration trials would be undertaken to ensure that levels remain below the cosmetic damage criterion.
- Building condition surveys would be completed both before and after the works to identify existing damage and any damage due to the works.
- Measurements of existing ambient vibration levels would be undertaken at receptors with vibration sensitive equipment during the detailed design phase. This information would be used to inform the site-specific CNVMPs for works near these locations.



Construction work hours

Wherever reasonable and feasible, construction work on the proposal would be undertaken in the recommended standard hours for construction work:

- Monday to Friday 7.00 am to 6.00 pm
- Saturday 8.00 am to 1.00 pm
- No work on Sundays or public holidays.

The nature of the proposal means evening and night work would also be required, particularly in the City Centre Precinct but also in other precincts especially in areas around road intersections. Construction works would be required outside of standard hours where:

- temporary road closures and other measures are required by the NSW Police and other regulatory authorities for the safe delivery of material/equipment
- works have the potential to disrupt commuter services and road networks
- works are required to be completed to maintain health and safety, avoid loss of life or injury and to prevent environmental damage.

Further assessment

During the detailed design stage, construction ground-borne noise impacts would be revisited during preparation of the more detailed site-specific Construction Noise and Vibration Impact Statement for the locations listed in Table 12.32 of this chapter (which equates to Table 66 in Technical Paper 11). This would include further assessment of the likely construction noise levels at the most affected recording rooms of all recording studios and to establish receiver-specific noise goals, taking into account the type of recordings undertaken, and the existing external to internal noise insulation. Consultation with the owners/operators of these facilities would be undertaken as part of this process.

During construction, attended measurements would be undertaken at the commencement of rockbreaking activities in the vicinity of the premises listed in Table 12.32 (which equates to Table 66 in Technical Paper 11), to assist in evaluating and managing construction ground-borne noise impacts in conjunction with the premises operators. Alternative construction methods such as smaller rockbreakers, rock saws or respite periods would be considered if required to minimise noise impacts. In the event that lower impact equipment cannot be substituted, all efforts would be made to reschedule work to less sensitive times in consultation with affected communities.

Additional assessment of construction road traffic noise impacts of night-time truck movements (if required) would be undertaken at detailed design stage when the finalised traffic plan is determined.

12.6 Planted trees

This section provides a summary of the existing planted trees within the City Centre Precinct, based on Technical Paper 9 – *Preliminary Tree Assessment* in Volume 5 of this EIS. This section also provides an indicative estimate of the number of planted trees that would be directly affected by the construction of the CSELR proposal, as well as environmental management measures that would be implemented to further reduce such impacts.

12.6.1 Existing conditions

The City Centre Precinct contains approximately 240 planted trees within the 'tree study area' along the alignment (refer Figures 12.16a and 12.16b), with a further 150 trees located within adjacent public open spaces (including First Fleet Park and Belmore Park). As outlined in Chapter 8, the tree study area was defined as the area that would be directly affected by the CSELR proposal, which includes any of the physical works (e.g. light rail tracks, stops, overhead wires, substations and the maintenance and stabling facilities), construction compounds, access roads and any other areas that would be physically disturbed during the construction of the proposal.

Trees within the City Centre Precinct tree study area typically comprise Plane Trees, evergreen Figs and evergreen Brush Boxes. The distribution of these trees throughout the precinct is shown in Figures 12.16a and b, and generally occurs at the following locations:

- along Alfred Street, George Street, Eddy Avenue, Rawson Place and Chalmers Street
- within First Fleet Park and Belmore Park.

Discussion on the key characteristics of the trees throughout the precinct is provided in Table 12.33. A full assessment of each tree within the tree study area — in terms of their key characteristics (i.e. species, condition, health and structure), ‘safe useful life expectancies’ and ‘landscape visual rating’ — is provided in Technical Paper 9 and City of Sydney’s (2012) *George Street Tree Audit*.

A number of the planted trees within the City Centre Precinct are listed on City of Sydney’s (2013b) *Register of Significant Trees*, and/or contribute to the significance of listed heritage items (refer to section 12.8). A number of these trees also provide a substantial contribution to the visual character and amenity of the locality. Assessment of these trees from a heritage and visual amenity perspective is provided in sections 12.8 and 12.7, respectively.

Table 12.33 Overview of planted trees within the City Centre Precinct

AREA	OVERVIEW OF PLANTED TREES
Alfred Street	Alfred Street contains approximately 20 trees within the tree study area, generally comprising evergreen Fig trees and deciduous Plane Trees. These trees are typically considered to be in good condition, displaying a structure, form and health typical of these plant species. Tree plantings along Alfred Street typically make a substantial contribution to the visual amenity of the public domain.
First Fleet Park	First Fleet Park contains approximately 60 trees, which include one India-rubber Fig and eight Peppercorn Trees that are listed on City of Sydney’s (2013b) <i>Register of Significant Trees</i> . The <i>Register of Significant Trees</i> notes that the India-rubber Fig is of local significance due to its ornamental and aesthetic character, its visual prominence and high amenity values within the locality. It also notes that the group of Peppercorn Trees are of local significance due to their visual, aesthetic, historic and amenity values.
George Street	George Street contains approximately 150 trees within the tree study area, including four trees at the western end of Martin Place. City of Sydney’s (2012) <i>George Street Tree Audit</i> notes that these trees typically comprise discontinuous rows of Plane Trees of varying age and condition, ranging from juvenile recently planted trees to semi-mature (established) and mature trees with good vigour and structure. Some of the tree plantings along George Street make a substantial contribution to the visual amenity of the public domain (for example, adjacent to the Cahill Expressway and between Hunter and Bond streets).
Eddy Avenue	Within the study area, Eddy Avenue contains one large mature Plane Tree, the structure of which has been modified as a result of past pruning activities. The tree also displays evidence of storm damage. The Plane Tree makes a substantial contribution to the visual amenity of the public domain at the entry to Central Railway Station. A number of larger trees are located adjacent to the northern side of Eddy Avenue, within Belmore Park.
Rawson Place	Rawson Place contains four mature (although not exceptionally large) evergreen Fig trees within the northern footpath. These trees are generally considered to be in good condition, displaying a structure, form and health typical of these plant species. The four Fig trees currently make a contribution to the visual amenity of this section of Rawson Place.
Chalmers Street and Elizabeth Street Gardens	Chalmers Street contains approximately 50 trees within the tree study area, generally comprising deciduous Plane Trees of varying health and condition, ranging from good to fair condition. Most of these trees have had their structure and form modified as a result of past pruning activities. These deciduous trees provide summer shade (albeit limited) for the footpath and make a contribution to the visual amenity of the public domain.
Belmore Park construction compound	Belmore Park contains approximately 45 trees, generally comprising avenues of evergreen Brush Boxes adjacent to footpaths, a large Moreton Bay Fig tree in the north-eastern corner of the park, as well as and landmark deciduous trees (oriental Plane Trees) scattered throughout the park. These trees are typically considered to be in good condition, displaying well formed, healthy crowns (i.e. canopy), and a form and health typical of these plant species (indicating that they are well maintained by City of Sydney). The trees within Belmore Park make a substantial contribution to the surrounding public domain and provide shade for park users.

Source: Based on Technical Paper 9, Volume 5, City of Sydney’s (2012) *George Street Tree Audit* and City of Sydney’s (2013b) *Draft Register of Significant Trees*



12.6.2 Direct impacts to planted trees

Construction of the CSELR proposal would require the removal of up to approximately 110 planted trees within the City Centre Precinct, or approximately 45 per cent of the trees within the tree study area. The majority of impacted trees are located along the length of George Street and at Chalmers Street. There would be a minor loss of trees at Alfred Street, Rawson Place and Eddy Avenue. The trees in Martin Place would not be impacted.

As discussed in Chapter 8, the following assumptions were made regarding which trees would require removal to facilitate the construction and operation of the CSELR:

- *Encroachment into the tree protection zone* — Any incursion of the CSELR construction footprint (including any kerb realignments and service relocations) greater than 10-20 per cent of the edge of a tree's canopy would most likely require the removal of the tree, subject to arborist advice.
- *Encroachment into the structural root zone* — Any incursion of the CSELR construction footprint (including any kerb realignments) into the structural root zone of a tree would likely compromise the tree's structural stability and would likely require the removal of the tree.
- *Tree canopy height* — Trees with canopies that would considerably encroach within one metre, or overhang, any light rail infrastructure, including overhead wiring and support systems, traffic signals and sight lines, or the LRVs themselves, were assumed to require removal, subject to arborist advice. While it is noted that some trees could be adequately trimmed to provide the required clearances for the operation of the CSELR proposal (and thus avoid the need to completely remove the tree), the impact that such trimming would have on the viability of the tree is currently unknown and would need to be determined by an arborist during detailed design.

Figure 12.16a Impacts to planted trees – City Centre Precinct

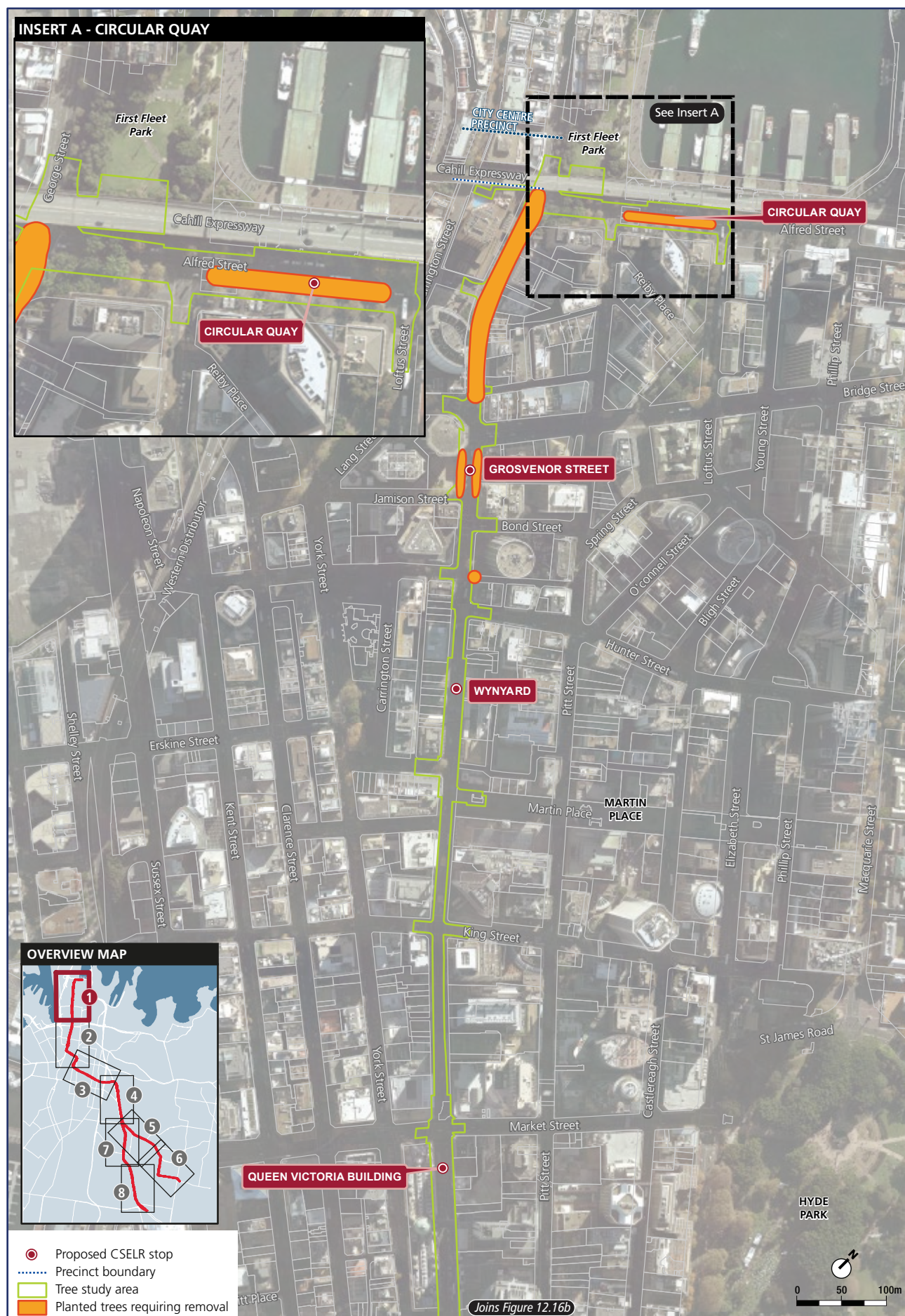
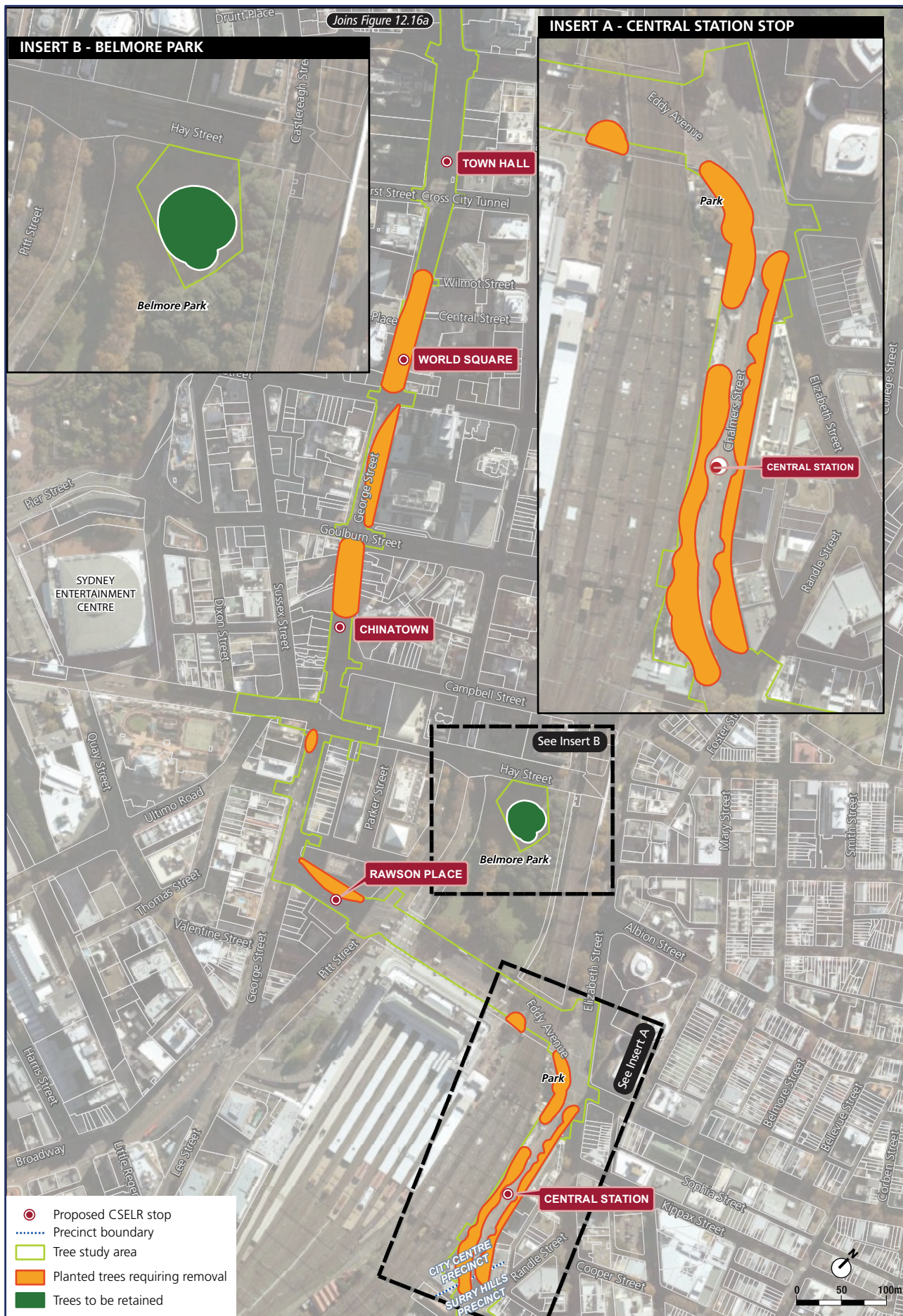


Figure 12.16b Impacts to planted trees – City Centre Precinct



Planted trees impacted along Rawson Place would comprise four mature (although not exceptionally large) evergreen Fig trees within the northern footpath. Planted trees impacted along George Street would typically comprise discontinuous rows of Plane Trees of varying age and condition, ranging from juvenile recently planted trees to semi-mature (established) and mature trees. At Eddy Avenue, the CSELR proposal would require the removal of the large mature Plane Tree from the entry to Central Railway Station. Planted trees impacted along Chalmers Street would generally comprise deciduous Plane Trees of varying health and condition.

No trees would be removed from within the proposed construction compound at Circular Quay. The three mature trees within the proposed construction compound proposed at Belmore Park would be retained, with the drip line around these trees restricted to certain activities only to prevent damage to root zones or branches (refer to section 12.6.3).

12.6.3 Management and mitigation

Direct impacts to a number of planted trees would be unavoidable due to the need to balance minimum road design requirements (e.g. operational lane configurations and widths), minimise the acquisition of private property, allow for service relocations, and minimise any potential safety risks associated with the operation of the CSELR (e.g. providing adequate clearances for the LRVs, overhead wires and other infrastructure) within a constrained corridor with limited available road space and competing modes of transport.

The following management and mitigation measures would be implemented to minimise direct impacts on planted trees during the construction of the CSELR proposal:

- Trees that would not be directly impacted by the proposed CSELR permanent works (e.g. overhead wires, substations, light rail stops, kerb realignments, service relocations, etc.) would be retained. Trees that would not significantly impinge on required clearances to such infrastructure, such that the tree would need to be removed to allow for the safe operation of the CSELR — would be retained. Some trees would require one-off or ongoing maintenance, for example pruning of low branches that would interfere with the overhead wiring. Where pruning of trees is required, a qualified arborist would be engaged to assess the health and condition of the tree and to plan and undertake any pruning works.
- Exclusion fencing would be established around the drip lines of each tree to minimise the risk of impact to the viability of the trees. Where impact to the drip line area cannot be avoided (due to space constraints), opportunities to raise construction facilities (e.g. demountable) above the ground level would be investigated so as to avoid impacting on the underlying tree roots, in accordance with Australian Standard AS 4970 *Protection of Trees on Development Sites*.
- The use of low impact construction techniques (on existing tree roots) for installation of new services would be considered, where appropriate and feasible.
- Where the loss of trees is unable to be mitigated through the above measures, Transport for NSW would replace trees removed as a result of the CSELR, in accordance with the Transport for NSW 'Vegetation Offset Guide' (2013d), which includes a principle of replacing 'the amenity/visual landscape value of vegetation removed' even if the vegetation may not have significant ecological value. Trees would be replaced at a ratio of between 2:1 and 8:1, in consultation with the City of Sydney and depending on the size of the tree to be removed. Selection of tree species, size and planting locations would be undertaken in close consultation with City of Sydney and in accordance with the City of Sydney's *George Street Concept Design* (2013a). The CSELR Landscape Strategy (refer to Appendix F) recommends the following tree species are used for replacement planting in the City Centre Precinct:
- The trees in Martin Place would not be impacted during the construction of the CSELR proposal. Design and siting of the underground substation in Martin Place would be undertaken so as to provide adequate clearance of the structure from the root zone of these trees. Exclusion fencing would be erected around these trees during construction.
- No trees within First Fleet Park would be removed for the proposed construction compound. There may be a need for some minor trimming to overhanging branches to provide clear access or emplacement of site sheds within the compound.
- No trees within Belmore Park would be removed for the proposed construction compound. Exclusion fencing would be established around the structural root zone of each tree to minimise the risk of impact to the viability of the trees. Where impact to the drip line area



cannot be avoided (due to space constraints), opportunities to raise construction facilities (e.g. demountable buildings) above the ground level would be investigated so as to avoid impacting the underlying tree roots, in accordance with Australian Standard AS 4970 *Protection of Trees on Development Sites*.

