



Planning Approval Consistency Assessment Form

SM-17-00000111

Metro Body of Knowledge (MBoK)

Assessment name:	Sydney International Speedway – Solar array and carpark lighting
Prepared by:	Sydney Metro
Prepared for:	Sydney Metro and Abergeldie
Assessment number:	SIS04
Status:	Final
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Date required:	July 2021
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Form information – do not alter:

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The Planning Approval Consistency Assessment Form should be completed in accordance with [SM-17-00000103 Planning Approval Consistency Assessment Procedure](#).

1. Existing Approved Project

Planning approval reference details (Application/Document No. (including modifications)):

- SSI 10048 Sydney International Speedway

Date of determination:

- SSI 10048: 23 December 2020

Type of planning approval: SSI (Division 5.2)

Description of existing approved project you are assessing for consistency:

- Construction and operation of the Sydney International Speedway including:
 - A new world-class clay-based racetrack for both speedway cars and motorcycles including sprint, wingless sprint, street stockers, V8 dirt modified and Formula 500 cars
 - A new grandstand and terraced seating to accommodate up to 7000 spectators
 - Public amenities, corporate boxes, food, beverage and merchandise outlets
 - Dedicated parking for speedway competitors and spectators
 - Additional overflow parking with flexibility to be used for dragway events
 - Dual access to the precinct by creating new vehicle access to the speedway pit area via a new intersection built off Ferrers Road
 - A dedicated competitor pit area to service the speedway
 - Workshops, garages and trackside support services.

The approved project has dedicated parking for Sydney Dragway to replace the existing spectator parking areas which would form part of the Sydney International Speedway project site. A summary of the carparks at the site are as follows, with a figure shown in Appendix A:

- Carpark A – Speedway parking
- Carpark B – Competitor parking which forms part of the operational speedway site
- Carpark C – Sydney Dragway parking available for use by other motorsport operators by agreement

- Carpark D (D1 and D2) – Sydney Dragway parking available for use by other motorsport operators by agreement

The electrical supply for the approved project includes a combination of a new substation, solar (and batteries) and backup generators to satisfy the power supply requirements of the Sydney International Speedway, particularly during race events. The approved project considered that carpark lighting would be solar powered, supported by backup batteries. The EIS states the Speedway would be connected to the electrical grid with further opportunities investigated for additional solar power.

Relevant background information (including EA, REF, Submissions Report, Director General's Report, MCoA):

- Sydney International Speedway Environmental Impact Statement including accompanying technical papers (August 2020)
- Sydney International Speedway Submissions Report (November 2020)
- Sydney International Speedway Amendment Report (November 2020)
- Instrument of Approval (dated 23 December 2020).

The above documents are available on the NSW planning portal here: <https://www.planningportal.nsw.gov.au/major-projects/project/30111>

All proposed works identified in this assessment would be undertaken in accordance with the mitigation measures identified in the EIS, Submissions Report and Amendment Report and the conditions of approval.

2. Justification and description of the proposal

Summary of the proposal

The proposal subject of this Consistency Assessment includes:

1. Mains power supply for carpark B as part of the operational component of the Sydney International Speedway to meet required lux levels during Speedway operations
2. Changing the power supply of Sydney Dragway's carparking (carparks C and D) from solar power to mains power to enable future multipurpose-use of the carparks
3. The inclusion of a solar array on the Speedway pit and garages.

Greenhouse gas inventory – Parking lighting

Since determination of the project, Sydney Metro has further developed the detailed lighting design of the carparks for the approved project. Sydney Metro have recalculated the operational greenhouse gas inventory for the 'Parking Lighting' which was assessed in the EIS to be equivalent to 66,368 Megawatt hours (MWh). This was based on a typical design of lighting power density (2.5W/m²), and would have covered all outdoor carparking areas (at a total of 121,220m²). The greenhouse gas emissions assessment in the EIS utilised Transport for NSW's online Carbon Estimate and Reporting Tool assessment. The greenhouse gas assessment was considered a preliminary estimate based on current design information and construction methods.

The above assumption in the EIS over-estimated the total power required for the carparks. Based on the lighting design, the operational greenhouse gas inventory for the carpark lighting has been recalculated, resulting in a reduction of MWh required for the carparks to 5,255 MWh, which is significantly lower than predicted in the EIS (a 92% decrease). This was recalculated based on the actual lighting allocation, in accordance with the operational assumptions as used in the EIS, using the Transport for NSW Carbon Estimate and Reporting Tool. This is summarised in the table below which shows the revised assumptions in red, and the results are shown in Appendix B and C:

	EIS Greenhouse Gas Inventory predictions	Revised EIS Greenhouse Gas Inventory based on lighting design
<i>Assumptions</i>	a) 2.5W/m ² x 121,220m ² b) 12 hrs/day c) 365 days/year d) for 50 years	a) 199 lights/80W each (carparks A, C, D1 and D2) b) 25 lights/500W each + 9 lights/80W each (carpark B) c) 12 hrs/day d) 365 days/year e) for 50 years
<i>MWh</i>	66,368 MWh	5,255 MWh (92% decrease from EIS prediction)

Competitor Carpark – Carpark B

Carpark B would be used during events at the Sydney International Speedway by the competitors to:

- Load/off load vehicles
- Undertake maintenance work outside of the pit garage
- Service vehicles adjacent to/in their trucks between the races
- During a race event, competitors will be moving to/from their trucks.