- Opportunities to translocate the four mature trees on Rawson Place to a suitable new location would be investigated during detailed design, where feasible.
- *Zelkova serrata* (Japanese Zelkova) trees are proposed to be used for the middle section of Alfred Street and along the entire length of George Street. This would create a visual connection between George Street and Circular Quay.
- *Lophostemon confertus* (Brush Box) trees are proposed in Rawson Place.
- No tree plantings would be accommodated along Eddy Avenue due to the limited available space to accommodate trees.
- *Platanus acerifolia* (London Plane) trees would be used on the eastern side of Chalmers Street only.
- The character of the small historic park at Central Railway Station (on the corner of Chalmers Street and Eddy Avenue) would be retained as a predominant turf area with new Plane Tree plantings — potentially *Platanus acerifolia* (London Plane) — along the edge of the park to provide shade; however, these trees would be located within the park and not on the footpath (consistent with the current situation).

Consistency of the above tree species with City of Sydney's (2011) *Street Tree Master Plan* is detailed in Appendix F.

12.7 Visual and landscape character

The following sections provides a summary of the potential local visual and landscape character impacts of the CSELR proposal within the City Centre Precinct, based on Technical Paper 10 — *Visual and Landscape Assessment* contained in Volume 5 of this EIS.

12.7.1 Existing landscape character and visual conditions

The City Centre Precinct is characterised by varying topography. George Street rises from Circular Quay, on the harbour, to a high point near Wynyard Railway Station, before it drops again towards Central Railway Station. The built form is marked by iconic and identifiable buildings. A number of historic sandstone buildings front onto George Street including the former General Post Office (GPO) and former Bank buildings at Martin Place, the Queen Victoria Building, Sydney Town Hall, and the Strand Arcade. In contrast to this historic urban fabric are modern buildings including Australia Square, the Hilton Hotel and Grosvenor Place, high-rise towers and recently refurbished buildings such as the ultra-modern Apple store on the corner of King Street and George Street.

Intersecting with George Street, a number of streets are pedestrianised, incorporating trees and plaza spaces for public use. The most notable of these is Regimental Square on Wynyard Street, and the square connecting Sydney Town Hall with St Andrews Cathedral. Regimental Square contains the Vietnam War Memorial and is an important pedestrian connection to the Wynyard Bus Interchange. Footpaths also widen into a plaza at the Queen Victoria Building where the Queen Victoria Statue sits, visually punctuating George Street.

Sydney's cross streets provide glimpses east and west, on occasion providing views to major parks, such as at Hyde Park from George Street at Market Street, and views towards Darling Harbour from the Queen Victoria Square at Druitt Street.

Chalmers Street forms the eastern edge of Central Railway Station and the beginning of Surry Hills. There are two entries to Central Railway Station on Chalmers Street, one at the intersection with Elizabeth and Foveaux streets and the second at Devonshire Street. Chalmers and Elizabeth streets offer views to the CBD skyline including the Sydney Tower. These views and the Central Station Bridge mark the south-eastern entry to the city. This intersection is broad and complex, with the merging of five major roads and the funnelling of traffic under the rail bridge arches. Chalmers Street is a four-lane one-way road with broad footpaths and a plaza at the station. This plaza includes a row of statues dedicated to a number of Ibero-American heroes, opened in 1989.

There are a number of plazas and squares along the route. At Circular Quay plazas extend along the northern edge of the buildings on Alfred Street, widening into a forecourt plaza for the historic Treasury building. In this location, the precinct is characterised by the bulk of the Cahill Expressway and City Circle railway line overhead, overshadowing the plaza spaces along Alfred Street and blocking views to Circular Quay and Sydney Harbour. A further significant open space is Martin Place, a pedestrianised street surrounded by heritage buildings and including the World War I ANZAC Cenotaph and water fountain.

Between Alfred Street at Circular Quay and Hunter Street, trees are intermittent and of varying maturity and health. Between Bathurst Street and Rawson Place there is a more consistent avenue of street trees; however, they have been planted at different times and are of varying maturity and health.

12.7.2 Visual sensitivity

The sensitivity of the precinct is predominantly influenced by a number of historic properties and important views. As well as the multitude of historic and modern landmark locations and buildings, the precinct includes areas which are national and international tourist destinations. A summary of visual sensitivity for the main viewing areas across the City Centre Precinct study area is provided below:

- The harbour-side areas of Circular Quay, including First Fleet Park, have significant historic and cultural importance. This park is the original landing place of the First Fleet in 1788, and an early contact site with the indigenous Cadigal people. The park is a break out space for The Rocks and forecourt to the Museum of Contemporary Art, and is well known as a place for appreciating views to the Harbour Bridge or Opera House. The landscape and visual amenity are considered to be of State sensitivity.
- The landscape and visual amenity of Circular Quay, south of the Cahill Expressway, are considered to be of State sensitivity. Although this location is just beyond the visual curtilage of the World Heritage listed Sydney Opera House, and has limited views from street level to the harbour and bridge itself, this area is used as a gateway to Sydney Harbour.
- George Street, between Alfred Street and Hunter Street, acts as a gateway to Circular Quay and therefore is used by a large number of tourists and city workers alike. There are glimpse views to the harbour and Harbour Bridge at the northern end of Grosvenor Street; however, views within the corridor are largely to modern hotels and office buildings including the high-rise towers of Australia Square and National Australia Bank House. Landscape features and views in this area are considered to be of regional sensitivity as they are important to the city of Sydney.
- George Street, between Hunter Street and Bathurst Street, includes a number of important buildings and public domain areas. These include (but are not limited to): the GPO and Bank buildings at Martin Place, the Queen Victoria Building, Sydney Town Hall, and The Strand Arcade. A number of these buildings are State heritage listed and are important to both the city of Sydney and the State as a whole. The landscape features and views in this area are considered to be of State sensitivity.
- George Street, from Bathurst Street to Rawson Place, generally has a slightly lower visual sensitivity. Along much of the CSELR alignment there is a mixed quality of architecture. Historic corner buildings, the Capitol Square Hotel and Central Baptist Church, HSBC high-rise tower and World Square Tower, for example, create visual interest and characterise localised views. The landscape features and views in this area are considered to be of regional sensitivity.
- The landscape and views of Central Railway Station when viewed along the Eddy Avenue elevation are considered to be of State visual sensitivity, as this visually prominent heritage-listed building and Clock Tower are located at the busiest railway station in the State, a main arrival point for Sydney. Elizabeth Street Garden, a landscaped park on the Corner of Eddy Avenue and Elizabeth Street also forms a part of the Central Railway Station grounds, and is identified in the *Central Station Conservation Management Plan* (Department of Public Works and Services 1995) as having high significance as a townscape element. Belmore Park is also an important open space within this landscape view.
- Chalmers Street is considered to have landscape and visual amenity of regional sensitivity as it includes an entry to Central Railway Station, and a plaza containing commemorative statues dedicated to a number of Ibero-American heroes.

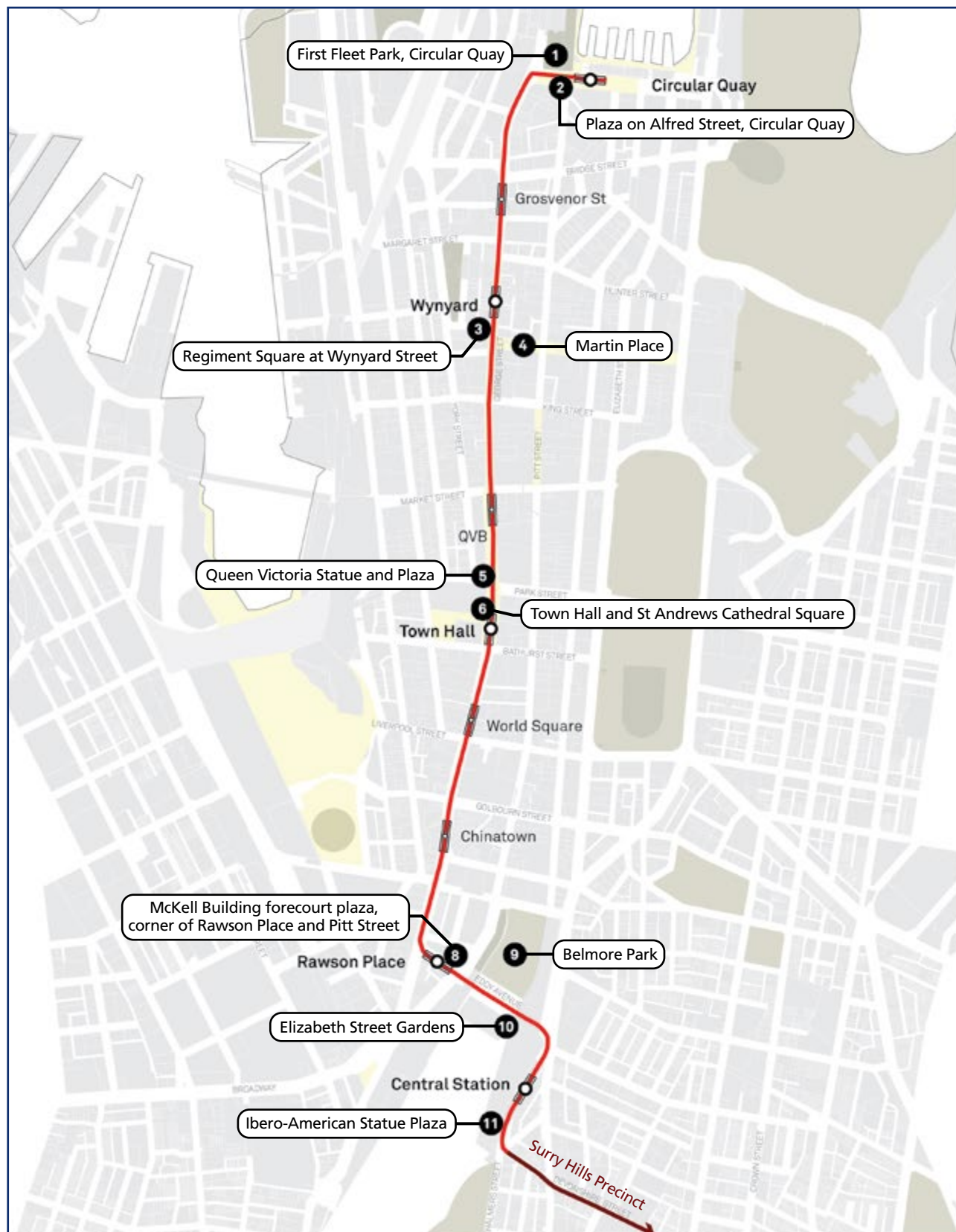
These sensitivity levels were applied throughout the impact assessment for the City Centre Precinct.



12.7.3 Landscape character areas

The landscape character areas within the City Centre Precinct identified as potentially affected by the proposal are shown on Figure 12.17. The impact of the CSELR proposal on these landscape character areas is summarised in section 12.7.5 and section 12.7.6

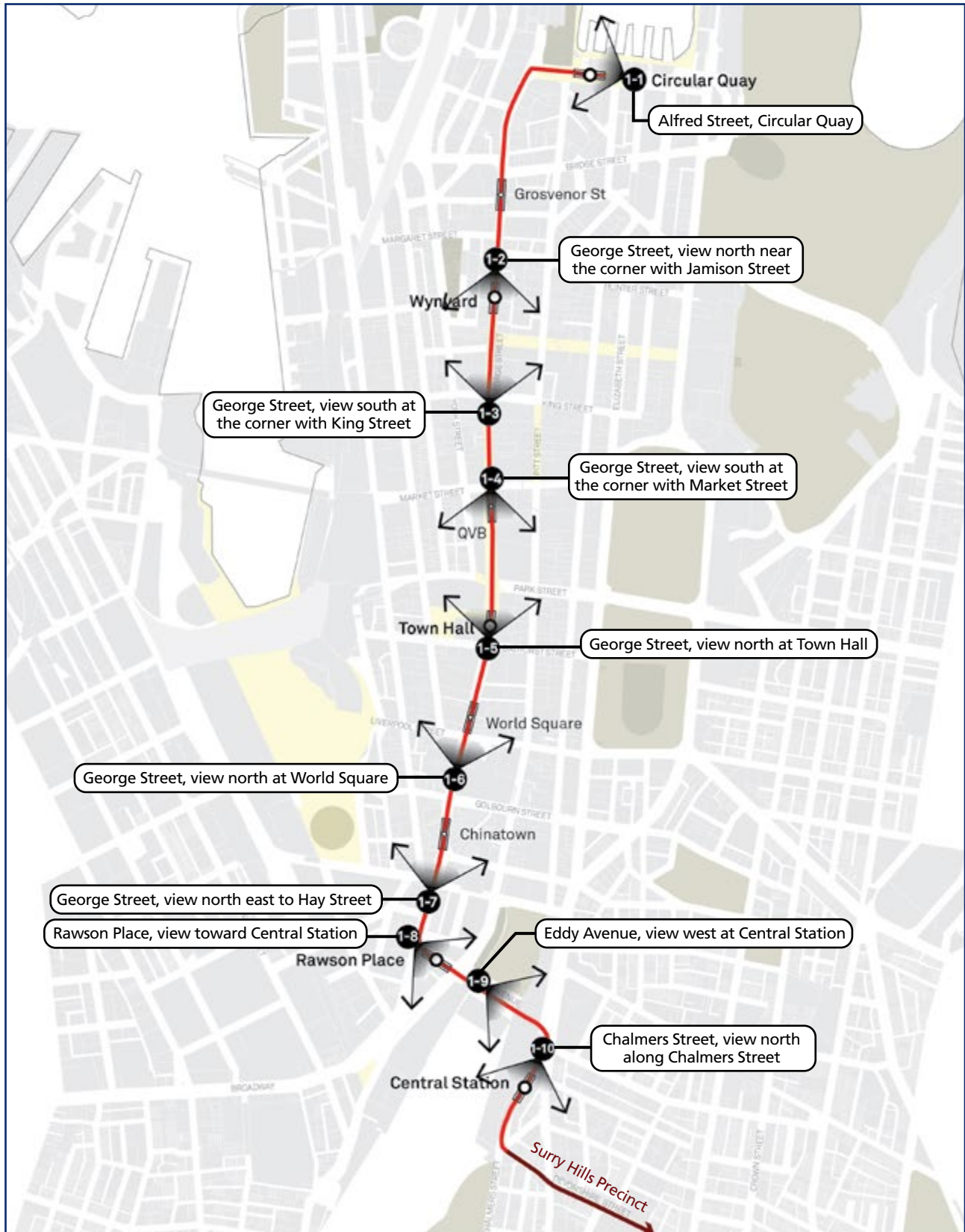
Figure 12.17 City Centre Precinct – Key landscape character areas



12.7.4 Representative viewpoints (daytime)

The viewpoints which were selected as representative of the range of views to the CSELR proposal within the City Centre Precinct are shown in Figure 12.18. The impact of the proposal on these viewpoints is provided in section 12.7.5 and section 12.7.6.

Figure 12.18 City Centre Precinct – Key viewpoints





12.7.5 Impacts during operation

The key visual impacts during operation of the CSELR within the City Centre Precinct would generally include the proposed stops and light rail infrastructure design, including:

- introduction of light rail tracks within the road surface along the length of the CSELR alignment
- creation of an extended plaza area within the vicinity of the Circular Quay stop and the pedestrian zone along George Street between Hunter Street and Bathurst Street
- wire-free charging stations at each of the stops between Circular Quay stop and Town Hall stop
- overhead wiring between Town Hall stop and Central Station stop
- removal of existing street trees along Alfred Street, George Street, Eddy Avenue, and Elizabeth Street
- removal of vehicular traffic (except for the LRVs and cross-streets) along George Street between Hunter Street and Bathurst Street.

Assessment of landscape impacts (daytime)

During operation, significant landscape improvements would be experienced at Town Hall and St Andrews Cathedral Square due to the pedestrianisation of George Street and public realm improvements. These improvements are generally compatible with the City of Sydney's vision for George Street and future plans for an expanded square for Sydney's Town Hall. The overhead wire-free running along the George Street pedestrian zone and at Circular Quay is considered to be consistent with the *Circular Quay Strategic Framework* (Sydney Harbour Foreshore Authority 2013). At Central Railway Station, a highly adverse landscape impact would be experienced at the Elizabeth Street Gardens which form a setting for the historic station bridges.

A summary of the potential landscape impacts of the CSELR proposal during operation is provided in Table 12.34.

Table 12.34 City Centre Precinct – Assessment of landscape impacts (operation)

LANDSCAPE CHARACTER (REFER FIGURE 12.17)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
1. First Fleet Park, Circular Quay	High beneficial landscape impact	• During operation, the function of this plaza would be improved to suit the needs of the community and surrounding site uses. • Relationships with surrounding buildings such as the Museum of Contemporary Art and footpath continuity would be improved with complex levels simplified. Although it is expected that some mature trees would be removed, the overall form and function of the park would be updated.
2. Herald Plaza on Alfred Street, Circular Quay	High beneficial landscape impact	• The function of this plaza would be maintained and improved during operation of the proposal. Building thresholds and entries and footpath continuity would not be adversely affected and although there would be a number of mature trees removed, the overall size of the plaza would be increased. • LRVs would be seen approaching, departing and stationary at the stop and would be somewhat similar to the character of the existing transport network which characterises this area.
3. Regimental Square at Wynyard Street	Negligible landscape impact	• There would not be any change in the character or function of this square during operation. • Building thresholds and entries and footpath continuity would be restored and it is not expected that any trees would be removed.
4. Martin Place	High beneficial landscape impact	• The function of this plaza would be maintained during operation. Any impacts on building entries and footpath continuity, occurring during construction, would be restored and it is not expected that any trees would be removed. • As George Street would be pedestrianised at this point, this would somewhat expand the plaza and improve pedestrian connectivity at its western end.

Table 12.34 cont.

LANDSCAPE CHARACTER (REFER FIGURE 12.17)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
5. Queen Victoria Statue and Plaza	High beneficial landscape impact	- The function of this plaza would be maintained during the operation of the proposal. Any impacts on building entries and footpath continuity occurring during construction would be restored. - As George Street would be pedestrianised in this area, this would essentially expand the plaza, reduce visual clutter around this intersection and improve the statue's prominence at the forecourt to the Queen Victoria Building (QVB). - The CSELR proposal would provide improvements to the quality of the public realm overall as new pavements and street furnishings are installed. These changes are compatible with the surrounding urban landscape.
6. Town Hall and St Andrews Cathedral Square	Very high beneficial landscape impact	- The function of this plaza would be maintained and improved during operation of the proposal. Currently this space sits adjacent to the Town Hall, and the visual prominence of this important building to the City is understated due to the visual and physical clutter of the busy traffic on George Street. - Any impacts on building entries and footpath continuity during construction would be restored and George Street would become pedestrianised, creating an expanded plaza and more functional gathering space and forecourt to Town Hall. - The CSELR proposal would provide improvements to the quality of the public realm overall as new pavements and street furnishings are installed.
7. Street trees on George Street	Moderate to high beneficial landscape impact	- During operation, where tree impacts cannot be mitigated through design elements or feasibly avoided, Transport for NSW would replace trees removed in accordance with the Transport for NSW's 'Vegetation Offset Guide' (2013d) (refer to section 12.6 for details). - Although the existing mature trees would be replaced with smaller, younger trees, this planting would contribute considerably to the proposed new boulevard planned to extend along the full length of George Street.
8. McKell Building forecourt plaza, corner of Rawson Place and Pitt Street	Negligible landscape impact	- The function of this plaza would be maintained during operation of the proposal. - There is a gradual rise along Rawson Place from George Street to Eddy Avenue and the development of the stop would require the installation of a number of ramps and handrails to maintain pedestrian accessibility. As a result, there may be some adverse effect on building thresholds and entries as well as some additional clutter. - The removed street trees would be replaced in accordance with the Transport for NSW's 'Vegetation Offset Guide' (2013d).
9. Belmore Park	Negligible landscape impact	The function of this plaza would be restored for the operation of the proposal. As a result, there may be some improvements to the park as new planting and lawns would be implemented in accordance with the Transport for NSW's 'Vegetation Offset Guide' (2013d).
10. Elizabeth Street Gardens	High adverse landscape impact	- The function of the park would be changed as the size of the garden would be reduced by about 230 square metres, and there would be a loss of four mature trees. This park is within the curtilage of Central Railway Station, and provides a green setting for the sandstone bridge. - The overall public realm upgrade would restore the remaining parkland and pedestrian connections.



Table 12.34 cont.

LANDSCAPE CHARACTER (REFER FIGURE 12.17)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
11. Ibero-American Statue Plaza	Negligible landscape impact	- The function of the Ibero-American statue plaza would be improved with a range of public realm works during operation. - Two of the existing Ibero-American statues would be relocated within the plaza site, however the statue plaza would not be removed as part of the CSELR proposal. - The size of the plaza would also be reduced by a total of approximately 900 square metres. Whilst the loss of some area of the plaza would occur (due to the required space for tracks and platforms associated with the Central Station stop), it is not anticipated that this loss, given the urban environment in which it is located, would impact on the overall setting of the Ibero-American Statue Plaza. - Additionally, approximately 30 existing trees would be removed. - However, the overall public domain upgrade would restore the setting of the statues with higher quality design and materials and introduction of a small number of new street trees.

Source: Based on Technical Paper 10 – Visual and Landscape Assessment, Volume 5

Assessment of representative viewpoints (daytime)

During operation, the CSELR proposal would generally contribute to improving existing viewpoints within the City Centre Precinct, including viewpoints to existing and proposed public spaces. This would particularly occur along the sections of George Street that are proposed to be pedestrianised, through the removal of traffic in this area and the creation of new plazas which would focus viewpoints on key buildings within the City Centre Precinct. The revitalisation of these spaces has previously been discussed in section 5.2.8 of this EIS.

A summary of the potential daytime visual impacts of the CSELR proposal on representative viewpoints during operation is provided in Table 12.35.

Table 12.35 City Centre Precinct – Assessment of representative viewpoints (operation)

VIEWPOINT (REFER TO FIGURE 12.18)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
Alfred Street, Circular Quay (View 1-1)	High beneficial visual impact	- Traffic would be removed from this view and the site would be pedestrianised (refer to Figure 12.19). The interchange stop would be visible in the centre of the view, with LRVs, platforms and a distinctive canopy structure that would extend over the stop. - Existing plaza trees would be replaced, although these would be of smaller size and maturity to the existing trees seen currently in this view, and would have a minor impact on the exiting view of the existing plaza adjacent to Alfred Street whilst the replacement trees mature. The proposed revitalisation of this areas and the creation of an improved public square in this location would however provide an overall improvement to this viewpoint. - LRVs would have a visual envelope extending for up to 45 metres, and would be visually prominent due their length, scale and design.

Table 12.35 cont.

VIEWPOINT (REFER TO FIGURE 12.18)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
George Street, view north near the corner with Jamison Street (View 1-2)	Negligible visual impact	- In this view the traffic would be removed and a wire-free light rail corridor would be located centrally in George Street. - The Grosvenor Street stop would be central to the view and include catenary structures and wires over the full length of the stop platform area, returning some overhead visual clutter at street level. - LRVs would be seen moving through this view, approaching and departing as well as stationary at the stop. - LRVs would be visually prominent due their length, scale and design. As a part of the proposal, the existing street trees would be removed and replaced in accordance with the Transport for NSW's 'Vegetation Offset Guide' (2013d). - Beyond the stop, the light rail would be wire-free and add minimal elements to the view.
George Street, view south at the corner with King Street (View 1-3)	Very high beneficial visual impact	- In this view the traffic would be removed and a wire-free light rail corridor would be located centrally in George Street. The visual clutter created by the traffic would be removed and a high quality urban plaza space would be developed from building edge to building edge. This would result in an overall improvement to the viewpoint of this new public space. - LRVs would be visually prominent due their length, scale and design. It is expected that in the future street trees would be introduced in general accordance with the City of Sydney's vision for George Street.
George Street, view south at the corner with Market Street (View 1-4)	Very high beneficial visual impact	- In this view the traffic along George Street would be removed and a wire-free light rail corridor would be located centrally in George Street. Traffic along Market Street would be retained, crossing George Street in the foreground of the view. This would result in an overall improvement to the viewpoint of this new public space. - The Town Hall stop would be located in the middle ground of the view, beyond the intersection, which would include catenary and overhead wires along the length of the platform. - The visual clutter created by existing traffic would be removed and a high quality urban plaza space would be developed from building edge to building edge. - Views to the façade of the QVB would be opened up as the street becomes essentially a forecourt to the building. There would, however, be some clutter created by the stop and overhead wires at the Queen Victoria Building stop and the LRVs that would be seen moving north and south along the corridor, and station and at the stop.
George Street, view north at Town Hall (View 1-5)	Very high beneficial visual impact	- In this view the traffic would be removed and a wire-free light rail corridor would be located centrally in George Street. A stop would be located in the centre of the view with a catenary structure and overhead wires located along the length of the station platforms. These elements would not obstruct views to the Town Hall façade and clock tower. This would result in an overall improvement to the viewpoint of this new public space. - LRVs would be visually prominent due their length and scale. However, the visual clutter created by existing traffic would be removed and a high quality urban plaza space would be developed across George Street. This new area of pedestrianised public realm would allow for new viewing locations to appreciate the Town Hall façade and clock tower that are currently constrained to the adjacent footpaths.



Table 12.35 cont.

VIEWPOINT (REFER TO FIGURE 12.18)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
George Street, view north at World Square (View 1-6)	High adverse visual impact	- In this view the traffic would be reduced to one northbound and one southbound lane. The rail corridor would follow the centre of George Street with catenary structures and overhead wires visible above. - World Square stop would take the form of an island platform and would become the dominant feature of the view (refer to Figure 12.20). The stop would add additional visual clutter at street level, created by the platform, crossings and roadside barriers all located within this relatively narrow corridor. - LRVs would be visually prominent due their length and scale and would be seen stopping at the station. Whilst there would be a reduction in traffic lanes, the introduction of this stop would create additional visual clutter at street level. - As a part of the proposal, the existing street trees would be removed and replaced in accordance with the Transport for NSW's (2013d) 'Vegetation Offset Guide'.
George Street, view north-east to Hay Street (View 1-7)	Negligible visual impact	- In this view, the existing light rail network would be seen running across the view, centrally along Hay Street, including catenary structures and overhead wires. These elements would not be visually prominent unless an LRV is passing. In this view, the rail corridor would run down the centre of George Street with wires overhead and two lanes of traffic would be retained. - LRVs would be visually prominent due their length and scale. At the intersection, in the middle ground of the view, there would be a junction with the existing light rail, where there would be two eastbound turns. Whilst there would be a reduction in traffic lanes, the introduction of elements such as platforms, overhead wires and potential roadside barriers would create additional visual clutter at street level. - The catenary and wires would not be visually prominent as they would mainly be seen against adjacent multi-storey buildings and would visually merge into the background. - As a part of the proposal, the existing street trees would be removed and replaced in accordance with the Transport for NSW's (2013d) 'Vegetation Offset Guide'.
Rawson Place, view toward Central Railway Station (View 1-8)	Moderate adverse visual impact	- In this view, the rail corridor would run down the southern edge of Rawson Place with catenary structures and wires overhead and two bus lanes located at the east, reducing to one turning lane along the northern side. The interchange stop would have a visually interesting roof structure covering the entire stop. This structure would intervene in views to the bridges which are currently the focal point from this view. The stop would also require the development of a number of ramps, walls and barriers that would create visual clutter at street level. - LRVs would be seen moving through this view, approaching and departing as well as stationary at the stop. LRVs would be visually prominent in the landscape due their length, scale and design. The existing street trees would be removed and replaced in accordance with the Transport for NSW's (2013d) 'Vegetation Offset Guide'. - Whilst there would be a removal of traffic lanes, the introduction of elements such as the canopy, platforms, overhead wires, roadside barriers, ramps etc. would create additional visual clutter at street level. The addition of these elements would have some adverse impacts to viewpoints as the proposed canopy would generate a barrier for existing views along Rawson Place.

Table 12.35 cont.

VIEWPOINT (REFER TO FIGURE 12.18)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
Eddy Avenue, view west at Central Railway Station (View 1-9)	Negligible visual impact	- In this view, the 10 lanes would be redistributed to dedicated lanes for general use, dedicated bus lanes, and three light rail lines all in parallel, with the rail platform aligned parallel and adjacent to the station building. - The stop development would also require minimal changes to the surrounding public realm and open space. There is no opportunity for the introduction of trees into this area. - LRVs would be visually prominent in the landscape due to their length, scale and design. The overall width and general character of this view would be visually similar to that which currently exists. There would be the addition of catenary structures and overhead wires; however, these should be visually absorbed into this complex view.
Chalmers Street, view north along Chalmers Street (View 1-10)	Negligible visual impact	- In this view three vehicle lanes and one bus lane would be reduced to one lane dedicated to traffic, one dedicated light rail and one shared light rail /traffic lane with an island platform stop. The alignment of the light rail and stop would require the loss of street trees on both sides of Chalmers Street as well as trees at the intersection of Randle, Chalmers and Devonshire streets. - LRVs would be seen moving north and south along the corridor, and stationary at the stop, with the potential for numerous LRVs to be seen in this location at the same time (refer to Figure 12.21). LRVs would be visually prominent in the landscape due their length and scale. The overall width and general character of this view would be visually more urban and less green than what currently exists. - Overall, the loss of street trees would result in a reduction of visual amenity. Introduction of elements such as the canopy structure, platform and overhead wires would create additional visual clutter, thereby resulting in some adverse impact to the existing views experienced from this public space/plaza. However, given the existing bus canopies and other infrastructure currently in this view, the overall change to this viewpoint is expected to be negligible.

Source: Based on Technical Paper 10 – Visual and Landscape Assessment, Volume 5

Assessment of night-time visual impacts

During operation, the CSELR proposal would introduce lit LRVs and stops to an area that is currently occupied by a highly trafficked roadway. LRVs would be seen moving along the alignment at regular intervals with headlights which are generally the same size, breadth and brightness as standard car headlights. The LRVs would also include illuminated carriage windows. The stops proposed at Circular Quay, Grosvenor Street, Wynyard, Queen Victoria Building, Town Hall, World Square, Chinatown, Rawson Place and Central Station would be brightly lit to ensure user safety.

During operation, there would be lighting at the light rail stops as well as headlights on the LRVs following the alignment. In locations where there are bends and corners in the CSELR alignment, headlights may be directed into adjacent properties, and from each of the stops into the adjacent properties. Currently, vehicle lights point in the same direction from cars, buses, and trucks. The LRVs would constitute a broader but less frequent, more predictable light source than the existing vehicle headlights. It is not expected that there would be any noticeable increase in skyglow (the illumination of the night sky or parts of it, typically as a result of artificial light) as a result of the proposal.

Generally, as this is an area of high district brightness, these elements would not create a noticeable reduction or improvement in amenity and would result in a negligible visual impact for the precinct overall during evening hours.



Figure 12.19 Indicative view looking north-west towards Circular Quay stop



Figure 12.20 Indicative view looking south at the corner of George Street and Liverpool Street to the south of World Square stop



Figure 12.21 Indicative view looking south towards Central Station stop



12.7.6 Impacts during construction

Construction of the CSELR proposal in the City Centre Precinct would require works including utility relocations, intersection modifications, track slab construction and other systems works (installation of wiring etc.). As part of the works, some sections of streets and footpaths would be closed to pedestrians and general traffic (refer to section 12.3). Civil and systems works would include construction of the track slab and rail installation. Track construction would occur in linear sections between intersecting streets, with the intersections constructed separately during weekends and week nights.

Each section would be established as a site with traffic lanes diverted, temporary hoardings and barriers. During this time, construction equipment such as slip track machinery, cherry pickers, mobile cranes and trucks would be seen within the precinct. A series of construction compounds would also be located within the City Centre Precinct including at Circular Quay, the George Street pedestrian zone and Belmore Park. Further detail regarding the proposed construction of the CSELR proposal is provided in Chapter 6.

Assessment of landscape impacts (daytime)

During construction there would be very high adverse landscape and visual impacts at First Fleet Park, Martin Place and Belmore Park due to the high sensitivity of these locations. Impacts during construction would be primarily derived from tree loss and the scale of the works being undertaken.

A summary of the potential landscape impacts of the CSELR proposal in the City Centre Precinct during construction is provided in Table 12.36.



Table 12.36 City Centre Precinct – Assessment of landscape impacts (construction)

LANDSCAPE CHARACTER (REFER TO FIGURE 12.17)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
1. First Fleet Park, Circular Quay	Very high adverse landscape impact	- The worksite would be enclosed by hoardings and would be accessed by heavy trucks and machinery. This would displace the users of the park for the duration of construction and impact the functionality of this area of the Quay. - The flow of pedestrian movement around Circular Quay would also be impacted although circulation around the site would be maintained; some visual connectivity with the Sydney Opera House and legibility in this precinct is likely to be reduced.
2. Herald Plaza on Alfred Street, Circular Quay	High adverse landscape impact	- A large portion of the existing plaza would be required for construction, requiring the removal of the existing trees, Tank Street Fountain water feature and plaza furnishings. The worksite would be enclosed by hoardings. - It is likely that the flow of pedestrian movement across Alfred Street would be diverted around the site, so that some visual connectivity and legibility in this precinct may be impacted - Users of this plaza would be displaced and visual softening afforded by the mature vegetation lost.
3. Regimental Square at Wynyard Street	Moderate adverse landscape impact	- Regimental Square and the Vietnam War Memorial would not be impacted directly by the proposal. However, when construction works are occurring on George Street, adjacent to the square, much of George Street would become a construction site. - It is likely that the flow of pedestrian movement accessing the square from the east would be diverted so that some visual connectivity and legibility in this precinct may be impacted.
4. Martin Place	Very high adverse landscape impact	- A substation would be located underground at the western end of the plaza. This would displace users and may alter building access, circulation and the type of activities that can occur within the plaza. - When construction works are occurring on George Street, adjacent to Martin Place, much of the street would become a construction site. It is likely that the flow of pedestrian movement accessing Martin Place from the west would be diverted around the site, so that some visual connectivity and legibility in this precinct may be impacted.
5. Queen Victoria Statue and Plaza	High adverse landscape impact	- The statue and plaza are not expected to be impacted directly. However, when construction works are occurring on George Street much of the street would become a construction site, enclosed by hoardings. - It is likely that the flow of pedestrian movement around the QVB and this plaza space would be altered to divert around the construction site. In this case some visual connectivity and legibility of this plaza space may be impacted.
6. Town Hall and St Andrews Cathedral Square	High adverse landscape impact	- This plaza is not expected to be impacted directly. However, when construction works are occurring on George Street, adjacent to this plaza, much of the street would become a construction site, enclosed by hoardings. - It is likely that access to the plaza, Town Hall and Town Hall Railway Station may be impacted as the flow of pedestrian movement is diverted around the construction site. In this case some visual connectivity and legibility of this plaza space may be impacted.

Table 12.36 cont.

LANDSCAPE CHARACTER (REFER TO FIGURE 12.17)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
7. Street trees on George Street	High to Moderate adverse landscape impact	On George Street, street trees are located between Alfred Street and Hunter Street; and then between Bathurst Street and Rawson Place. During construction, a number of trees along George Street would be removed (refer to section 12.6.2).
8. McKell Building forecourt plaza, corner of Rawson Place and Pitt Street	Moderate adverse landscape impact	- The McKell building forecourt plaza would not be directly impacted by the proposal during construction. However, much of Rawson Place would become a construction site as an interchange and stop is developed in this location. This would require the removal of the existing semi-mature street trees located on Rawson Place. - The construction site would be enclosed hoardings and it is likely that the flow of pedestrians along and through Rawson Place would be diverted around the worksite and access to the plaza may be altered. - Views from this elevated plaza and the general amenity for users would be impacted as its southern boundary becomes a construction site.
9. Belmore Park	Very high adverse landscape impact	- Belmore Park would be directly impacted by the proposal during construction. A large area of the park, adjacent to Hay Street, would become a construction site supporting the southern CBD City Centre Precinct works. It is likely that to accommodate this worksite some park users would be displaced and activities suitable for this area of the park would change. - The site would be enclosed by fencing, and heavy vehicles and machinery would access the site from Hay Street. It is likely that pedestrian movement would be diverted around the site so that the connectivity and legibility of this precinct would be impacted.
10. Elizabeth Street Gardens	High adverse landscape impact	- Part of this pocket park would be incorporated into a worksite for construction of the proposal. - Users of this park would be displaced and the flow of pedestrian movements along Chalmers Street would be diverted around the site, so that visual connectivity and legibility of footpaths to Eddy Avenue and Elizabeth Street would be impacted. - Four trees would be removed from this park during construction.
11. Ibero-American Statue Plaza	Moderate adverse landscape impact	- Part of the plaza and forecourt entrance to Central Railway Station would be used to accommodate a site compound for a substation. Following this, a portion of the plaza would be incorporated into a worksite for construction of the proposal, surrounded by hoarding. - This work is likely to both directly and indirectly affect the quality of this landscape with the flow of pedestrian movements along Chalmers Street in this location diverted away from the site. The plaza would however be restored retaining the exiting statues following the construction of the Central Station stop and removal of the temporary construction compound.

Source: Based on Technical Paper 10 – Visual and Landscape Assessment, Volume 5



Assessment of representative viewpoints (daytime)

During construction, the CSELR proposal would generally result in adverse impacts to existing viewpoints within the City Centre Precinct, arising from removal of existing trees, the creation of worksites surrounded by hoardings, channelling of views along footpaths (which would block views to the lower levels of buildings), and the general movement of plant and equipment (which would intermittently impact existing views).