Given the safety design requirements and required lux levels (illuminance) to achieve the necessary brightness during race events, a solar design was not progressed for this carpark. The lights would be connected to the mains power to achieve the required lux levels to achieve safety requirements.

Sydney Dragway - Carparks C and D

The approved project has dedicated parking for Sydney Dragway to replace the existing spectator parking areas which would form part of the Sydney International Speedway project site. The new Sydney Dragway parking in carparks C and D would be available for use by other motorsport operators by agreement.

Since determination of the project, Sydney Metro have undertaken consultation with Sydney Dragway and Western Sydney Parklands Trust on the solar design of the lighting in carparks C and D. Sydney Dragway and Western Sydney Parklands Trust have indicated that there is an opportunity and desire to utilise carpark areas for alternate purposes when the carparks are not in use for Sydney Dragway event parking.

The lighting for carparks C and D were designed as stand alone solar lights with battery poles / columns evenly spaced throughout the carpark. Through consultation, it has been identified that in order to allow for potential alternate activities and uses in the future, the internal light poles could be relocated to the perimeter of the carparks where possible to allow for a cleared carpark design. This would enable a flexible use of the carpark space for other activities.

Through the Safety In Design process undertaken by Sydney Metro, in order to achieve the required lumens (light output) for carpark safety, it was indicated that the solar lighting with a perimeter design would not emit sufficient lighting to meet the required standards of the carparks. Sydney Metro investigated the option for additional portable solar lights to be deployed. However, one of the risks of the solar portable lights is that during operations, there is a risk that the portable solar lights would not be installed in a safe manner and in the correct location to achieve the required standards.

The preferred option to achieve the required lumens to cover the entire carpark from the perimeter, is to move the Dragway carpark lights to the main supply using Sydney Dragway's substation, which has been assessed to have sufficient capacity to support this supply. This approach would eliminate the requirement for portable solar lights, and would achieve the objective of enabling the carpark to be used as a multipurpose area. To comply with pedestrian walkway lighting levels stipulated in the Western Sydney Parklands Trust design manual and Australian standards, lighting must be provided along the designated walkways within the carparks. Some internal light poles are therefore still required for footpaths within the carparks however these would not preclude future use of the carparks for alternate activities.

Solar array on the Speedway pit and garages

Mitigation measure GHG2 for the approved project states: *"Opportunities to optimise the project design to minimise greenhouse gas emissions during operation would be considered as part of further design development..."*. As such, Sydney Metro have identified the opportunity to include a solar array on the pit and garage area of the Sydney International Speedway. This is a collection of solar panels that generate electricity as a system, which would offset the mains electricity required during operation of the approved project. The solar array

would cover the pit and garage area which is approximately 1,000m², and would offset approximately 6,915 tCO₂-e (greenhouse gas emissions) over the operational life of the project (50 years). This is greater than the total greenhouse gas emissions predicted to be generated as a result of the total carpark lighting.

Summary of proposed changes

Area	EIS design	Proposed changes
<i>Carpark A</i>	Solar lighting	Solar lighting (<i>no changes</i>)
<i>Carpark B</i>	Solar lighting	Lighting connected to mains power to achieve required lux levels during operation of the Speedway
<i>Carpark C and D</i>	Solar lighting	Lighting connected to mains power to enable a design solution that allows for flexible use of the carpark space
<i>Speedway</i>	Connection to mains power with further opportunities investigated for additional solar power	Connection to mains power with inclusion of a solar array

3. Timeframe

The proposal does not include any changes to the construction timeframes required for the approved project.

4. Site description

The Sydney International Speedway (SIS) is being developed on land owned by the NSW Government, managed by the Western Sydney Parklands Trust (WSPT).

No changes to the approved project area is required for the proposal.

Refer to Appendix A for a summary of the carpark areas and the area of the pit and garages.

5. Site Environmental Characteristics

The proposal would be consistent with the approved project area as described in section 3 of the Amendment Report. The project is located within the Western Sydney Parklands which is managed by the Western Sydney Parklands Trust pursuant to the provisions of the *State*

Environmental Planning Policy (Western Sydney Parklands) 2009 (Western Sydney Parklands SEPP). The objective of the Western Sydney Parklands SEPP is to implement planning controls that will enable the Western Sydney Parklands Trust to develop the Parklands into a multi-use urban parkland for Western Sydney.