A summary of the potential daytime visual impacts of the CSELR proposal on representative viewpoints in the City Centre Precinct during construction is provided in Table 12.37.

Table 12.37 City Centre Precinct – Assessment of representative viewpoints (construction)

VIEWPOINT (REFER TO FIGURE 12.18)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
Alfred Street, Circular Quay (View 1-1)	Very high adverse visual impact	- The view of this public space would change as service relocations begin, and the existing mature trees are removed. This impact would be more substantial as the view becomes focused on a construction worksite which would extend across the view. - The site would be enclosed by hoardings, restricting visibility around the site. - The scale and mass of the worksite are not visually consistent with the character of this area and surrounding urban landscape of Circular Quay. Overall, the view would be less green and involve a more constrained public realm.
George Street, view north near the corner with Jamison Street (View 1-2)	High adverse visual impact	This view would change as construction works are undertaken. The worksite would comprise much of the ground plane of the view and block views to the lower levels of buildings on George Street, channelling views along the footpath.
George Street, view south at the corner with King Street (View 1-3)	Very high adverse visual impact	- This view would change as construction works are undertaken. These impacts would be more substantial as the view becomes focused on a construction worksite, undertaken as intersection works and inter-block works. The worksite would be surrounded by hoardings which would channel views along the footpaths, and block views to the lower levels buildings. - The hoarding would also enclose the footpath, and block sunlight into these areas, which would become dark and heavily shaded.
George Street, view south at the corner with Market Street (View 1-4)	Very high adverse visual impact	- This view would change substantially as construction works are undertaken which would be undertaken consecutively as intersection works and inter-block works. The changes to the view are not visually consistent with the character of this area and surrounding urban landscape of George Street. - The hoardings that would surround the worksites would obscure and limit views to the QVB building facade.
George Street, view north at Town Hall (View 1-5)	Very high adverse visual impact	- This view would change as construction works are undertaken. Traffic along Bathurst Street would be retained, crossing George Street in the foreground of the view. - Impacts would increase as the view becomes focused on a construction worksite during the civil works phase, which would be undertaken consecutively as intersection works and inter-block works. Changes to the view are not visually consistent with the character of this area and surrounding urban landscape of George Street. - The worksite hoarding would extend across the view, obscuring and limiting views to the QVB in the background, and Town Hall building façade. The clock tower, however, is likely to be visible protruding above the worksite.
George Street, view north at World Square (View 1-6)	High adverse visual impact	- This view would change as the traffic is removed and the view becomes focused on a construction worksite. The early works and civil works phases would be divided into intersection works and inter-block works, undertaken separately and consecutively. - Following the corridor civil works phase the World Square Stop would be constructed, visible in the middle ground of the view. - The hoardings that would surround the worksites would obscure and limit views across the street.

Table 12.37 cont.

VIEWPOINT (REFER TO FIGURE 12.18)	POTENTIAL IMPACT	ASSESSMENT OF IMPACT
George Street, view north-east to Hay Street (View 1-7)	High adverse visual impact	- This view would change considerably as the traffic is removed and the view becomes focused on a construction worksite. The early works and civil works phases would be divided into intersection works and inter-block works, undertaken separately and consecutively. - These changes to the view are not visually consistent with the character of this area and surrounding urban landscape of George Street. The existing light rail network would remain open during much of this time; however, this corridor would be used as the main access for the worksites along George Street so that construction traffic would be seen more frequently in this view.
Rawson Place, view toward Central Railway Station (View 1-8)	High adverse visual impact	- The view of this public space would change considerably as traffic is removed from Rawson Place and the site is established. The works would then include demolition, utility relocations, civil works and stop construction. - The southern footpath and commercial frontages would remain open, creating a corridor and blocking views to the lower levels of this streetscape. - The twin sandstone rail bridges would largely be obscured; however, the Central Railway Station façade may be seen above the hoarding and construction activities.
Eddy Avenue, view west at Central Railway Station (View 1-9)	Very high adverse visual impact	- This view would change as the bus lanes are relocated so that approximately half of the interstate coach terminal space becomes a construction site. - Views to the twin sandstone rail bridges in the background and façade of the Central Railway Station building would largely be obscured; however the clock tower is likely to be visible above the hoarding and construction activities. This change to the view would remove the prominence of the historic station building.
Chalmers Street, view north along Chalmers Street (View 1-10)	High adverse visual impact	- The view of this public space would change as traffic is removed from Chalmers Street, pedestrian access is diverted, the Central Railway Station entry (at the intersection with Elizabeth Street) is closed, and the site is established. - The works would then include removal of a number of mature trees, utility relocations, civil works and stop construction.

Source: Based on Technical Paper 10 – Visual and Landscape Assessment, Volume 5

Assessment of night-time visual impacts

During construction there are likely to be times where there would be 24-hour use of the construction sites. At these times the sites would include brightly lit areas, providing a safe work environment for construction activities to occur. There would also be headlights from construction-related traffic including trucks accessing the site. It is expected that lighting on the site would be brighter than the current traffic and street lighting; however, additional skyglow would be managed by cut-off light fittings and directed lights for the construction tasks.

Views to the works within the City Centre Precinct would be largely unfiltered by vegetation and in close proximity to adjacent, mainly commercial, properties. This additional lighting would have a visual effect but would be generally compatible with the existing bright and dynamic night scene along George Street. There would be some additional lighting associated with traffic accessing worksites; however, this would be seen in the context of existing busy streets. Overall, these elements would not create a noticeable reduction or improvement in the amenity of an area of high district brightness. This would result in a negligible visual impact for this area during evening hours.



12.7.7 Management and mitigation

A series of mitigation measures have been designed to mitigate the potential visual and amenity impacts of the CSELR proposal during construction and operation. Mitigation measures for the City Centre Precinct are presented in Table 12.38 and Table 12.39.

General mitigation measures for the whole of the CSELR proposal are also presented below.

Table 12.38 City Centre Precinct – Visual and landscape mitigation measures (operation)

MITIGATION MEASURES	APPLICABLE LOCATIONS
All precincts	
Consider options for the overhead wire/catenary system to be an integrated part of the public domain suite of materials in consultation with City of Sydney or Randwick City Council.	All (excluding wire-free areas)
Where possible, catenary should be located with consistent pole types and even spacing.	All
Consider the opportunity to combine several above-ground street elements (lighting, traffic signals etc.) on common use poles to reduce visual clutter, in consultation with the City of Sydney or Randwick City Council as appropriate.	All
At night the strategy for lighting is to ensure the project contributes to a safe and legible streetscape. In particular, the lighting required for the proposal would be mitigated as follows: - all lights would be located at a similar level to the overhead catenary system so to minimise the light spill onto adjacent areas - all lights would be directed downwards, with the exception of feature lighting that would always be capped by a surface material - light colour would be designed in response to the surrounding context and be selected to complement the surrounding lighting colour - Australian Standard levels for public safety and CCTV would be used, so no unnecessary lighting would be required to be provided.	All
City Centre Precinct	
Use semi-mature to mature tree specimens to replace the character of those lost on a 'like for like' basis, in consultation with the City of Sydney and in accordance with the Transport for NSW's (2013d) <i>'Vegetation Offset Guide'</i>.	First Fleet Park; Belmore Park
Reconstruct the plaza to incorporate all statues and restore its setting in consultation with the City of Sydney.	Ibero-American Statue Plaza
Use mature tree specimens to replace the character of those lost on George Street and Chalmers Street on a 'like for like' basis, in consultation with the City of Sydney and in accordance with the Transport for NSW's (2013d) <i>'Vegetation Offset Guide'</i>.	George Street and Chalmers Street
Consider the opportunity to use central poles and combine several above-ground street elements to reduce potential impacts on existing awnings and footpaths, in consultation with the City of Sydney as appropriate.	Rawson Place
Where possible any areas of direct light intrusion (glare and spill) from LRV headlights would be identified and managed.	The corner of George Street and King Street, George Street and Park Street, George Street and Bathurst Street, and other locations where the alignment bends
At stops and stabling areas, cut off and directed light fittings (or similar techniques) would be used to minimise glare and light spill onto private property.	Circular Quay stop, Wynyard stop, Town Hall stop, Grosvenor Street stop, World Square stop, Chinatown stop, Rawson Place stop, Central Station stop and Rawson Place interstate coach terminal

Table 12.38 cont.

MITIGATION MEASURES	APPLICABLE LOCATIONS
City Centre Precinct cont	
Ongoing consultation with the City of Sydney Council, Randwick City Council and other relevant stakeholders would continue to be undertaken throughout the detailed design phase to identify opportunities for revitalisation of existing public spaces and the public domain and to determine the most appropriate form or revitalisation for these areas.	All public spaces

Source: Based on Technical Paper 10 – Visual and Landscape Assessment, Volume 5

Table 12.39 City Centre Precinct – Visual and landscape mitigation measures (construction)

MITIGATION MEASURES	APPLICABLE LOCATIONS
All precincts	
Where feasible and reasonable, the elements within construction sites would be located to minimise visual impacts (e.g. materials and machinery would be stored behind fencing).	All
Lighting of compounds and worksites would be restricted to agreed hours and security needs and in accordance with the construction environmental management plan.	All
Visual mitigation would be implemented as soon as feasible and reasonable, and remain for the duration of the construction period.	All
Regular maintenance of site hoarding and perimeter site areas would be undertaken, including the prompt removal of graffiti.	All
Minimise light spill from the light rail construction corridor into adjacent visually sensitive properties by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.	All
On completion of construction, worksites and other land occupied temporarily would be reinstated to their existing conditions.	All
City Centre Precinct	
Equipment positioning and site access would be away from the forecourt of the Museum of Contemporary Art (MCA) and the Circular Quay area. Restricted work sites would also be used towards the southern part of the Circular Quay work site where possible, locating work sites away from the MCA.	Circular Quay
Avoid any impacts to the heritage listed Tank Stream Fountain in Alfred Street plaza.	Circular Quay
Timing of works should accommodate special events, such as New Year's Eve and Vivid Festival events, where possible.	Circular Quay and plaza on Alfred Street
Identify opportunities for an artistic approach to treatment of site hoardings and enclosures, in collaboration with the MCA. This should include consideration of day and night-time activation of the exterior of the site.	Circular Quay
Identify opportunities for an artistic/historic harbourside narrative approach to the treatment of the site hoardings and enclosures, in collaboration with Customs House.	Plaza on Alfred Street
Position site compounds and construction areas to avoid direct impacts on the structure or use of the Cenotaph.	Martin Place
Time the works to avoid special events, such as Anzac Day given the significance of the Sydney Cenotaph.	Martin Place



Table 12.39 cont.

MITIGATION MEASURES	APPLICABLE LOCATIONS
City Centre Precinct cont	
Position equipment and site access away from the Queen Victoria Statue and Plaza.	Queen Victoria Statue and Plaza
Identify opportunities for an artistic approach to treatment of the site hoardings and enclosures, in collaboration with the City of Sydney. This should include consideration of day and night-time activation of the exterior of the site.	Queen Victoria Statue and Plaza and Town Hall and St Andrews Cathedral Square
Position equipment and site access away from the plaza as far as practicable.	Ibero-American Statue Plaza

Source: Based on Technical Paper 10 – Visual and Landscape Assessment, Volume 5

12.8 Built and non-Indigenous heritage

A detailed historic heritage impact assessment for the CSELR proposal was undertaken by Godden Mackay Logan. A comprehensive technical report is available as Technical Paper 5 – *Heritage Impact Assessment* in Volume 4. A summary of the assessment is provided in the following sections.

12.8.1 Existing conditions

Heritage context and significance

The built heritage environment along the proposed CSELR alignment reflects the evolution and expansion of Sydney from the landing of the first European settlers to the present day. The City Centre Precinct includes a number of built and non-Indigenous heritage features of World Heritage (the Sydney Opera House) or State Significance, with a concentration of State Significant sites around the Circular Quay and George Street areas in the Sydney CBD, reflecting the evolution of the development of the newly established colony (refer to Figures 12.22a and 12.22b).

Moving south along George Street, a high number of significant heritage buildings remain to this day, reflecting the continuing importance of George Street through the 19th and 20th centuries.

Listed heritage items

Some 84 sites or structures within the City Centre Precinct are identified on either the State Heritage Register (SHR) or another heritage register. Key features of the built environment include:

- World Heritage Sites (Sydney Opera House)
- State Significant listed buildings and structures
- locally significant buildings and structures
- significant street trees and collections of street trees.

Detailed descriptions of each feature and the potential impacts to them as a result of the proposal are provided in Technical Paper 5 in Volume 4. Of the 84 items listed, 30 items have been identified as having potential to be directly impacted. These are shown in Figure 12.22a and Figure 12.22b and listed in Table 12.40.

Table 12.40 Directly affected heritage items

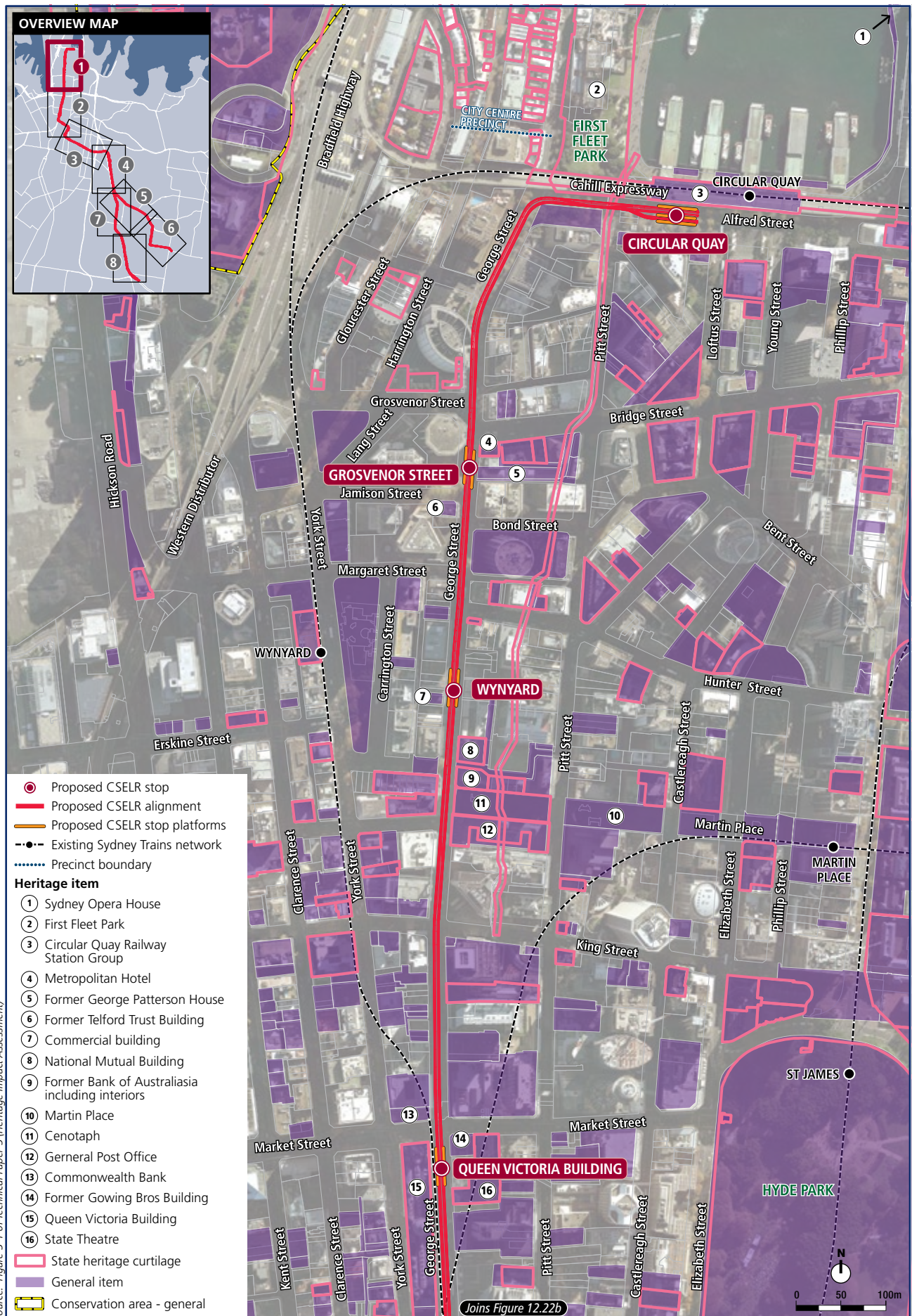
LOCATION REFERENCE (REFER TO FIGURES 12.22A AND 12.22B)	NAME	LISTING ¹
1	Sydney Opera House	World Heritage List
2	First Fleet Park	SHFA S170 Register
3	Circular Quay Railway Station Group	SHR (listing no.01112)
4	Metropolitan Hotel	SHR (listing no. 00663)
5	Former George Patterson House	SLEP 2012 (item no. I1762)
6	Former Telford Trust Building	SLEP 2012 (item no. I1763)
7	Commercial Building	SLEP 2012 (item no. I1767)
8	National Mutual Building	SHR (listing no. 00234)
9	Former Bank of Australasia including interiors	SLEP 2012 (item no. 1772)
10	Martin Place	SLEP 2012 (item no. I1889)
11	Cenotaph, Martin Place	SHR (listing no. 01799)
12	General Post Office	SHR (listing no. 00763)
13	Commonwealth Bank	SLEP 2012 (item no. I1781)
14	Former Gowing Bros Building	SLEP 2012 (item no. I1789)
15	Queen Victoria Building	SHR (listing no. 01814)
16	State Theatre	SHR (listing no. 00446)
17	Sydney Town Hall	SHR (listing no. 01452)
18	St Andrews Anglican Cathedral and Chapter House	SHR (listing no. 01708)
19	Bank of NSW	SHR (listing no. 00080)
20	Former Vine House	SLEP (item no. I1795)
21	Former Bank of Australasia	SLEP (item no. I1796)
22	Century Hotel	SLEP (item no. I1801)
23	King George Hotel (former) and Haymarket Post Office	SHR (listing no. 00615)
24	Palace Hotel complex	SLEP 2012 (item no. I839)
25	Station House	SLEP 2012 (item no. I846)
26	Daking House	SLEP 2012 (item no. I863)
27	Sydney Terminal and Central Railway Station Group	SHR (listing no. 01255)
28	Belmore Park	SLEP 2012 (item no. I825)
28	Belmore Park Significant Trees	City of Sydney Register of Significant Trees 2013 (item no. 8.01)
29	Dental Hospital	SLEP 2012 (item no. I1489)
30	Former Metro Goldwyn Mayer including interior	SLEP 2012 (item no. I1470)

Source: Tables 5.1 and 5.2 in Technical Paper 5 – Heritage Impact Assessment, Volume 4

Note 1: SHFA S170 Register = Sydney Harbour Foreshore Authority Section 170 heritage and conservation register; SHR = NSW State Heritage Register; SLEP 2012 = Sydney Local Environmental Plan 2012.

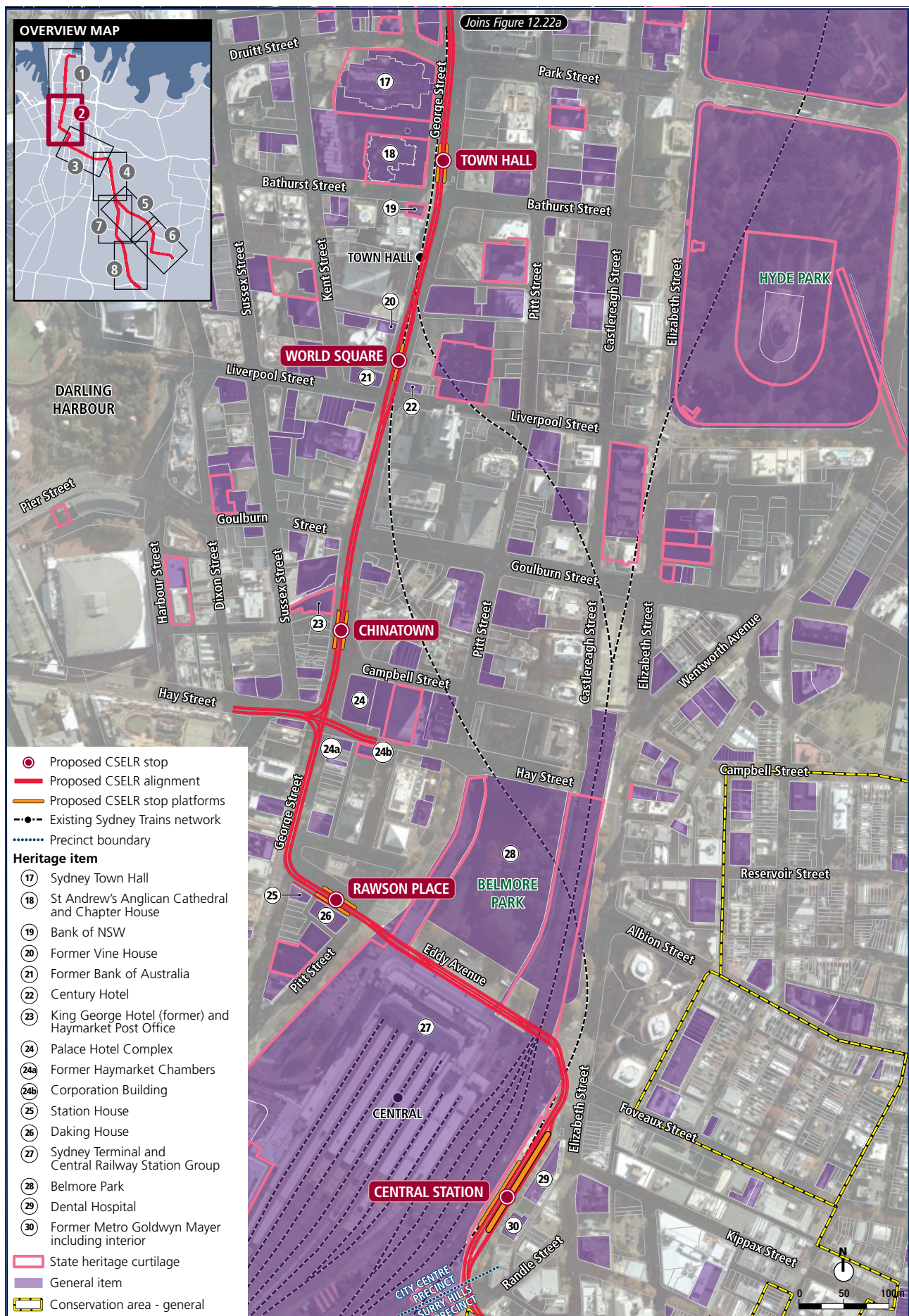


Figure 12.22a Existing built and non-indigenous heritage items – City Centre Precinct



Source: Figure 5-1 of Technical Paper 5 (Heritage Impact Assessment)

Figure 12.22b Existing built and non-indigenous heritage items – City Centre Precinct





Areas of archaeological potential

Three archaeological zones have been developed to respond to known or potential archaeological significance along the proposed CSELR alignment. These zones comprise:

- Zone 1: State significant archaeological resource — known or potential
- Zone 2: Locally significant archaeological resource — known or potential
- Zone 3: No archaeological resource present.

The potential archaeological significance of the corridor of the proposed CSELR alignment within the City Centre Precinct is shown in Figure 12.23a and Figure 12.23b and described in section 4.3 of Technical Paper 5. The CSELR corridor has been divided into a number of discrete Historical Archaeological Management Units (HAMUs). Each unit has been allocated according to the nature of the potential archaeological resource in an area. These units have then been allocated a particular archaeology zoning based on the significance of the potential archaeology. This zoning should allow the varying nature and significance of the archaeological resource to be managed pragmatically and consistently throughout the development of the CSELR proposal.

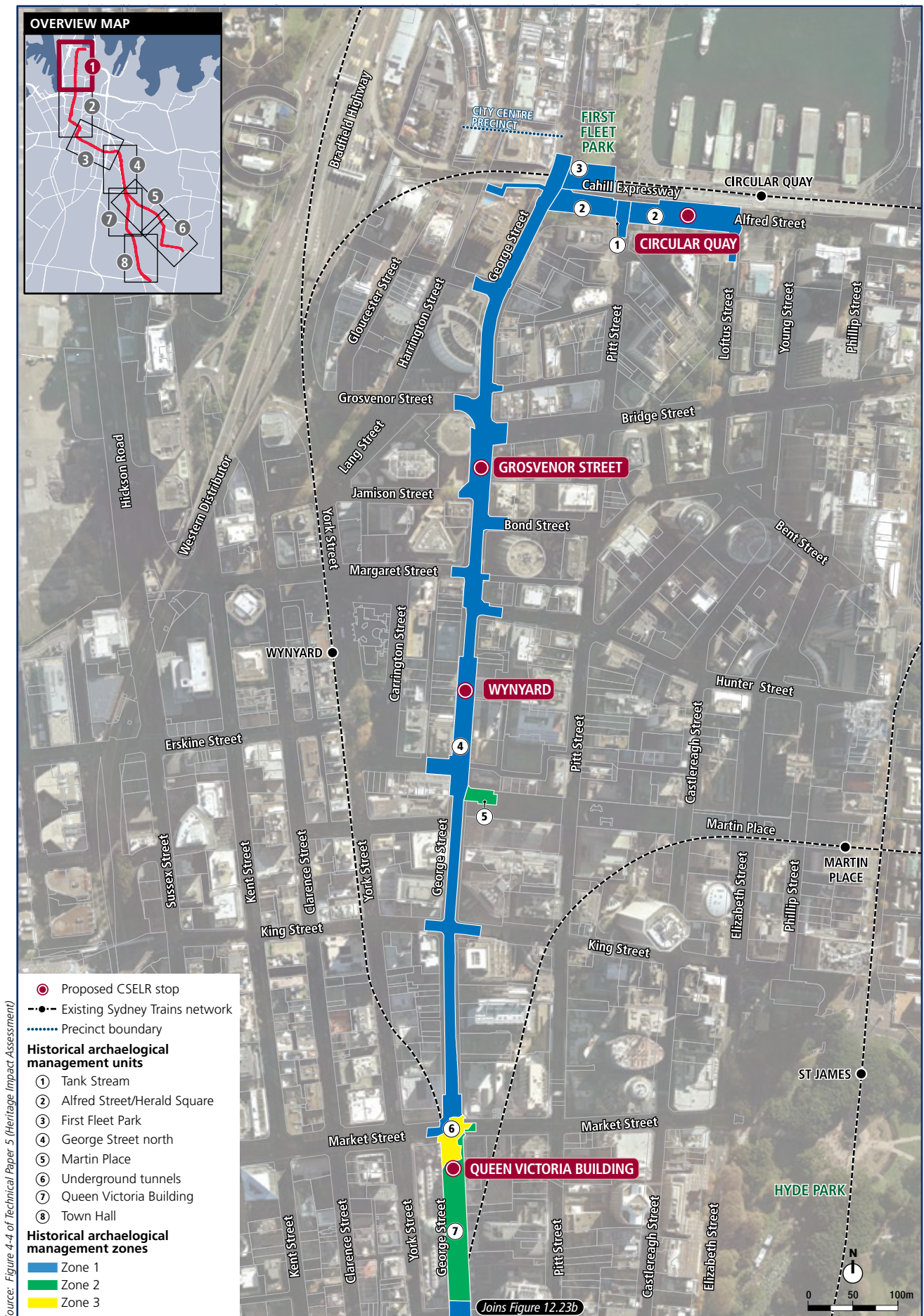
As shown in Figure 12.23a and Figure 12.23b, 14 HAMUs were defined in the City Centre Precinct for the CSELR.

Of the 14 HAMUs identified, the following were defined within the City Centre Precinct as having the potential to contain State significant archaeology:

- Tank Stream HAMU
- Alfred Street/Herald Square HAMU
- First Fleet Park HAMU
- George Street north HAMU
- Town Hall HAMU
- Belmore Park HAMU
- Eddy Avenue HAMU
- Chalmers Street HAMU.

Table 12.41 provides a description of the above listed HAMUs in the City Centre precinct. In addition, there is a potential for archaeological remains of Local significance to be present within all of the HAMUs, except where archaeological remains have been removed by previous extensive ground disturbance (i.e. during the construction of underground structures such as the pedestrian underpasses in George Street).

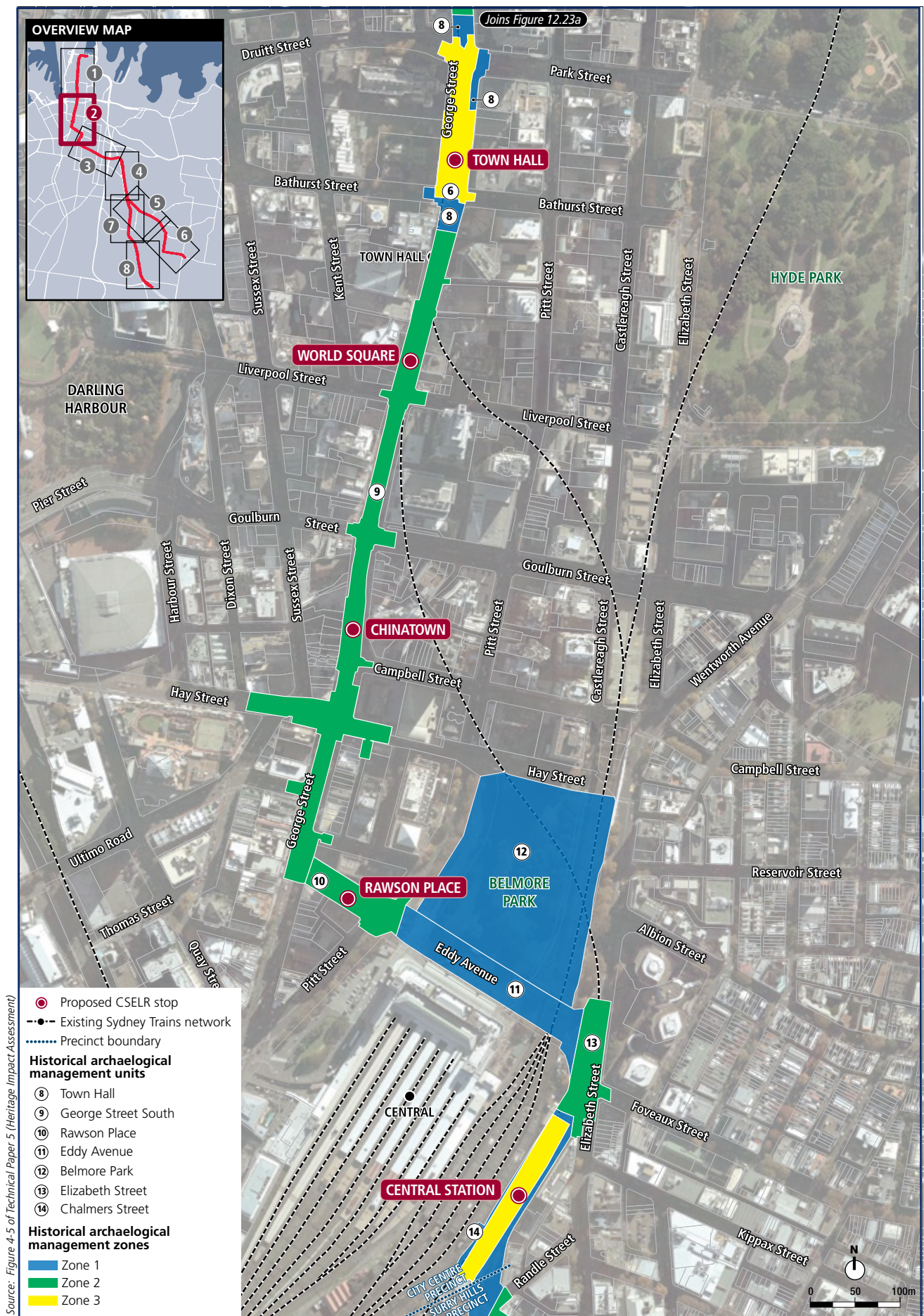
Figure 12.23a Draft HAMUs – City Centre Precinct



Source: Figure 4-4 of Technical Paper 5 (Heritage Impact Assessment)



Figure 12.23b Draft HAMUs – City Centre Precinct



Source: Figure 4-5 of Technical Paper 5 (Heritage Impact Assessment)

Table 12.41 Description of HAMUs in the City Centre Precinct

HAMU	LISTING	DESCRIPTION OF HAMU
Tank Stream	SHR- Item #00363 Sydney Water S170 Register- Tank Stream Stormwater Channel No.29 - Item #4573709 SLEP 2012- Tank Stream including tunnels and tanks-I1656	The section of the Tank Stream in the vicinity of the CSELR alignment is described in the Tank Stream <i>Conservation Management Plan</i> (Sydney Water 2005) as dating to 1860. Prior to the construction of this section in 1860, other works associated with the Tank Stream were linked to the construction of Semi-Circular Quay in the 1850s. This required the Tank Stream to be extended north of Bridge Street. The archaeological evidence of the Tank Stream has the potential to contain deposits that can contain information about pre-human and pre-urban environments in Sydney. The fabric enclosing the watercourse demonstrates one of the most comprehensive collections of hydrological technology in Australia. The sections of the former Tank Stream south of King Street that survive have the potential for retaining evidence of the earliest periods of its human use, although this is likely to have been severely compromised by development. The swampy source of the stream may provide evidence of past environmental conditions.
Alfred Street/ Herald Square	No listings specifically reference significance of potential historical archaeological resource	There is low to moderate potential for archaeological evidence of State significance to be present including: - archaeological evidence of the natural environment, including original soil profiles or natural landforms, such as the shoreline of Sydney Cove - evidence of early 19th Century development on the east side of George Street, including structural remains (brick/stone/wooden foundations), postholes, yard/work surfaces, underfloor deposits etc. - evidence of maritime industries undertaken on Sydney Cove/Tank Stream foreshore including structural remains of wharves and jetties, yard/work surfaces and artefact scatters/rubbish pits. There is also high potential for archaeological evidence of Local significance to be present.
First Fleet Park	SHR- Sydney Cove West Archaeological Precinct- Item #01860 SHFA S170 Register- First Fleet Park	The archaeological potential of First Fleet Park has been assessed as high. Extant remains are likely to include early to late 19th Century residential and commercial premises, seawall, and features associated with Queens Wharf. The archaeological resource is likely to yield information about the early colony and its development not available from other sources. These types of remains are also part of the history of the harbour and reflect the growing importance of the port of Sydney from the 1830s onwards. Given the proximity of the George Street footpath/road corridor immediately to the west of the First Fleet Park boundary, it is assumed for the purposes of this assessment that the historical archaeological potential for this area is similar to that of First Fleet Park itself.
George Street North	No listings specifically reference significance of potential historical archaeological resource within the road corridor, although the <i>Central Sydney Archaeological Zoning Plan 1992</i> assumes all roadways to have historical archaeological potential	Potential historical archaeological evidence of historical significance may include: - early 19th Century drains crossing George Street - early 19th Century residence and retail premises fronting George Street, particularly where George Street has been widened - macadam and woodblock paving along the length of George Street north - metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Some of these sites may have been previously disturbed by installation of services, construction of roadways and paths, and installation of the earlier tram network. Archaeological investigations in the late 1990s indicated that some remains were present below road base fills.



Table 12.41 cont.

HAMU	LISTING	DESCRIPTION OF HAMU
Town Hall	No listings specifically reference significance of potential historical archaeological resource within the roadway close to Town Hall, although the <i>Central Sydney Archaeological Zoning Plan 1992</i> assumes all roadways have historical archaeological potential	There is low potential for outlying burials associated with the old Sydney Burial Ground (pre 1820) that were not exhumed or destroyed during the construction of the Town Hall. There is low-moderate potential for historical archaeological remains of Local significance to be present including: - early alignment of George Street, such as sandstone kerbs, drains, early road surfaces - evidence of 19th Century services such as drains, sewerage, eater and gas services constructed of stone, brick, ceramic, metal or wood. - metal tracks and wooden sleepers in the centre of George Street, associated with the George Street tram line. Archaeological resources in this zone may be highly disturbed or destroyed by the large scale earthworks undertaken for the construction of the Town Hall and associated underground tunnels.
Belmore Park	Belmore Park is identified on the <i>Central Sydney Archaeological Zoning Plan 1992</i> and on the State Heritage Inventory as an area of historical archaeological potential	According to the <i>Belmore Park Heritage Study</i> (2012), there is high archaeological potential for the following to be present: - evidence of Pitt Street Presbyterian Church, manse and school (1850s–1901), including structural remains with brickwork/stone/wooden foundations, post holes, yard/work surfaces, underfloor deposits, demolition deposits, landscape modification and deeper subsurface features (e.g. wells, privies, drains etc.) - remains of the World War II slit air raid shelters, including excavation cuttings/fillings, linings and occupation deposits. Items of low potential have also been identified in the area. Some of these sites may have been previously disturbed by installation of services, construction of the roadways and paths, and installation of the earlier tram network. Significant modifications to the local landscape associated with the construction of Central Railway Station may have disturbed and/or destroyed some 19th Century archaeological evidence.
Eddy Avenue	No listings specifically reference significance of potential historical archaeology within the roadway of Eddy Avenue, although the <i>Central Sydney Archaeological Zoning Plan 1992</i> assumes all roadways have historical archaeological potential	There is low-moderate archaeological potential for the following: - evidence of 19th Century buildings such as Carters' Barracks', the Convent of the Good Samaritan, the Sydney Female Refuge and/or the tram depot building - evidence of 19th and early 20th Century services, such as drains, sewerage, water and gas services constructed on stone, brick, ceramic, metal or wood - evidence of the early alignment of Burial Ground Road/Garden Road and/or Eddy Avenue, such as sandstone kerbs, drains, early road surfaces - metal tracks and wooden sleepers along Eddy Avenue associated with the previous tram line.
Chalmers Street	No listings specifically reference significance of potential historical archaeology within the roadway of Eddy Avenue, although the <i>Central Sydney Archaeological Zoning Plan 1992</i> assumes all roadways have historical archaeological potential	There is low potential for outlying burials associated with the Devonshire Street Cemetery (post-1820). There is low-moderate potential for historical potential for historical archaeological remains to be present associated with the following: - evidence of 19th Century development demolished for the construction of the Central Railway Station and Chalmers Street including structural remains, postholes, yard/work surfaces, underfloor deposits, landscape modification - early alignment of Chalmers Street, such as sandstone kerbs, drains, early road surfaces and structural remains indicating the early alignment of the street - evidence of 19th and early 20th Century services such as drains, sewerage, eater and gas services constructed of stone, brick, ceramic etc. - metal tracks and wooden sleepers associated with the George Street tram line. Archaeological resources in this zone may be highly disturbed or destroyed by the large-scale earthworks undertaken for the construction of Central Railway Station.