6. Environmental benefit

Sydney Metro and Sydney Dragway have identified an opportunity for the Sydney Dragway carparks to be designed for future multipurpose use which would have a positive sustainability outcome. As previously discussed, the proposal is required to meet lighting standards within the Sydney Dragway carparks, and although the shift from solar power to mains power would increase emissions generated during operation, there are benefits to providing areas that would be able to be used for multiple purposes in the future. Sydney Metro would retain the other solar powered lighting at the Speedway carpark. The solar lighting of carpark A would offset approximately 560 tCO₂-e (greenhouse gas emissions) over the operational life of the project.

Sydney Metro have also implemented a solar array on the pit and garage area to generate electricity to offset some of electricity use at the site. The solar array on the Speedway pit and garages would offset 6,915 tCO₂-e (greenhouse gas emissions) over the operational life of the project. Overall, the solar lighting and the solar array would offset 7,475 tCO₂-e (greenhouse gas emissions) which is equivalent to approximately 21% of the estimated total greenhouse gas emissions generated over the life of the project (based on revised parking lighting electricity consumption). The total predicted greenhouse gas emissions for the project are 28,275 tCO₂-e (2,427 less than estimated for the EIS for the approved project).

Refer to Appendix B for a revised Operational Greenhouse Gas Inventory.

7. Control Measures

The works would be undertaken within the existing CEMP which identifies appropriate controls for the works.

The following conditions which are most specifically relevant to the proposed works include:

Condition E41:

The SSI must be designed and built, in consultation with the Western Sydney Parklands Trust and Council, having regards to the:

- (a) Western Sydney Parklands SEPP;*
- (b) Western Sydney Parklands Urban Design Manual (2020), including sustainability considerations;*
- (c) good design outcomes in Better Placed (NSW Government Architect, 2017); and*
- (d) principles of green infrastructure and outcomes in draft Greener Places (NSW Government Architect, 2020).*

Sydney Metro have undertaken consultation with Western Sydney Parklands Trust on the design of the Sydney International Speedway including the lighting design for carparks C and D to enable future multipurpose use. The proposed works would contribute to aim of the Western Sydney Parklands SEPP to “develop the Western Parklands into a multi-use urban parkland for the region of western Sydney” by “facilitating use of the Western Parklands to meet a range of community needs and interests”. Sydney Metro and Sydney Dragway have considered community interests in the design of the Sydney Dragway carparks to enable potential additional uses when the carpark areas are not required for events. The carpark lighting would also be designed to meet the principles for lighting as specified in the Western Sydney Parklands Urban Design Manual.

Condition E42:

The Proponent must construct and operate the SSI with the objective of minimising light spill to surrounding properties and effects on foraging behaviour or flight paths of nocturnal bird and bats known to utilise Prospect Nature Reserve. All lighting associated with the construction and operation of the SSI must be consistent with the requirements of AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting, relevant Australian Standards in the series AS/NZ 1158 – Lighting for Roads and Public Spaces and give consideration to the National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (Commonwealth of Australia 2020). Additionally, the Proponent must mitigate residual night lighting impacts to protect existing or approved (as at the date of this approval) properties adjacent to the SSI and must consult with affected landowners.

Sydney Metro would ensure the lighting design of the carparks would meet the requirements of Condition E42. Sydney Metro would undertake light spill assessment where required to minimise impacts potential ecological impacts. Sydney Metro would continue to consult with affected landowners.

Mitigation Measure GHG2:

Opportunities to optimise the project design to minimise greenhouse gas emissions during operation would be considered as part of further design development, including considerations relating to:

- *Track design to minimise ongoing plant maintenance*
- *Waste management strategy and design to minimise waste to landfill during operation.*

Sydney Metro have identified the opportunity to include a solar array on the pit and garage area of the Sydney International Speedway. This has therefore been identified as an opportunity to minimise greenhouse gas emissions during operation to offset additional mains electricity use required for the Dragway carpark lighting. Overall, the total predicted greenhouse gas emissions are 28,275 tCO₂-e (2,427 less than estimated for the EIS for the approved project). Refer to Appendix B for detailed breakdown of the estimated greenhouse gas emissions as a result of the proposal, noting recalculations have only been undertaken on parking lighting and the inclusion of the solar array.

9. Climate Change Impacts

Is the site likely to be adversely affected by the impacts of climate change? If yes, what adaptation/mitigation measures will be incorporated into the design?

Potential impacts of climate change are expected to be minimal due to the relatively short timeframe of the construction phase of the project. The capacity of the Sydney Dragway diesel-fuelled generator will be reviewed to ensure adequate capacity to mitigate any additional risk associated with the partial removal of the solar / battery carpark lighting. Climate change adaptation impacts from this proposal would be consistent with those assessed in the Environmental Impact Statement.

Whilst the proposal would result in the reduction of solar lighting on some carparks, this impact would be offset with the implementation of the solar array on the Speedway pit and garages (refer to Appendix B).