Source: Section 4.3 in Technical Paper 5 – Heritage Impact Assessment, Volume 4

12.8.2 Impacts on heritage listed items

The construction and operation of the CSELR has the potential to cause disturbance to and either temporary or permanent changes to the setting, context and appreciation of heritage resource.

In general, operation of the CSELR would result in a range of impacts to the built and non-Indigenous heritage environment, as a result of changes to the setting, context and appreciation of heritage features. Such impacts are likely to arise from:

- presence of a new transport medium (i.e. the LRVs)
- infrastructure associated with the operation of the CSELR (including rails, stops, services and additional street furniture)
- new overhead lines and substations to provide power for the CSELR
- reduction in vehicular traffic through George Street
- removal of street trees along the CSELR alignment.

As with operation, construction would also potentially result in impacts on the built and non-Indigenous heritage environment, as a result of changes to the setting, context and appreciation of heritage features. Potential impacts during the construction phase of the proposal would arise from:

- removal of trees
- installation of construction compounds and site hoardings
- soil compaction beneath laydown areas and construction compounds
- regrading of the ground to achieve final track and stop levels
- construction of the CSELR track slab
- construction of stops and associated infrastructure (such as stop shelters)
- installation of substations and overhead cabling
- changes to traffic flow and distribution.

The potential impacts to the items as a result of the construction and operation of the CSELR proposal are identified in Table 12.42. Detailed descriptions of each of the listed features are provided in Technical Paper 5.



Table 12.42 Impacts to heritage items (refer Figure 12.22a and 12.22b for locations)

LOCATION REFERENCE	NAME	IMPACT
1	Sydney Opera House	Neutral
2	First Fleet Park	Major adverse (temporary)
3	Circular Quay Railway Station Group	Minor adverse
4	Metropolitan Hotel	Moderate/minor adverse
5	Former George Patterson House	Moderate/minor adverse
6	Former Telford Trust Building	Moderate/minor adverse
7	Commercial Building	Neutral
8	National Mutual Building	Moderate/minor adverse
9	Former Bank of Australasia including interiors	Moderate/minor adverse
10	Martin Place	Moderate adverse (temporary)
11	Cenotaph, Martin Place	Moderate/minor adverse (temporary)
12	General Post Office	Moderate adverse (temporary)
13	Commonwealth Bank	Moderate/minor adverse
14	Former Gowing Bros Building	Moderate/minor adverse
15	Queen Victoria Building	Moderate/minor adverse
16	State Theatre	Moderate/minor adverse
17	Sydney Town Hall	Moderate/minor adverse
18	St Andrews Anglican Cathedral and Chapter House	Moderate/minor adverse
19	Bank of NSW	Moderate/minor adverse
20	Former Vine House	Moderate/minor adverse
21	Former Bank of Australasia	Moderate/minor adverse
22	Century Hotel	Moderate/minor adverse
23	King George Hotel (former) and Haymarket Post Office	Moderate/minor adverse
24	Palace Hotel complex	Moderate/minor adverse
24a	Haymarket Library (Former Haymarket chambers)	Moderate adverse
24b	Corporation Building	Moderate adverse
25	Station House	Moderate adverse
26	Daking House	Moderate adverse
27	Sydney Terminal and Central Railway Station Group	Moderate adverse
28	Belmore Park	Moderate adverse
28	Belmore Park Significant Trees	Moderate adverse
29	Dental Hospital	Minor adverse
30	Former Metro Goldwyn Mayer including interior	Minor adverse

Source: Section 6.2.3 in Technical Paper 5 – Heritage Impact Assessment, Volume 4.

12.8.3 Impacts on areas of potential archaeological significance

Direct impacts would generally be associated with the construction of the CSELR causing disturbance to or loss of archaeological resources.

Potential impacts during the construction phase of the proposal might arise from:

- soil compaction beneath laydown areas and construction compounds
- regrading of the ground to achieve final track and stop levels
- construction of the CSELR track slab
- construction of stops and associated infrastructure (such as stop shelters)
- installation of substations and overhead cabling
- protection and relocation of existing utilities
- changes to traffic flow and distribution.

Detailed descriptions of each HAMU and the potential impacts to them as a result of the proposal are provided in Table 12.43 below. Locations of each HAMU are shown in Figures 12.23a and 12.23b.

Table 12.43 Heritage impact assessment for HAMUs in the City Centre Precinct

HAMU	HERITAGE IMPACT ASSESSMENT
Tank Stream	The exact location and depth of the Tank Stream and associated archaeological deposits are not precisely known in the vicinity of the CSELR alignment. Any proposed impacts to the Tank Stream and/or within its three metre buffer zone would be considered unacceptable. The proposed CSELR alignment on Alfred Street crosses the subsurface path of the Tank Stream. As track construction has been defined as having a potential impact of two metres deep, it is likely that proposed works associated with the construction of the CSELR would impact on the Tank Stream's buffer zone, and potentially on the State Heritage Registered fabric of the Tank Stream itself. The proposed CSELR would have a major adverse impact on the Tank Stream.
Alfred Street/ Herald Square	Construction of the Circular Quay stop and CSELR track slab would involve excavation below the current ground surface. Works associated with the construction of the Circular Quay stop platform, shelter and catenary support poles would involve deeper excavation than for the track slab. These works are likely to have a major adverse impact on the potential historical resource. Other ground disturbance activities within the Alfred Street/Herald Square HAMU (i.e. service relocation, tree removal) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of Alfred Street/Herald Square HAMU as a works depot, laydown area and/or parking area – where it would not involve the removal of the existing ground surface and/or excavation (e.g. for service installation) – is unlikely to have an impact on the historical archaeological resource. The proposed works in the Alfred Street/Herald Square is likely to impact on State and Locally significant historical archaeological resources.
First Fleet Park	Part of First Fleet Park is proposed as a construction compound. The construction compound depot would necessitate the occupation of a large area of the park for an extended period. The park is listed on the SHR for its exceptionally significant historical archaeological resource. The construction compound is likely to consist of a number of temporary sheds including ablution blocks and lunch rooms. Proposed ground works associated with the compound have not yet been defined. Compaction associated with the installation of demountable sheds or movement of heavy vehicles may also impact subsurface archaeological remains. Excavation for the installation of services would occur within existing service trenches, with a neutral impact as this would not disturb historical archaeological resources. Any modification outside of existing trenches (or any other excavation) would be likely to have a major adverse impact on the potential historical archaeological resource. Other impacts associated with compaction may have a minor to major adverse impact on the potential historical archaeological resource, dependent on establishing an appropriate works protocol. The proposed works in First Fleet Park are likely to impact on State and Locally significant historical archaeological resources.



Table 12.43 cont.

HAMU	HERITAGE IMPACT ASSESSMENT
George Street North	Construction of the Grosvenor Street and Wynyard stops and the CSELR track slab would involve excavation below the current ground surface. Works associated with the construction of the Grosvenor stop (platform, shelter and catenary support poles) would involve deeper excavation than for the track slab. These works are likely to have a major adverse impact on the potential historical resource. Proposed works associated with the installation of the Haymarket substation have not been defined at this stage. It is assumed that ground disturbance works (including excavation for the substation) would have to occur. These works are likely to have a major adverse impact on the potential historical resource. Other ground disturbance activities in the George Street North HAMU (such as service relocation, regrading etc.) would have localised impacts on the historical archaeological resource. These works are likely to have moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the George Street North HAMU as a construction zone – where it would not involve removal of the existing ground surface and/or excavation – is unlikely to have an impact on the historical archaeological resource. The proposed works in the George Street North HAMU is likely to impact on State and Locally significant historical archaeological resources.
Town Hall	Construction of the CSELR track slab would involve excavation below the current ground surface. The construction of the CSELR track slab would be concentrated in the centre of the George Street roadway, which may have experienced the highest levels of disturbance to potential burials (due to activities such as construction and/or removal of the previous tram tracks). Works associated with the construction of the Town Hall stop (platform, shelter and catenary support poles) would involve deeper excavation than for the track slab. These works are likely to have a moderate to major adverse impact on the potential historical resource. Other ground disturbance activities within the Town Hall HAMU (such as service relocation, regrading etc.) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Town Hall HAMU as a construction zone – where it would not involve removal of the existing ground surface and/or excavation – is unlikely to have an impact on the historical archaeological resource.
Belmore Park	Belmore Park is proposed as the site of a construction compound. The compound would necessitate the occupation of a large area of the park for an extended period. The construction compound is likely to consist of a number of temporary sheds including ablution blocks and lunch rooms. Proposed ground works associated with the compound have not yet been defined; however, it is assumed it may involve subsurface installation of services and tree removal. Such ground works would likely disturb the potential historical archaeological resource and may have a moderate impact on the potential archaeological resource. The area may also be used for the storage of materials and heavy equipment. Compaction associated with the installation of demountable sheds or movement of heavy vehicles would likely impact subsurface archaeological remains. This compaction may have a minor to moderate adverse impact on the historical archaeological resource.
Eddy Avenue	Construction of the CSELR track slab would involve excavation below the current ground surface and would be concentrated on the southern side of Eddy Avenue, closest to the Central Railway Station building. These works are likely to have a moderate to major adverse impact on the potential historical resource. Other ground disturbance activities within the Eddy Avenue HAMU (such as service relocation, tree removal etc.) would have localised impacts on the historical archaeological resource. These works are likely to have a moderate to major adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Eddy Avenue HAMU as a construction zone – where it would not involve removal of the existing ground surface and/or excavation – is unlikely to have an impact on the historical archaeological resource. The proposed works in the Eddy Avenue HAMU is likely to impact on State and Locally significant historical archaeological remains.

Table 12.43 cont.

HAMU	HERITAGE IMPACT ASSESSMENT
Chalmers Street	Construction of the CSELR track slab would involve excavation below the current ground surface. Works associated with the construction of the Central Railway Station stop (platform, shelter and catenary support poles) would involve deeper excavation than for the track slab. These works are likely to have a minor to moderate adverse impact on the potential historical resource. Proposed works associated with the installation of the Chalmers Street substation have not been defined at this stage. It is assumed that ground disturbance works, including excavation for the substation would have to occur; however, details of the extent of the excavation for the substation are not available at this stage. These works are likely to have a moderate to major adverse impact on the potential historical resource, depending on the extent and nature of the proposed works (not yet defined). Other ground disturbance activities within the Chalmers Street HAMU (such as service relocation, tree removal etc.) would have localised impacts on the historical archaeological resource. These works are likely to have a minor to moderate adverse impact on the potential historical archaeological resource, depending on the extent and nature of the proposed works. Use of the Chalmers Street HAMU as a construction zone is unlikely to have an impact on the historical archaeological resource.

Source: Section 4.3 in Technical Paper 5 – Heritage Impact Assessment, Volume 4

12.8.4 Management and mitigation

Overarching principles

A series of overarching mitigation measures have been recommended for HAMUs and the built heritage items identified through the heritage impact assessment set out in Technical Paper 5, which would be applicable to all heritage aspects of the CSELR. This includes State significant historical archaeology and locally significant archaeology (both known sites and potential archaeology). Detailed descriptions of the proposed mitigation as a result of the proposal are provided in Technical Paper 5 (section 6) and are summarised below.

The overarching management and mitigation principles for potential impacts to built and non-Indigenous heritage archaeology include:

- consultation with appropriately qualified heritage specialists through the detailed design phase and into construction to ensure the appropriate management of the heritage resource and appropriate evolution of mitigation
- sympathetic siting and treatment of stops, substations and other street furniture
- avoidance of impact to known archaeology, in particular State significant sites, during construction
- protection of sensitive features during construction
- treatment and management of street trees in line with the recommendations of the *Preliminary Tree Assessment* (Technical Paper 9)
- monitoring of specified excavation works by an Excavation Director who meets the NSW Heritage Division of the Office of Environment and Heritage (OEH) requirements for directing State significant archaeological investigations
- Heritage inductions for all contractors to advise and inform them of the archaeological potential and actions to be implemented in the event of any unexpected remains
- notification of the NSW Heritage Division of OEH and Transport for NSW if intact State significant relics are discovered.

Further detail on the specific requirements associated with the management of impacts to HAMUs and built heritage features is presented in the following sections.



Historic Archaeology Management Units (HAMUs)

Archaeological resources would be managed in accordance with their significance. The identified level of significance can influence the degree of impact that may be acceptable or the level of investigation and recording that may be required.

HAMUs identified as containing known or potential State significant relics would require the highest level of management. Units with State significant archaeology may also benefit from preliminary archaeological testing to locate and further understand the integrity and extent of the actual resource, allowing for appropriate planning for the mitigation of impacts.

Locally significant archaeological resources, whilst still important, would be able to be managed in a greater variety of ways, depending on the extent, nature and intactness of the resource found.

Some HAMUs may benefit from more detailed archaeological assessment as part of the management of historical archaeological resource in the next stage of the project. More detailed assessment would also help refine management strategies to ensure impacts are appropriately mitigated once final impacts are determined.

Management and mitigation strategies developed to address the likely significance of the identified historical archaeological resource are identified for each archaeological zone in Table 12.44, and are described in detail in Technical Paper 5. Some HAMUs also require specific mitigation and management strategies tailored to the anticipated nature of archaeological resource in that area. Where this is the case, these strategies are outlined as specific points in the mitigation strategies for each archaeological unit in the Technical Paper and are summarised for those HAMUs containing State significant archaeology in Table 12.45. Full details of all heritage mitigation identified for the CSELR is presented in Technical Paper 5.

Table 12.44 Management and mitigation strategies to be applied across all HAMUs as identified by Zone

HAMU ARCHAEOLOGICAL POTENTIAL ZONE	GENERAL MANAGEMENT AND MITIGATION STRATEGY
Zone 1	- Impact and/or removal are generally unacceptable for archaeological resources listed on the State Heritage Register and/or identified as being highly intact. - All contractors would receive a heritage induction. - An Excavation Director who meets the NSW Heritage Division of OEH requirements for directing State significant archaeological investigations would monitor the works. - In situ retention of the archaeological resource is likely to be required, unless it is highly disturbed and/or of a fragmentary nature — or if the impacts are assessed by the Excavation Director to be minor in nature. - A Work Method Statement or Archaeological Research Design would be prepared by a qualified historical archaeologist in accordance with NSW Heritage Division of OEH requirements, prior to the commencement of works. The Work Method Statement or Archaeological Research Design would outline a methodology for the investigation, salvage and/or conservation of archaeological resources. - An archaeological testing program would be implemented in this HAMU to test the location, extent, integrity and nature of State significant (Zone 1) archaeological resources. The testing program would be undertaken in accordance with an approved archaeological Work Method Statement or Archaeological Research Design. - The results of the testing program would further refine the Work Method Statement or Archaeological Research Design for the investigation, salvage and conservation of archaeological resources. - Works which may impact, disturb or destroy relics within Zone 1 HAMUs would be monitored by the Excavation Director to ensure unacceptable impacts do not occur. - The NSW Heritage Division of OEH and Transport for NSW would be notified when intact State significant relics are discovered. - Public engagement such as media releases, public open days during the works program, and post-works heritage interpretation may be required. - Post-excavation reporting, artefact analysis and conservation of relics would be required if relics are found.

Table 12.44 cont.

HAMU ARCHAEOLOGICAL POTENTIAL ZONE	GENERAL MANAGEMENT AND MITIGATION STRATEGY
Zone 2	- Impact and/or removal are likely to be acceptable if appropriate mitigation measures are followed. - All contractors would receive a heritage induction. - A Work Method Statement or Archaeological Research Design would be prepared by a qualified historical archaeologist in accordance with NSW Heritage Division of OEH requirements, prior to the commencement of works. The Work Method Statement or Archaeological Research Design would outline a methodology for the investigation, monitoring and/or salvage of archaeological resources. - Archaeological monitoring can be led by the State significant Excavation Director/Local Excavation Director for works within Zone 2 areas, followed by open area excavation as required (which depends on the nature, extent and integrity of the archaeological resource to be impacted, and the level of impact proposed). - If unexpected State significant relics are discovered in Zone 2 areas, such relics may need to be managed in accordance with the Zone 1 requirements. The Excavation Director would determine if the unexpected relics are likely to be reassessed as State significant, and then determine appropriate mitigation (i.e. manage as Zone 1 or Zone 2). - The NSW Heritage Division of OEH and Transport for NSW would be notified when intact State significant relics are discovered. - Public engagement such as heritage interpretation and/or public open days may be warranted, depending on the nature and significance of the archaeological resource. - Post-excavation reporting, artefact analysis and conservation would be required if relics are found.
Zone 3	- All contractors would receive a heritage induction. - An archaeologist would be on call to investigate archaeological remains identified during ground works where an archaeologist is not present on-site.

Table 12.45 Additional mitigation identified for HAMUs identified with potential State significant archaeology

HAMU	SPECIFIC MANAGEMENT AND MITIGATION
Tank Stream	- Physical protection would be provided through construction of a bridging structure to retain integrity of the Tank Stream. - Management would be implemented in accordance with policies in Sydney Water's (2005) <i>Tank Stream Conservation Management Plan</i>. - Consultation would be undertaken with Sydney Water, City of Sydney and NSW Heritage Division of OEH.
Alfred Street/ Herald Square	- Implementation of an archaeological testing program. - Open area excavation and archival recording during site works.
First Fleet Park	- The potential historical archaeological resource would be managed in accordance with the policies outlined in the <i>First Fleet Park Conservation Management Strategy</i>. - Consultation would be undertaken with the Sydney Harbour Foreshore Authority. - Ground disturbance works within First Fleet Park HAMU would be avoided. - Services, if required, would be above ground or installed within existing service trenches. - The subsurface archaeological remains within First Fleet Park would be protected from compaction or movement of vehicles over the park's ground surface. - The scope of appropriate ground works within First Fleet Park HAMU would be developed in consultation with a suitably qualified archaeologist and Sydney Harbour Foreshore Authority to ensure the impact on the archaeological resource is as minor as possible.
George Street north	Works in this HAMU are likely to require some open area excavation and archival recording during site works, and post-excavation analysis and reporting. The nature and intactness of the archaeological resource may warrant interpretation.
Town Hall	If skeletal remains are identified they would be managed in accordance with Zone 1 strategies and, at a minimum, managed in accordance with the NSW Heritage Division of OEH guideline <i>Skeletal Remains: Guidelines for Management of Human Skeletal Remains</i>, and exhumed and reinterred at an appropriate location. If identified, consultation with the Heritage Division of OEH would be required.



Table 12.45 cont.

HAMU	SPECIFIC MANAGEMENT AND MITIGATION
Eddy Avenue	If skeletal remains are identified, these would be managed in accordance with Zone 1 strategies and, at a minimum, managed in accordance with the NSW Heritage Division of OEH guideline <i>Skeletal Remains: Guidelines for Management of Human Skeletal Remains</i>, and exhumed and reinterred at an appropriate location. If identified, consultation with the Heritage Division of OEH would be required.
Belmore Park	The subsurface archaeological remains within Belmore Park would be protected from compaction or movement of vehicles over the park's ground surface.
Chalmers Street	If skeletal remains are identified, these would be managed in accordance with Zone 1 strategies and, at a minimum, managed in accordance with the NSW Heritage Division of OEH guideline <i>Skeletal Remains: Guidelines for Management of Human Skeletal Remains</i>, and exhumed and reinterred at an appropriate location. If identified, consultation with the Heritage Division of OEH would be required.

Built heritage

Table 12.46 sets out the specific mitigation measures identified for built and landscape heritage items in the City Centre Precinct. Where no specific mitigation measures are required this is stated. No measures are required for the majority of items along George Street. The overarching mitigation principles outlined above and the general mitigation measures set out in section 6.1 of Technical Paper 5 apply to all aspects of the CSELR.

Table 12.46 Mitigation of impacts to heritage items (refer Figure 12.22a and 12.22b for locations)

LOCATION REFERENCE	NAME	MITIGATION
1	Sydney Opera House	The detailed design of the proposed construction worksite in Circular Quay would minimise potential visual impacts on the setting of the Sydney Opera House.
2	First Fleet Park	- The proposed construction compound in part of First Fleet Park would be planned to retain significant elements of the park, including plantings, monuments and landscape features and to avoid impacts on the setting of the Sydney Opera House. - A photographic archival recording of First Fleet Park would be undertaken prior to works commencing.
3	Circular Quay Railway Station Group	No specific mitigation measures required.
4	Metropolitan Hotel	No specific mitigation measures required.
5	Former George Patterson House	
6	Former Telford Trust Building	
7	Commercial Building	
8	National Mutual Building	
9	Former Bank of Australasia including interiors	

Table 12.46 cont.

LOCATION REFERENCE	NAME	MITIGATION
10	Martin Place	- The detailed design of works in Regimental Square would retain and conserve the memorial and associated significant plantings. - The memorial and significant associated landscaping would be retained and protected during construction works. - A photographic archival recording of Regimental Square would be undertaken prior to works commencing. - No new permanent above ground structures would be introduced into Martin Place, particularly in the vicinity of the Cenotaph. - The size and material of any required access hatches for the substation in Martin Place would minimise visual impacts on the ground plane of Martin Place. - The design of necessary substation ventilation shafts, access hatches, and other infrastructure would minimise visual impacts on the Cenotaph. - The condition of the Cenotaph would be assessed prior to commencement of construction works for the proposed substation and monitored during construction. - The planning of the works compound would ensure that access is provided to the Cenotaph for the groups who use the memorial.
11	Cenotaph, Martin Place	
12	General Post Office	
13	Commonwealth Bank	No specific mitigation measures required.
14	Former Gowing Bros Building	
15	Queen Victoria Building	
16	State Theatre	
17	Sydney Town Hall	
18	St Andrews Anglican Cathedral and Chapter House	
19	Bank of NSW	
20	Former Vine House	
21	Former Bank of Australasia	
22	Century Hotel	
23	King George Hotel (former) and Haymarket Post Office	
24	Palace Hotel complex	The design of the proposed above ground Parker Lane substation would be further investigated during detailed design with the aim of avoiding adverse impact on views of the lower section of the Palace Hotel from Parker Lane (which could include the consideration of a below ground substation option at this location).
24a	Former Haymarket Chambers	
24b	Corporation Building	
25	Station House	The regrading of the road and pavement levels would be detailed to avoid adverse impacts on the fabric of Station House at ground level, and maintain the integrity of entry doors and shopfronts.
26	Daking House	- The detailed design of the Rawson Place stop would consider impacts on Daking House. The proposed shelter would be designed to minimise impacts on key views of the façade of Daking House and would be set back as far as possible from its significant awning. The regrading of the road and pavement levels would be detailed to avoid adverse impacts on the fabric of Daking House at ground level, and maintain the integrity of entry doors and shopfronts. - A photographic archival recording of the principal elevations of Daking House would be undertaken prior to works commencing.



Table 12.46 cont.

LOCATION REFERENCE	NAME	MITIGATION
27	Sydney Terminal and Central Railway Station Group	- Detailed design of the Eddy Avenue alignment would retain and conserve the significant fabric of Central Railway Station and its underbridges. - Any fixings proposed to be attached to the underbridges would be to the concrete structure, not the sandstone. - Service poles would be rationalised and services grouped to minimise clutter on Eddy Avenue and minimise impacts on the setting of Central Railway Station and views of its principal elevation. - The alignment of the Eddy Avenue to Chalmers Street turn would minimise impacts on the Elizabeth Street Gardens. - Significant fabric of the Elizabeth Street Gardens that is to be removed, such as the edging and the palms, would be salvaged, catalogued and stored for possible reinstatement (or partial reinstatement) following completion of construction works. - The location and design of the Rawson Place stop would seek to minimise impact on key views of Central Railway Station east along Rawson Place. - A photographic archival recording of the parts of Central Railway Station to be affected by the CSELR works, including the Elizabeth Street Gardens and the Chalmers Street boundary wall, would be undertaken prior to works commencing.
28	Belmore Park	Significant trees and landscaping to be retained would be protected from damage by vehicular or machinery movement.
28	Belmore Park Significant Trees	- Significant landscape elements (such as sandstone kerbing) that is to be removed for the construction compound, would be salvaged, catalogued and stored for reinstatement following completion of construction works. - A photographic archival recording of Belmore Park would be undertaken prior to works commencing.
29	Dental Hospital	No specific mitigation measures are required.
30	Former Metro Goldwyn Mayer including interior	

Heritage Interpretation Strategy

A Heritage Interpretation Strategy has been developed for the CSELR proposal and is included as Technical Paper 6. The Strategy outlines how the history, significant heritage places and stories associated with each of the precincts through which the CSELR travels may be interpreted.

For the City Centre Precinct the key places of interest are:

- Sydney's first cemetery — located on the site of the present day Town Hall Sydney's early markets — now occupied by the Queen Victoria Building
- the site of the Bank of NSW, Australia's first bank, which moved into premises in George Street in 1822
- the site of the original David Jones store which opened on George Street in 1838
- Sydney General Post Office (GPO) and Martin Place
- the World Square site (former Anthony Horderns emporium).

The following opportunities for interpretation have been identified:

- application of interpretive signage/or evocative historical imagery at select light rail stops
- development of an online exhibition, or digital publication outlining the history and significance of the precincts and places along the CSELR alignment
- 'Walk the Line' — a self guided tour along the CSELR alignment that could be downloaded from a website, developed as an app, or printed as a brochure or booklet.

Heritage interpretation measures would be developed during detailed design in consultation with the City of Sydney.

Effectiveness of the mitigation measures

The effectiveness of the built and non-Indigenous heritage management and mitigation measures proposed in this EIS has been ranked in section 6.2 of Technical Paper 5. This ranking was based on the type of mitigation proposed and the extent to which the measures would mitigate the impact to a heritage item or area. The effectiveness of each mitigation measure would also depend on the level of significance of the heritage item or area affected (i.e. State or local significance).

For example, in respect of historical archaeology, avoidance of an intact archaeological resource (such as the Tank Stream), and its preservation in-situ, would be the most effective mitigation measure for significant archaeological resources, whereas, investigation, recording and salvage of a fragmentary archaeological resource (such as a rubbish dump) by a qualified archaeologist would be appropriate.

In respect of built and landscape heritage, (for example) reconstruction would be a more effective measure for an item of Local significance than for an item of State significance, where preservation would be preferred over other conservation methods with a greater degree of intervention.

The effectiveness of the mitigation measures proposed for historical archaeology and built and landscape heritage was ranked in section 6.2 Technical Paper 5 using the following categories:

- *Highly effective* — This mitigation measure would completely mitigate the impact on the item/ area's heritage significance.
- *Moderately effective* — This mitigation measure would substantially mitigate the impact on the item/ area's heritage significance.
- *Somewhat effective* — This mitigation measure would only partially mitigate the impact on the item/ area's heritage significance.
- *Least effective* — This mitigation measure is the bare minimum required to achieve some mitigation of the impact on the item/area's heritage significance; however, the impact would not be completely mitigated.

The effectiveness of the mitigation measures proposed for historical archaeology is identified against each of the specific HAMUs in Table 6.1 of Technical Paper 5, whereas the effectiveness of the mitigation measures proposed for built and landscape heritage are identified against each heritage item/conservation area in Table 6.4 of Technical Paper 5.

A summary of the general effectiveness of each form of mitigation for built and landscape heritage is provided in Table 12.47.



Table 12.47 Ranking of the effectiveness of the built and non-Indigenous heritage mitigation measures

TYPE OF MEASURE	HERITAGE ITEM/ CONSERVATION AREA'S LEVEL OF SIGNIFICANCE	EFFECTIVENESS
Revise design/construction methodology to avoid any impact	State Local	Highly effective Highly effective
Revise design/construction methodology to reduce impact	State Local	Moderately effective Moderately effective
Reconstruction	State Local	Somewhat effective Moderately effective
Replacement (for trees)	State Local	Somewhat effective Moderately effective. (If the tree is listed for its historical significance, then this measure would be reduced to 'somewhat effective'.)
Partial reconstruction/replacement	State Local	Somewhat effective Somewhat effective
Salvage	State Local	Least effective Least effective
Archival recording (prior to demolition/removal or partial demolition/removal)	State Local	Least effective Somewhat effective

Source: Table 6.2 of Technical Paper 5 – Heritage Impact Assessment, Volume 4

12.9 Socio-economic characteristics

The following section provides a summary of the potential local social and economic impacts of the CSELR proposal within the City Centre Precinct, based on Technical Paper 3 – *Social Impact Assessment* and Technical Paper 4 – *Economic Impact Assessment* contained in Volume 3 of this EIS.

12.9.1 Existing conditions

Census statistics from the Sydney/Haymarket/The Rocks Statistical Area (Level 2), using sources such as the Australian Bureau of Statistics (ABS) (2011) and Bureau of Transport Statistics (BTS) data (2011 and 2012), were taken to be representative of the City Centre Precinct.

It is estimated that within the City Centre Precinct that there are currently approximately 24,780 residents. This is expected to increase to approximately 34,010 by 2021 and to approximately 43,600 by 2036. This is an average annual increase of approximately three per cent.

BTS employment projections (2012a) forecast that the City Centre Precinct would experience an increase of approximately 128,640 jobs or 48 per cent between 2011 and 2046 (increasing from 270,210 jobs in 2011). The most significant employment growth forecast is to occur within the 'white collar' industries, such as professional, scientific and technical services, financial and insurance services and information media and telecommunications.

The key features of the local demographic, employment and travel profiles are listed below:

- The City Centre Precinct is one of the younger and more ethnically diverse of the CSELR precincts. Its median population age is 29.
- Fewer than one in four residents were born in Australia, and less than 35 per cent of residents speak only English at home. Mandarin, Thai, and Indonesian are the three most common languages, other than English, spoken at home.
- The distribution of young people and ethnic diversity is not uniform across the City Centre Precinct. In general, the southern portion of the CBD is younger than the northern portion of the CBD. University students likely favour the southern portion of the CBD because of its proximity to universities such as Sydney University, UTS, and TAFE. Older residents are found in the northern portion of the CBD, likely for a variety of reasons.

- Higher concentrations of overseas-born residents are generally found in the southern portion of the CBD village group, around Chinatown and Haymarket. The northern portion of the CBD, and The Rocks/Millers Point in particular, has a comparatively low percentage of residents born overseas.
- Areas of higher socio-economic disadvantage exist within The Rocks as well as Haymarket. The Rocks contains relatively high levels of public housing, many residents of which have special needs and access a range of government services. Haymarket has many residents from non-English speaking backgrounds as well as young people who may be both working and studying.
- When it comes to their place of residence, City Centre Precinct residents are highly mobile. Only about 28.5 per cent of residents did not change address in the five years prior to the 2011 Census, and approximately 42.2 per cent of new residents in that five year period came from overseas.
- The City Centre Precinct has the highest percentage (approximately 87.3 per cent) of residents that have completed year 12 or equivalent, compared with the other CSELR precincts. Approximately three out of four residents have completed a non-school qualification (e.g. trade certificate, Bachelor's degree, graduate diploma).
- The City Centre Precinct's labour force participation is lower than that of Greater Sydney, and the precinct has a high amount of part-time workers compared with other CSELR precincts. Approximately 20 per cent of the population reported no income. This may be a result of the high number of students living in the area.
- Approximately one-third (approximately 34.8 per cent) of dwellings are lone person households, and approximately another third (approximately 36.80 per cent) are two-person households, with the remainder being households of three or more.
- The City Centre Precinct has the highest median rental payment (\$600/week) of all the CSELR precincts.
- Over half (approximately 58.2 per cent) of City Centre Precinct households do not have a motor vehicle. Over half (approximately 55.6 per cent) of residents walk or cycle to work, while approximately another third (approximately 31.5 per cent) use some form of public transport to get to work. Of those that use public transport, nearly half (approximately 49.5 per cent) used a bus at some point in their journey.

A full profile of the City Centre Precinct, broken down by topic and compared with each of the other CSELR precincts, is provided in Appendix 8.1 of Technical Paper 3 – Social Impact Assessment.

12.9.2 Impacts during operation

The potential social and economic impacts of the CSELR proposal during operation are summarised below for the City Centre Precinct and described further in Technical Paper 3 – *Social Impact Assessment* and Technical Paper 4 – *Economic Impact Assessment*.

The operation of the CSELR proposal and the pedestrianisation of George Street would transform the city in a significantly positive way. Bus congestion would be reduced, and pedestrians would benefit from more spacious footpaths and generous access to City Centre destinations. New public spaces would be created that would enhance and enliven community and cultural living. The CSELR would also provide economic benefits, including opportunities for new businesses along George Street, as this area opens up to increased night-time opportunities and outdoor dining.

Social impacts during operation

The key social impacts of the CSELR proposal during operation are summarised in Table 12.48 for the City Centre Precinct. This table provides a summary and rating of the key potential social impacts both before and after implementation of proposed mitigation measures. These mitigation measures are presented in section 12.9.4.



Table 12.48 City Centre Precinct – Key social impacts during operation

POTENTIAL IMPACT	KEY EFFECTS OF IMPACT	IMPACT RATING (POST MITIGATION)
Local amenity, character, environment	Significantly Positive - The pedestrianisation of George Street would provide an opportunity to introduce new paving, trees, street furniture, outdoor dining areas, improved lighting and public art. - The pedestrian zone would promote the attraction of small businesses, bars and restaurants. It would attract both tourists and local visitors to the CBD and develop a night-time economy. - The pedestrianised plaza at Alfred Street, Circular Quay, would be enhanced. Existing civic squares at Martin Place, Town Hall, Rawson Place, and Central Railway Station would be enhanced, with opportunities for further activation.	Significantly Positive
Visual impact	Significantly Positive - The removal of vehicle traffic from the pedestrianised area and the creation of new public space would have positive visual impacts. - Visual prominence of the Queen Victoria Building, statues, and other distinctive buildings would be improved through the removal of vehicle congestion. - The light rail would have 'wire-free' operations from Circular Quay stop to Town Hall stop. The visual intrusion of the light rail overhead wires in other parts of the route may be viewed more neutrally after operations commence. - The replacement of buses by a smaller number of LRVs would be an improvement in terms of visual amenity. - Visual impacts are further discussed in section 12.7.	Significantly Positive
Changes to access and local traffic conditions	Moderately Positive - The pedestrianisation of George Street with the operation of light rail would require permanent alterations to access and local traffic conditions. - The potential negative impacts of access and traffic changes are likely to be balanced out by improved pedestrian access and reduced congestion on George Street as well as a reduction in the overall number of buses in the CBD. - The pedestrianisation of George Street would likely increase the use of buses and private vehicles on Elizabeth Street, Clarence Street, and York Street which would result in potential negative impacts to those streets. - All existing property accesses along George Street would be maintained during the operational phase of the CSELR proposal; however, certain restrictions are likely to apply. These would be developed and implemented by the relevant road authority and could include: - access restrictions implemented by the City of Sydney to provide for appropriate safety and amenity for pedestrians. These measures would be determined by City of Sydney, in consultation with Transport for NSW. - limitations on driveway access along the proposed CSELR corridor to left-in left-out only, where feasible. - Access and traffic impacts are discussed further in section 12.3.	Moderately Positive
Changes to local community services	Significantly Positive Access to local community services would be improved with the introduction of light rail services in conjunction with the pedestrianisation of part of George Street and other public domain improvements.	Significantly Positive
Access to and use of public spaces and urban connectivity	Significantly Positive - The pedestrianisation of George Street would relieve congestion currently experienced on footpaths operating at capacity. - The pedestrianisation of part of George Street would contribute to major public squares at Town Hall and Martin Place, connecting the east and west of the city and expanding the area accessible to the public. - Additional discussion on this issue is provided in section 12.7.	Significantly Positive

Table 12.48 cont

POTENTIAL IMPACT	KEY EFFECTS OF IMPACT	IMPACT RATING (POST MITIGATION)
Noise and vibration	Moderately Positive - The new pedestrian zone would experience a significant reduction in road traffic noise relative to the current existing situation. Whilst the CSELR would introduce a new noise source to the pedestrian zone (the light rail), transportation noise in areas away from cross streets would be expected to reduce overall (refer to section 12.5). - Event Cinemas, Haymarket Library, Metro Theatres, and Capitol Theatres have been identified as potential sensitive receptors for ground-borne noise. - Noise and vibration impacts are further discussed in section 12.5.	Moderately Positive
Property acquisition	Neutral - Small areas of public or private land would be acquired for substations at Circular Quay, Martin Place, Parker Lane, and Chalmers Street. - Small segments of existing footpaths at the corner of Elizabeth Street/ Eddy Avenue at the corner of Chalmers Street/Devonshire Street would be acquired for the CSELR alignment through these intersections.	Neutral
Safety and security	Neutral Separation of light rail and pedestrians within the pedestrianised section of George Street is important to maintain safety and minimise conflicts. This is likely to mainly be an issue in the start-up phase of light rail operations. As the public adjust to the new transport system and street conditions, this impact is likely to be neutral.	Neutral
Community and cultural issues	Significantly Positive - The pedestrianised area of George Street would expand the public space available and thus expand the opportunities for community gatherings and events. There would be expanded opportunities for buskers and others wishing to publicly showcase their talent. - The design of the CSELR proposal includes a cross-over at Town Hall which may facilitate short-running of light rail services between Central and Town Hall if events are held on George Street north of Town Hall.	Significantly Positive
Health and wellbeing	Moderately Positive - The new light rail is likely to encourage more walking and cycling. - The pedestrianisation of George Street may also lead to more people walking to and within the CBD, with residents, workers, and visitors alike choosing to walk rather than catch a taxi or a bus. - Cycling to the CBD would also be expected to increase for a variety of work and leisure trips given the reduction in congestion along key CBD routes such as George Street.	Moderately Positive
Social sustainability and community functioning	Moderately Positive - The CSELR proposal would provide the opportunity for better access to community services, cultural facilities, retail outlets and employment opportunities. - Linkages to special events at Moore Park, specialist medical practices in Randwick, educational institutions such as UNSW, and other destinations along the CSELR alignment would also be improved for City Centre Precinct residents.	Significantly Positive

Source: Based on Technical Paper 3 – Social Impact Assessment, Volume 3



Economic impacts during operation

The key economic impacts of the CSELR proposal during operation are summarised in Table 12.49 for the City Centre Precinct. This table provides a summary and rating of the key potential economic impacts both before and after implementation of proposed mitigation measures. These mitigation measures are presented in section 12.9.4.