10. Impact Assessment – Construction

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No change from the approved project.	No additional measures required.	Y	Y	
Water	No change from the approved project.	No additional measures required.	Y	Y	
Air quality	No change from the approved project.	No additional measures required.	Y	Y	
Noise and vibration	No change from the approved project.	No additional measures required.	Y	Y	
Aboriginal heritage	No change from the approved project.	No additional measures required.	Y	Y	
Non-Aboriginal heritage	No change from the approved project.	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Community and stakeholder	No change from the approved project.	No additional measures required.	Y	Y	
Traffic	No change from the approved project.	No additional measures required.	Y	Y	
Waste	No change from the approved project.	No additional measures required.	Y	Y	
Social	No change from the approved project.	No additional measures required.	Y	Y	
Economic	No change from the approved project.	No additional measures required.	Y	Y	
Visual	No change from the approved project.	No additional measures required.	Y	Y	
Urban design	No change from the approved project.	No additional measures required.	Y	Y	
Geotechnical	No change from the approved project.	No additional measures required.	Y	Y	
Land use	No change from the approved project.	No additional measures required.	Y	Y	
Climate change adaptation	No change from the approved project.	No additional measures required.	Y	Y	
Risk	No change from the approved project.	No additional measures required.	Y	Y	
Other	No change from the approved project.	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Management and mitigation measures	No change from the approved project.	No additional measures required.	Y	Y	

11. Impact Assessment – Operation

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	The lighting design for the carparks would be designed in accordance with Condition E42 with the objective of minimising light effects on foraging behaviour or flight paths of nocturnal bird and bats known to utilise Prospect Nature Reserve. The lighting design would implement light angling or shields to minimise the impact to nocturnal fauna.	No additional measures required.	Y	Y	
Water	No change from the approved project.	No additional measures required.	Y	Y	
Air quality	No change from the approved project.	No additional measures required.	Y	Y	
Noise and vibration	No change from the approved project.	No additional measures required.	Y	Y	
Aboriginal heritage	No change from the approved project.	No additional measures required.	Y	Y	
Non-Aboriginal heritage	No change from the approved project.	No additional measures required.	Y	Y	
Community and stakeholder	Sydney Metro have undertaken consultation with Sydney Dragway and Western Sydney Parklands Trust on the design of the lighting in carparks C and D. The proposal enables an opportunity to utilise carpark areas for alternate purposes when the carparks are not in use for Sydney Dragway event parking. This would achieve a positive community and stakeholder outcome.	No additional measures required.	Y	Y	
Traffic	No change from the approved project.	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Waste	No change from the approved project.	No additional measures required.	Y	Y	
Social	No change from the approved project.	No additional measures required.	Y	Y	
Economic	No change from the approved project.	No additional measures required.	Y	Y	
Visual	No change from the approved project. The solar array on the pit and garages would be designed to not have an obtrusive visual impact on the Speedway site.	No additional measures required.	Y	Y	
Urban design	No change from the approved project.	No additional measures required.	Y	Y	
Geotechnical	No change from the approved project.	No additional measures required.	Y	Y	
Land use	No change from the approved project.	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Climate change adaptation	Climate change adaptation impacts from this proposal would be consistent with those assessed for the approved project. The EIS identified the climate change risk that increased ambient temperatures and heatwaves could result in peaks in electrical network demand and increased power transmission outages. The risk treatment as identified in the EIS states <i>Solar lighting backed up by batteries and diesel generators would be provided for car parks. The Speedway site would be connected to the electrical grid with further opportunities investigated for additional solar power.</i> In order to further mitigate the risk of power transmission outages, the capacity of the diesel-fuelled generator would be reviewed to ensure adequate capacity to mitigate the risk associated with the removal of some solar lighting in the carparks.	The capacity of the diesel-fuelled generator would be reviewed to ensure adequate capacity to ensure power transmission outages are minimised.	Y	Y	
Risk	No change from the approved project.	No additional measures required.	Y	Y	
Other	No change from the approved project.	No additional measures required.	Y	Y	
Management and mitigation measures	No change from the approved project.	No additional measures required.	Y	Y	

12. Consistency with the Approved Project

Based on a review and understanding of the existing Approved Project and the proposed modifications, is there is a transformation of the Project?	No. The proposed works would not transform the project. The proposal is required to offset solar lighting which can no longer be incorporated within some of the carparks at the site with a solar array. These works are required to meet the lighting standards necessary during the operation of the approved project, and to provide additional benefits to stakeholders.
Is the project as modified consistent with the objectives and functions of the Approved Project as a whole?	Yes. The proposed works would be consistent with the objectives and functions of the approved project.
Is the project as modified consistent with the objectives and functions of elements of the Approved Project?	Yes. The changes identified in this assessment are consistent with the objectives and functions of the elements of the approved project.
Are there any new environmental impacts as a result of the proposed works/modifications?	All risks would be adequately addressed through the application of the mitigation measures in the above tables. There would be no new environmental risks as a result of the proposed works.
Is the project as modified consistent with the conditions of approval?	Yes. The proposed works would be consistent with the conditions of approval.
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed works are understood and will be accounted for by implementing the control measures within this document, the CEMP, CEMP sub-plans.
Are the impacts of the proposed activity/works able to be managed so as not to have an adverse impact?	Yes. The impacts of the proposed works can be managed so as to avoid an adverse impact.

13. Other Environmental Approvals

Identify all other approvals required for the project:

N/A

Author certification

To be completed by person preparing checklist.

I certify that to the best of my knowledge this Consistency Checklist:

- Examines and takes into account the fullest extent possible all matters affecting or likely to affect the environment as a result of activities associated with the Proposed Revision; and
- Examines the consistency of the Proposed Revision with the Approved Project; is accurate in all material respects and does not omit any material information.

Name:	Jessie Strange	Signature:	
Title:	Planning Approvals Officer		
Company:	Sydney Metro	Date:	28/06/2021

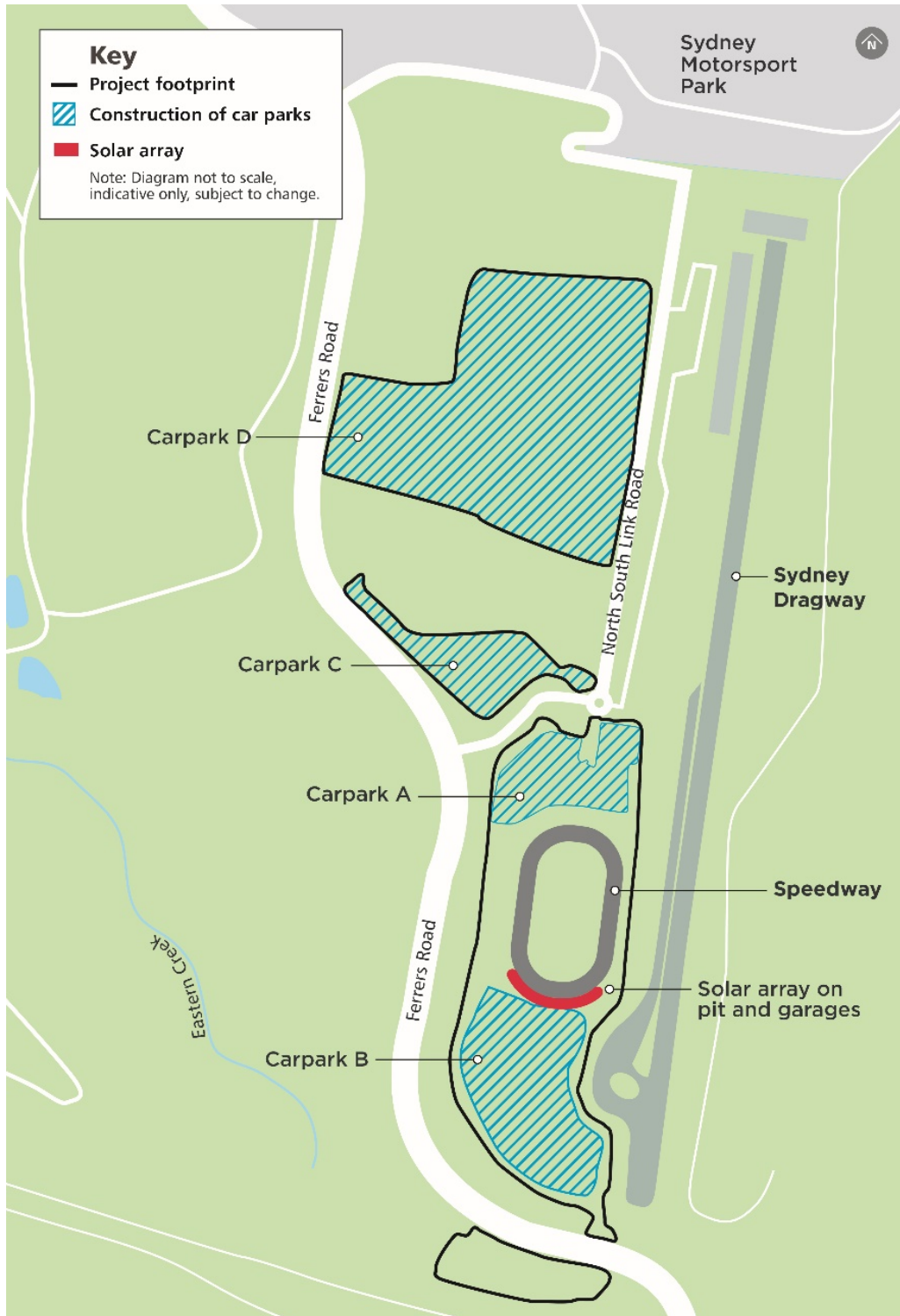
Based on the above assessment, are the impacts and scope of the proposed activity/modification consistent with the existing Approved Project?