Table 12.49 City Centre Precinct – Key economic impacts during operation

POTENTIAL IMPACT	KEY EFFECTS OF IMPACT	IMPACT RATING (POST MITIGATION)
Access to work, retail or leisure	Moderate Positive The CSELR proposal would result in improved accessibility, visibility and connectivity as a result of the reduction/elimination of vehicles (including buses) and the pedestrianisation of parts of George Street.	Moderate Positive
Enhanced tourism perception	Significant Positive The CSELR proposal would result in improved quality and amenity of the urban environment as well as a legible, user-friendly transport service that connects to key tourist attractions in the City Centre Precinct.	Significant Positive
Impact to night-time economy	Moderate Positive - The CSELR proposal would result in improved levels of safe and reliable public transport that connects the City Centre Precinct with other key locations for the night-time economy (such as Surry Hills). - Whilst taxis may no longer be able to pick-up and drop-off on George Street, alternative arrangements would be made for connecting streets to address these requirements.	Moderate Positive
Impact to land values	Slight to Moderate Positive The CSELR proposal would result in improved capacity of public transport and pedestrianisation of parts of George Street which is likely to create positive flow-on benefits to landowners, particularly retailers fronting George Street.	Slight to Moderate Positive
Amenity	Significant Positive The CSELR proposal would result in improvements in most locations to existing levels of visual amenity and noise levels as a result of the reduction in traffic (including buses) as well as improvements to landscaping, expansion of pedestrian areas and de-cluttering of street furniture.	Significant Positive
Access to loading docks/servicing areas	Neutral Ongoing access to service and delivery areas along George Street and connections for businesses that presently use George Street would be maintained as part of the operation of the CSELR proposal.	Neutral

Source: Based on Technical Paper 4 – Economic Impact Assessment, Volume 3

12.9.3 Impacts during construction

Potential social and economic impacts during construction are summarised below for the City Centre Precinct and described further in Technical Paper 3 – *Social Impact Assessment* and Technical Paper 4 – *Economic Impact Assessment*.

Whilst the CSELR proposal would result in a number of long-term benefits, this would come with a series of short-term social and economic costs during construction. These include substantial visual and amenity impacts resulting from construction works, changes to access arrangements and other perceived impacts that may reduce economic activity throughout the construction period.

Social impacts during construction

The key social impacts of the CSELR proposal during construction are summarised in Table 12.50 for the City Centre Precinct. This table provides a summary and rating of the key potential social impacts both before and after implementation of proposed mitigation measures. These mitigation measures are presented in section 12.9.4.

Table 12.50 City Centre Precinct – Key social impacts during construction

POTENTIAL IMPACT	KEY EFFECTS OF IMPACT	IMPACT RATING (POST MITIGATION)
Local amenity, character, environment	Moderately Negative - The Rocks, though largely unaffected directly by construction may experience severance, as the area becomes difficult for visitors and tourists to access. - The retail and entertainment precincts along George Street would be most affected during construction. The construction of the CSELR proposal would result in a major change in the character and environment of this area for the duration of construction. - There would need to be tree removal along the alignment and to facilitate the operation of the Circular Quay and Belmore Park construction compounds. - There are a number of other construction works scheduled for the CBD during the construction of the CSELR, in Darling Harbour (SICEEP), in Barangaroo, and at Wynyard, among others. Potential interactions between these projects and the CSELR may result in some cumulative impacts (refer to Chapter 11).	Slightly Negative
Visual impact	Moderately Negative - The visual intrusion of construction activities along the whole alignment is likely to be a substantial impact for visitors and tourists, shoppers, workers in CBD offices, retailers and local businesses. - Visual connectivity and legibility would be impaired by construction sites. Particularly sensitive locations are First Fleet Park and Circular Quay/Customs House, as this is the 'gateway to Sydney' for tourists and visitors. Visual impacts are further discussed in section 12.7.	Slightly Negative
Changes to access and local traffic conditions	Moderately Negative - Changes to access and traffic conditions would be a major impact during construction, particularly the section of the route north of Bathurst Street. George Street would be closed to general traffic between Hunter Street and Bathurst Street with only local and emergency access permitted, as per the proposed operational phase of the proposal. - The majority of intersections within the CBD would remain open; however, full intersection closures may occur on weekends. These closures would affect direct access to ground floor shops and businesses, deliveries, taxi operations, functioning of businesses on upper levels, and hotel operations. - Access and traffic impacts are further discussed in section 12.3.	Slightly Negative
Changes to local community services	Slightly Negative - Construction of the CSELR proposal may result in some access disruptions for the emergency services, the Sydney Dental Hospital and the major post offices at Martin Place and Australia Square. - Access to churches along the route may be affected by construction including the Central Baptist Church and Christ Church St Laurence. - There may be some minor access issues for St Andrews Cathedral School and the Sydney City Library Haymarket. - Maintaining access to community services will be especially important for disadvantaged residents along the route, such as public housing tenants with special needs in The Rocks. Service providers should be informed of works and consulted as to access requirements to ensure continuity of service for those affected.	Neutral



Table 12.50 cont

POTENTIAL IMPACT	KEY EFFECTS OF IMPACT	IMPACT RATING (POST MITIGATION)
Access to and use of public spaces and urban connectivity	Moderately Negative - Urban connectivity would be substantially compromised during construction along the length of George Street. - Access to The Rocks would be affected by the closure of Alfred Street and George Street to through-traffic. - In addition a number of public spaces would be used for construction works, compounds or other facilities, albeit only in part. These include First Fleet Park, part of Martin Place and Belmore Park. - Additional impacts are discussed in section 12.7.	Neutral
Noise and vibration	Moderately Negative - Noise would occur at periodic intervals during construction. Most of this area currently has moderate levels of background noise from traffic (refer to section 12.5). - With the closure George Street and other parts of the alignment in the CBD to traffic, construction noise would replace traffic noise. Hotels and other tourist facilities along George Street and Chalmers Street may be affected by night-time noise. - Noise and vibration impacts are further discussed in section 12.5.	Slightly Negative
Property acquisition	Slightly Negative Land would be temporarily leased for construction compounds/ construction workforce amenities.	Neutral
Safety and security	Moderately Negative - There are moderate risks to the public from any construction site. Road and pedestrian safety along the alignment would need to be monitored throughout construction. - Removal of traffic from George Street early in the construction phase would reduce traffic volumes on George Street such that traffic controllers would be required to stop pedestrian movements infrequently.	Neutral
Community and cultural issues	Moderately Negative - During construction, there are a number of culturally sensitive locations that may be impacted by construction works. These include the area around the Circular Quay/Customs House, Martin Place, Town Hall Place and Belmore Park. - A number of city theatres may have access issues during construction, including Event Cinemas, Metro Theatre, and Capitol Theatre. - Special events and parades in the CBD would be affected during the construction stage. Events that use George Street specifically include Chinese New Year, St Patrick's Day Parade, ANZAC Day March, Sydney Easter Parade, May Day March, Sydney Christmas Parade. (These are discussed further in section 12.3).	Slightly Negative
Health and wellbeing	Moderately Negative Potential health issues may be associated with noise and dust from some activities during construction.	Slightly Negative
Social sustainability and community functioning	Slightly Negative The overall functioning of the local community may be impaired temporarily during construction due to perceived barriers to movement within the precinct as a result of ongoing construction works.	Slightly Negative

Source: Based on *Technical Paper 3 – Social Impact Assessment, Volume 3*

Economic impacts during construction

The key economic impacts of the CSELR proposal during construction are summarised in Table 12.50 for the City Centre Precinct. This table provides a summary and rating of the key potential economic impacts both before and after implementation of proposed mitigation measures. These mitigation measures are presented in section 12.9.4.

Table 12.51 City Centre Precinct – Key economic impacts during construction

POTENTIAL IMPACT	KEY EFFECTS OF IMPACT	IMPACT RATING (POST MITIGATION)
Changes to access and local traffic conditions	Moderate Negative - Potential impacts in the City Centre Precinct relate to changes to vehicle access including taxis and buses as well as the redirection of some pedestrians during construction, which may reduce the perceived ease of access for visitors/clients. - Potential flow-on impacts may include disruptions to access within connecting streets and for commercial services (including buses) that presently use parts of the CBD (such as Eddy Avenue) to pick up/drop off goods and passengers.	Slight Negative
Amenity impacts (i.e. noise and vibration)	Moderate Negative Potential impacts may occur to the operation of businesses without adequate soundproofing or businesses reliant on the amenity of outdoor areas (i.e. cafes or outdoor dining venues).	Slight Negative
Access to loading docks/servicing areas	Moderate Negative - Constraints may occur to the frequency/ease of access for businesses that rely on delivery docks off George Street. - Potential time delays and additional travel times may impact businesses that use George Street as part of their travel route for deliveries/access.	Slight Negative
Impact to night-time economy	Moderate Negative Some impacts may occur to restaurants/bars as a result of perceived access constraints, changes to taxi pick-up and drop-off points, as well as the amenity of George Street.	Slight Negative
Passing trade & demand for services	Slight Negative - Due to the amenity and access changes in the City Centre Precinct during construction, businesses may experience a reduction in demand for trade and services. - Other businesses may benefit (i.e. food retailers) as a result of an increase in demand due to increased numbers of construction workers. - Businesses close to crossing points between construction hoardings could benefit from greater visibility; those that are located between two crossings would be less visible (due to construction works) and thereby have a greater potential for adverse impact on trading levels.	Slight Negative
Stimulation of redevelopment opportunities	Moderate Positive A commitment to the CSELR proposal and the commencement of works could create a positive catalyst for the redevelopment of some underutilised sites and locations in the City Centre Precinct.	Moderate Positive
Access to work, retail and leisure	Moderate Negative Impacts to the perceived ease of getting to work or other land use activities could reduce the attractiveness of working/visiting/operating facilities in the City Centre Precinct.	Slight Negative
Visual impact	Moderate Negative There would be some adverse impact to the visual amenity of George Street, First Fleet Park and Belmore Park during the construction period.	Slight Negative

Source: Based on Technical Paper 4 – Economic Impact Assessment, Volume 3

12.9.4 Management and mitigation

A series of mitigation measures would be implemented to minimise and manage the social and economic impacts identified in section 12.9.2 and section 12.9.3. Measures designed to mitigate social impacts are detailed in Table 12.52.



Table 12.52 Social construction and operational mitigation measures

POTENTIAL IMPACT	POTENTIAL MITIGATION
Operation	
Local amenity, character, environment	- Adverse local amenity and character impacts would be mitigated through urban design and/or public domain improvements. Urban design elements proposed for light rail stops would include the use of consistent materials, and new street tree plantings to side footpaths to unify the corridor. Public domain improvements could include the maximisation of open space (for example within High Cross Park) and the replanting of street trees where possible. - Further details for the mitigation of amenity impacts are provided in section 12.7.
Visual impact	- Within the George Street pedestrian zone, the light rail tracks would be highlighted by either a different material colour, finish, texture or size of paving, so that pedestrians can visually and texturally distinguish between the pedestrian zone and the light rail track zone. - The function of the Ibero-American statue plaza on Chalmers Street would be maintained and improved with a range of public realm works. - Further details for the mitigation of visual impacts are provided in section 12.7.
Changes to access and local traffic conditions	- Special event organisers would be consulted to determine the nature and extent of existing and planned future events that would require the use of George Street and, thus, would be affected by CSELR operations. - Where required and feasible, special arrangements for deliveries to businesses directly fronting the CSELR alignment would be provided. This could include the provision of time-based loading zones on nearby streets. - Any access restrictions required for the CSELR proposal would be subject to further consultation between the affected parties, Transport for NSW and the appropriate local council (City of Sydney Council or Randwick City Council). A case by case consideration of each affected property access would be undertaken during detailed design (in consultation with the affected parties) to determine the access restrictions required along the proposed CSELR route. - Further traffic and transport mitigation strategies for the mitigation of local access and traffic impacts during operation are provided in section 12.3.
Changes to local community services	Access to local community services and open spaces would be maintained during operation of the CSELR proposal. Consultation with the operators of community services (including local childcare centres and places of worship) would be undertaken to minimise impacts to the access of these facilities.
Access to and use of public spaces and urban connectivity	- Light rail stops would incorporate a high quality urban design that would reflect the precinct in which they would be located to assist in minimising impacts to visual amenity resulting from the provision of the CSELR proposal. - Transport for NSW would continue to work with stakeholders to identify potential opportunities to integrate CSELR public domain improvements with other city planning strategies (such as the City of Sydney's other public square projects) to improve access to local community services and further enhance the public domain along the CSELR alignment. - Where possible, public open spaces directly affected by the CSELR proposal would be reinstated as soon as possible. - Further mitigation of access to public space and connectivity impacts is provided in section 12.7.
Noise and vibration	Details for the mitigation of noise and vibration impacts are provided in section 12.5.
Property acquisition	Where property acquisition is required, it would be acquired in accordance with the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. A property acquisition plan would be prepared as part of detailed design.
Safety and security	Where feasible, the CSELR would incorporate features to maintain the safety of passengers, CSELR employees and the general public. Stops would be designed to be safe and attractive places to wait for CSELR services and would (where feasible and appropriate) incorporate LED lighting technology, emergency calling capabilities and CCTV.
Community and cultural issues	- Ongoing consultation would occur with event organisers as to the ongoing, future desired use of George Street. - Informational material advertising the commencement of CSELR operations would be prepared in multiple languages widely spoken by the affected community.
Social sustainability and community functioning	The CSELR and stops would be designed to promote interaction with, and facilitate access to/from, neighbouring areas.

Table 12.52 cont

POTENTIAL IMPACT	POTENTIAL MITIGATION
Construction	
Local amenity, character, environment	- A construction environmental management plan (CEMP) would be prepared by the contractor and would specify further mitigation measures for specific amenity, character and environmental impacts. - Further details for the mitigation of amenity impacts during construction are provided in section 12.7.
Visual impact	- Public space and parkland used for construction would be reinstated, including compounds/site offices, as soon as possible once these areas are no longer required for the construction of the CSELR. - Further details for the mitigation of construction visual impacts are provided in section 12.7.
Changes to access and local traffic conditions	- Ongoing consultation with affected stakeholders and organisers of special events would be undertaken. Alternate routes to avoid impacting special events during construction of the CSELR are to be provided where possible. Advance planning for major events would be undertaken with the City of Sydney. - Most footpaths and cycleways would remain unaffected during construction; however in the limited cases where construction impinges on these paths, clearly marked alternatives would be provided. - Further traffic and transport mitigation strategies for the mitigation of local access and traffic impacts during construction of the CSELR proposal are provided in section 12.3.
Changes to local community services	- Alternate routes to public areas and community facilities impacted by the construction of the proposal would be identified, including The Rocks, Belmore Park, the Sydney Dental Hospital and other community services (churches, schools etc.). - Access to local community services would be maintained during construction of the CSELR proposal, where possible. This could include undertaking construction works in segments and stages. Where this is not possible, alternative access arrangements would be made in consultation with relevant service operators. - Place managers would assist with ensuring needs of disadvantaged residents are accounted for, particularly as some residents may not have access to telephone or email facilities or may not speak English comfortably. - Access plans would be prepared in consultation with property owners and businesses.
Access to and use of public spaces and urban connectivity	- Sequencing of construction activities would be managed to ensure that impacts on public spaces are minimised. - Where footpaths are narrowed or closed off, local diversions would be put in place. - Pedestrians would be diverted to an alternate footpath or crossing prior to establishment of any works zone that would close off the footpath or crossing. - During detailed design, seek opportunities to refine construction work areas to minimise impacts on public spaces. - Provide clear signage around construction compounds utilising open spaces such as First Fleet Park and Belmore Park advising of the project, timing, access arrangements and contact details for complaints. - Alternate spaces would be considered that could substitute for the use of public space required for the construction of the CSELR, for example, Belmore Park. - Mitigation of public domain and connectivity impacts are provided in section 12.7 and further mitigation regarding impact to public spaces is provided in section 12.6 and 12.7.
Noise and vibration	Details for the mitigation of construction noise and vibration impacts are provided in section 12.5.
Property acquisition	Where required during construction, land would be temporarily leased for construction compounds/construction workforce amenities or other construction activities as required.



Table 12.52 cont

POTENTIAL IMPACT	POTENTIAL MITIGATION
Safety and security	- The CEMP would identify risks to safety and security on a site-by-site basis and provide appropriate mitigation measures. - Detailed design would incorporate the principles of Crime Prevention through Environmental Design (CPTED). <i>Disability Discrimination Act 1992</i> requirements would be adopted. - Construction lighting standards would be met or exceeded. - Hoarding/fence lines would be erected to maximise sight lines for pedestrians and avoid hiding places and blind spots to improve pedestrian personal security. - Any gantry arrangements would have internal lighting. - Relocation of closed circuit television (CCTV) cameras would be considered if construction obstructs their view field. - Separation barriers would be installed along the borders of worksites. - Consideration would be given to suspension of works on event days within the City Centre to minimise construction safety risks to crowds. - Safety and security impacts would be addressed as part of the CEMP.
Community and cultural issues	- The scheduling of construction activities would take into consideration major events in the City Centre to minimise impacts on the access to, and function of, these events. This would include consultation with relevant stakeholders. - Staging of works would be undertaken to minimise disruption, in consultation with local community groups, to minimise impacts to community activities and functions. - Materials promoting light rail operation and use in the City Centre Precinct would be prepared in multiple languages, widely spoken by the affected community.
Health and wellbeing	- The CEMP is to identify risks to health and wellbeing on a site-by-site basis and would include appropriate mitigation measures. - Health impacts would be addressed as part of the CEMP, including watering exposed areas to minimise dust impacts, using non-tonal reversing indicators, and fitting construction machinery with appropriate muffling devices.
Social sustainability and community functioning	The CEMP would account for cumulative impacts of construction given concurrent works in the precinct.

Source: Based on Technical Paper 3 – Social Impact Assessment, Volume 3

Three main mitigation measures are proposed to be implemented during the construction and operational phases of the CSELR proposal to mitigate potential economic impacts identified for the City Centre Precinct. These include the preparation of the following:

- Through liaison with businesses and landowners, access plans would establish existing servicing and delivery requirements, access periods or alternative arrangements for businesses and landowners affected by the proposal. These access plans would also identify alternative routes, specific activities or land uses (such as schools, medical centres etc.) within each precinct and would identify strategies to maintain emergency access throughout each precinct at all times. Further details regarding the proposed traffic management strategies for the City Centre Precinct are provided in section 12.3.4.
- A business and landowner engagement and management plan would provide ongoing information to businesses and landowners potentially affected by the CSELR proposal through a variety of sources including information packs, a website, regular newsletters/ brochures and email alerts. The plan would also identify effective means for ongoing cooperation and communication with the business community.
- The CEMP would outline a range of mitigation measures to minimise the level of disturbance created as a result of construction related activities. The CEMP would contain a number of additional plans to manage specific impacts such as noise and traffic. Further details regarding the CEMP for the CSELR proposal is provided in Chapter 18.