Yes ☒ The proposed activity/works are consistent and no further assessment is required.

No The proposed works/activity is not consistent with the Approved Project. A modification or a new activity approval/ consent is required. Advise Project Manager of appropriate alternative planning approvals pathway to be undertaken.

Endorsed by			
Name:	Stuart Hodgson	Date:	30 June 2021
Title:	Director ESP SMW	Comments:	Please provide design evidence of outcomes agreed to
Signature:			

Appendix A: Project site layout and features of the proposal



Appendix B: Revised greenhouse gas inventory

Figure A – Operational greenhouse gas inventory for the approved project (extract from Environmental Impact Statement – Table 20-3) showing design assumptions for Parking Lighting (noting solar lighting which would not generate emissions)

Table 20-3 Operational greenhouse gas inventory and emissions

Design assumptions:

- 2.5W/m² x 121,220m²
- 12 hrs/day
- 365 days/year
- for 50 years

Emission source	Quantity	Unit	Emissions (tCO ₂ -e)			
			Scope 1	Scope 2	Scope 3	Total
Operational electricity consumption						
Parking Lighting ¹	66,368	Megawatt hours (MWh)	-	-	-	-
Speedway Lighting	338	MWh	-	274	30	304
CCTV	8806	MWh	-	7133	793	7926
Event AV Systems	1366	MWh	-	1106	123	1229
Grandstand	683	MWh	-	554	62	616
Corporate Boxes	4662	MWh	-	3776	420	4196
Competitor Areas	4696	MWh	-	3803	423	4226
Workshops	3163	MWh	-	2562	285	2847
Food, beverage and ticketing	3430	MWh	-	2778	309	3087
Operational fuel consumption						
Food and beverage	9	Kilolitres (kL) LPG	14	-	1	15
Water truck	734	kL Diesel	1998	-	103	2101
Grader	612	kL Diesel	1665	-	86	1751
Operational waste consumption						
Cardboard/paper	248	tonnes	-	-	718	718
Food organics	510	tonnes	-	-	970	970
Mixed recycling	485	tonnes	-	-	0	0
General waste	558	tonnes	-	-	670	670
Cooking oil	27	tonnes	-	-	51	51
Total estimated operational emissions			3677	21,986	5044	30,702

¹ Carpark lighting would be solar lighting and would not generate emissions

Figure B – Amended greenhouse gas inventory - showing amended design assumptions (in red) for Parking Lighting (based on preliminary lighting design as all solar lighting)

Design assumptions:

- **Carpark A, C and D: 199 light poles x 80w**
- **Carpark B: 25 light poles x 500w, 9 light poles x 80w**
- 12 hrs/day
- 365 days/year
- for 50 years

Emission source	Quantity	Unit	Emissions (tCO ₂ -e)			
			Scope 1	Scope 2	Scope 3	Total
Operational electricity consumption						
Parking Lighting ¹	5,253 66,368	Megawatt hours (MWh)	-	-	-	-
Speedway Lighting	338	MWh	-	274	30	304
CCTV	8806	MWh	-	7133	793	7926
Event AV Systems	1366	MWh	-	1106	123	1229
Grandstand	683	MWh	-	554	62	616
Corporate Boxes	4662	MWh	-	3776	420	4196
Competitor Areas	4696	MWh	-	3803	423	4226
Workshops	3163	MWh	-	2562	285	2847
Food, beverage and ticketing	3430	MWh	-	2778	309	3087
Operational fuel consumption						
Food and beverage	9	Kilolitres (kL) LPG	14	-	1	15
Water truck	734	kL Diesel	1998	-	103	2101
Grader	612	kL Diesel	1665	-	86	1751
Operational waste consumption						
Cardboard/paper	248	tonnes	-	-	718	718
Food organics	510	tonnes	-	-	970	970
Mixed recycling	485	tonnes	-	-	0	0
General waste	558	tonnes	-	-	670	670
Cooking oil	27	tonnes	-	-	51	51
Total estimated operational emissions			3677	21,986	5044	30,702

¹ Carpark lighting would be solar lighting and would not generate emissions

Figure C – Amended greenhouse gas inventory - showing amended design assumptions (in red) for Parking Lighting (based on revised lighting design and inclusion of solar array)

Emission source	Quantity	Unit	Emissions (tCO ₂ -e)							
			Scope 1	Scope 2	Scope 3	Total				
Operational electricity consumption										
Parking Lighting ¹	5,255	66,368	Megawatt hours (MWh)	-	-	4,413	-	630	-	5,043
Speedway Lighting	338		MWh	-		274		30		304
CCTV	8806		MWh	-		7133		793		7926
Event AV Systems	1366		MWh	-		1106		123		1229
Grandstand	683		MWh	-		554		62		616
Corporate Boxes	4662		MWh	-		3776		420		4196
Competitor Areas	4696		MWh	-		3803		423		4226
Workshops	3163		MWh	-		2562		285		2847
Food, beverage and ticketing	3430		MWh	-		2778		309		3087
Solar Lighting (elec. offset) ²	582		MWh			-560				-560
Solar Array (elec. offset) ³	7,205		MWh			-6,915				-6,915
Operational fuel consumption										
Food and beverage	9		Kilolitres (kL) LPG	14		-		1		15
Water truck	734		kL Diesel	1998		-		103		2101
Grader	612		kL Diesel	1665		-		86		1751
Operational waste consumption										
Cardboard/paper	248		tonnes	-		-		718		718
Food organics	510		tonnes	-		-		970		970
Mixed recycling	485		tonnes	-		-		0		0
General waste	558		tonnes	-		-		670		670
Cooking oil	27		tonnes	-		-		51		51
Total estimated operational emissions				3677		21,986		5044		30,702
						18,924		5,674		28,275

Design assumptions:

- Carpark A, C and D: 199 light poles x 80w
- Carpark B: 25 light poles x 500w, 9 light poles x 80w
- 12 hrs/day
- 365 days/year
- for 50 years

Design assumptions:

- Carpark A: 32 light poles x 80w
- 12 hrs/day
- 365 days/year
- for 50 years

Design assumptions:

- 100kWp panel

1. This includes emissions for all carparks (A, B, C, D) assuming mains power

2. Carpark A lighting would be solar lighting and is therefore a negative value as an offset

3. Solar array proposed on the Speedway workshops which would offset 6,915 ton CO₂e emissions over 50 years

Appendix C: Transport for NSW Carbon Estimate and Reporting Tool results

GHG emission revised base case - solar lighting for all carpark

Operational energy

Carbon Estimate & Reporting Tool



Legend

Concrete	Click text to go to calculator
250.0	Calculated result
	Cell for user input
	Cell for user commentary

Project	Speedway lighting verification
Reporting period	Energy use modeled over asset lifetime
Date of data entry	21 June 2021

Operational energy totals - BASE CASE

Asset service life **50** years

	Quantity	Unit
Annual operational energy use	378.3	GJ/year
Annual operational greenhouse gas emissions; scope 1	0.0	t CO ₂ e/year
Annual operational greenhouse gas emissions; scope 2	88.3	t CO ₂ e/year
Annual operational greenhouse gas emissions; scope 3	12.6	t CO ₂ e/year
Annual operational greenhouse gas emissions; total	100.9	t CO ₂ e/year

	Quantity	Unit
Total operational energy use over asset life	18,913	GJ
Total operational greenhouse gas emissions over asset life; scope 1	0	t CO ₂ e
Total operational greenhouse gas emissions over asset life; scope 2	4,413	t CO ₂ e
Total operational greenhouse gas emissions over asset life; scope 3	630	t CO ₂ e
Total operational greenhouse gas emissions over asset life; total	5,043	t CO ₂ e

Copy Base Case data to Forecast Optimised

Base Case - Estimated BAU energy use

Project	Quantity	Unit	Energy source
TOTAL project			
Annual electricity consumption			Electricity
Annual diesel consumption			Diesel
Annual natural gas consumption			Natural gas
Annual LPG consumption			LPG
Annual petrol consumption			Petrol / ULP
Annual E10 consumption			Petrol / Ethanol (10%)

Evidence / data source / comments

Energy conversion

0	GJ/year
0	GJ/year
0	GJ/year
0	GJ/year
0	GJ/year
0	GJ/year
0.0	GJ/year

WARNING!!! EITHER fill in the project totals above OR fill in the breakdown per project element below. When values are entered for the total project (above) the breakdown (below) is disregarded!

Breakdown into project elements	Quantity	Unit	Energy source
[Enter project element I]			
speedway carpark_solar	11633.28	kWh/year	Electricity
drag carpark_C	7463.52	kWh/year	Electricity
drag carpark_D1	17222.16	kWh/year	Electricity
drag carpark_D2	9863.76	kWh/year	Electricity
competitor carpark	58889.1	kWh/year	Electricity
[please specify]			

Evidence / data source / comments

e.g. traction power, rolling stock
e.g. lighting, HVAC, vertical transport
e.g. signalling, communications, fire, hydraulics
e.g. tunnel power, ventilation
e.g. retail, front-of-house, back-of-house
e.g. miscellaneous power

41.87981	GJ/year
26.86867	GJ/year
61.99978	GJ/year
35.50954	GJ/year
212.0008	GJ/year
0	GJ/year

Subtotals [Enter project element I]

Electricity	378.3	GJ/year	100.9	t CO ₂ e/year
Diesel	0.0	GJ/year	0.0	t CO ₂ e/year
Natural gas	0.0	GJ/year	0.0	t CO ₂ e/year
LPG	0.0	GJ/year	0.0	t CO ₂ e/year
Petrol / ULP	0.0	GJ/year	0.0	t CO ₂ e/year
Petrol / Ethanol (10%) blend	0.0	GJ/year	0.0	t CO ₂ e/year

Annual lighting load (Demand met by its own solar generation & storage system)

Annual GHG emission by lighting load (Offset by its own solar generation & storage system)

Annual lighting load (Demand met by its own solar generation & storage system)

378.3 GJ/year

As per EIS assumption, all carpark lighting loads are supplied by its solar panel & battery system, no main supply

Proposed GHG emission - main supply & solar array & solar lighting

Operational energy

Carbon Estimate & Reporting Tool



Transport
for NSW

Legend

Concrete	Click text to go to calculator
250.0	Calculated result
	Cell for user input
	Cell for user commentary

Operational energy totals: Forecast – Optimised

	Quantity	Unit	
Annual operational energy use	938.9	GJ/year	
Annual operational greenhouse gas emissions; scope 1	0.0	t CO ₂ e/year	includes mitigation
Annual operational greenhouse gas emissions; scope 2	-42.6	t CO ₂ e/year	includes mitigation
Annual operational greenhouse gas emissions; scope 3	-6.1	t CO ₂ e/year	includes mitigation
Annual green power, offsets and certificates purchased	0.0	t CO ₂ e/year	
Annual operational greenhouse gas emissions; total	-48.6	t CO ₂ e/year	

50 year asset service life

	Quantity	Unit
Total operational energy use over asset life	46,947	GJ
Total operational greenhouse gas emissions over asset life; scope 1	0	t CO ₂ e
Total operational greenhouse gas emissions over asset life; scope 2	-2,128	t CO ₂ e
Total operational greenhouse gas emissions over asset life; scope 3	-304	t CO ₂ e
Total green power, offsets and certificates purchased	0	t CO ₂ e
Total operational greenhouse gas emissions over asset life; total	-2,432	t CO ₂ e

Forecast – Optimised: Estimated optimised energy use

Project	Quantity	Unit	Energy source
TOTAL project			
Annual electricity consumption			Electricity
Annual diesel consumption			Diesel
Annual natural gas consumption			Natural gas
Annual LPG consumption			LPG
Annual petrol consumption			Petrol / ULP
Annual E10 consumption			Petrol / Ethanol (10%)

Evidence / data source / comments

Negative net emission - The energy generated onsite (solar array and solar lighting) exceeds the total carpark lighting used from the main supply.

Breakdown into project elements	Quantity	Unit	Energy source
[Enter project element I]			
speedway carpark_solar	11633.28	kWh/year	Electricity
drag carpark_C	7463.52	kWh/year	Electricity
drag carpark_D1	17222.16	kWh/year	Electricity
drag carpark_D2	9863.76	kWh/year	Electricity
competitor carpark	58889.1	kWh/year	Electricity
[please specify]			

Evidence / data source / comments

e.g. traction power, rolling stock
e.g. lighting, HVAC, vertical transport
e.g. signalling, communications, fire, hydraulics
e.g. tunnel power, ventilation
e.g. retail, front-of-house, back-of-house
e.g. miscellaneous power

Subtotals [Enter project element I]			
Electricity	378.3	GJ/year	100.9 t CO ₂ e/year
Diesel	0.0	GJ/year	0.0 t CO ₂ e/year
Natural gas	0.0	GJ/year	0.0 t CO ₂ e/year
LPG	0.0	GJ/year	0.0 t CO ₂ e/year
Petrol / ULP	0.0	GJ/year	0.0 t CO ₂ e/year
Petrol / Ethanol (10%) blend	0.0	GJ/year	0.0 t CO ₂ e/year

Annual GHG emission by lighting load (Offset by renewable energy generation below)

Forecast – Optimised: Operational energy Mitigation calculator

Operational energy use related mitigation measures	Quantity	Unit	Emission factor (kg CO ₂ e/unit)	Mitigation achieved (t CO ₂ e)	Evidence / data source / comments
On-site renewable energy generation	144113.6	kWh electricity	1.0	-138.3	On-site generation can only be claimed if the generated electricity is consumed within the project and you are not selling any renewable energy certificates
Change in electricity use	11633.0	kWh electricity	1.0	-11.2	
Change in diesel consumption for site vehicles			0.0	0.0	
Change in diesel consumption for stationary plant			0.0	0.0	
Change in diesel consumption for mobile plant			0.0	0.0	
Change in other fuels			0.0	0.0	
Use of biodiesel			0.0	0.0	
			0.0	0.0	

Total mitigation achieved **-149.5** t CO₂e / year

Annual solar reductions from both Solar array & solar lighting for Speedway carpark A

Operational energy use related offset measures	Quantity	Unit	Offset Emission factor (kg CO ₂ e/unit)	Offsets purchased (t CO ₂ e)	Evidence / data source / comments
Green Power / renewable electricity purchased			0.0	0.0	
Green energy certificates			0.0	0.0	
Carbon offsets		t CO ₂ e/year	1000.0	0.0	

Total offsets purchased **0.0** t CO₂e / year