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Architecture
Urban Design
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Interiors

Narrabeen Education Precinct

Development Application Report

Architectural Design | September 2022

P22-024
16.09.2022

Revision	Description	Date	Approved by
1	Development Application Report - First Draft	23/08/2022	RF/JO/CM
2	Development Application Report - Second Draft	13/09/2022	RF
3	Development Application Report	16/09/2022	RF/CM

Contents

Acknowledgment of Country

The authors of this report acknowledge and respect the traditional custodians of the land on which this project will be constructed and operate. We recognise their continuing connection to land, waters and culture and pay our respects to their Elders past, present and emerging.

Contents

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“We are currently preparing students for jobs that don’t yet exist … using technologies that haven’t been invented … in order to solve problems we don’t even know are problems yet.”

Richard Riley, former US Secretary of Education

1.0 Executive Summary

1.0 Executive Summary

1.01 Project Summary

This report has been prepared by DesignInc for School Infrastructure NSW, to support the development of a new school building and refurbishment of heritage buildings at Narrabeen Education Precinct, which encompasses the Narrabeen North Public School and Narrabeen Sports High School sites

This report has been structured as follows:

- Executive Summary
- Site Analysis
- Design Objectives - Architecture
- Design Objective - Landscape
- Design Impacts
- Building Construction and Operation
- Appendices

Proposal

The proposed Narrabeen Education Precinct development includes redevelopment of Narrabeen North Public School (NNPS) and Narrabeen Sports High School (NSHS). The Public School and High School have been identified by the NSW Department of Education (DoE) as requiring upgrade works.

The works at NNPS upgrades the school campus including demolition of existing buildings (Blocks H and J), construction of three (3) new buildings with refurbishment of three (3) existing buildings (Blocks B, K and V).

The works at NSHS upgrade the school including addition of new two (2) storey extension to Building A, construction of new single storey amenities building and refurbishment of four (4) existing buildings (Buildings A, B, C and K).

This Development Application (DA) will seek consent for the following works at NNPS & NSHS:

The works the subject of the Development Application (DA) at NNPS comprise:

Construction of a new two (2) storey building containing administration facilities, multi-purpose hall and out-of-school-hours care (OSHC) facility on the ground floor with staff facilities and amenities on the first floor; and

New Covered Outdoor Learning Area (COLA).

The works the subject of the DA at NSHS comprise:

Alterations and additions to Building A (Gymnasium) to create new stage for gymnasium and new two (2) storey addition comprising canteen, boys and girls changing rooms and staff room on the ground floor; and movement studio and two (2) new General Learning Spaces (GLS) on the first floor.

Other development works are occurring on the site under separate planning pathways including:

Development without consent (REF); and Exempt development

The proposed development does not seek to increase staff or student numbers.

Site Description

The subject sites are located at 6 and 10 Namona Street, North Narrabeen (referred to as the Narrabeen Education Precinct) and fall within the local government area of Northern Beaches Council.

The Narrabeen Education Precinct has a total area of 9.84 hectares.

Narrabeen North Primary School (NNPS) is located on the northern side of Namona Street, North Narrabeen and is legally described as Lot 3 Deposited Plan (DP) 1018621. NNPS is surrounded by residential dwellings to the east, grassed sporting fields (Warriewood Valley Sportsground) to the north and Northern Beaches Indoor Sports Centre to the west. NNPS contains two (2) Binishell domes (Block A and Block B) which are identified as a local heritage item under the Pittwater Local Environmental Plan 2014. The two (2) Binishell Domes are listed as State significant on DoE's Section 170 Heritage and Conservation Register. The Double Binishell Dome (Block B) is listed on the State Heritage Register (SHR).

Narrabeen Sports High School (NSHS) is located on the southern side of Namona Street and is legally described as Lot 12 DP 1119562. NSHS is surrounded by Pittwater Road to the east, Pittwater Sports Centre to the south and Mullet Creek to the west.

1.0 Executive Summary

1.02 Project References

Project team

Project Manager	Johnstaff
Architecture, Interiors, Landscape	DesignInc
Planning	DFP Planning
Quantity Surveyor	Turner & Townsend
Civil, Structural	Enstruct Group
Electrical, Mechanical, ESD	Steensen Varming
Hydraulic, Fire	Erbas
Acoustics	Acoustic Studio
Traffic	Ason Group
Heritage Consultant	City Plan Heritage
BCA, Accessibility	Philip Chun & Associates
Aboriginal Heritage	Tocomwall
Ecology and Arborist	ADE Consulting
Geotechnical	Douglas Partners
Surveying	Clement & Reid Project Surveyors
Waste Management	Elephants Foot
Indigenous Consultant	Carranggel Consulting

As part of this process the following documentation has been referred to:

- Design for Schools, Government Architect NSW, 2018
- Environmental Design In Schools, Government Architect, NSW, 2018
- Pittwater LEP 2014
- Consultant reports
- Surveys
- EFSG
- SINSW Guides associated with MMC and the Hub Layouts

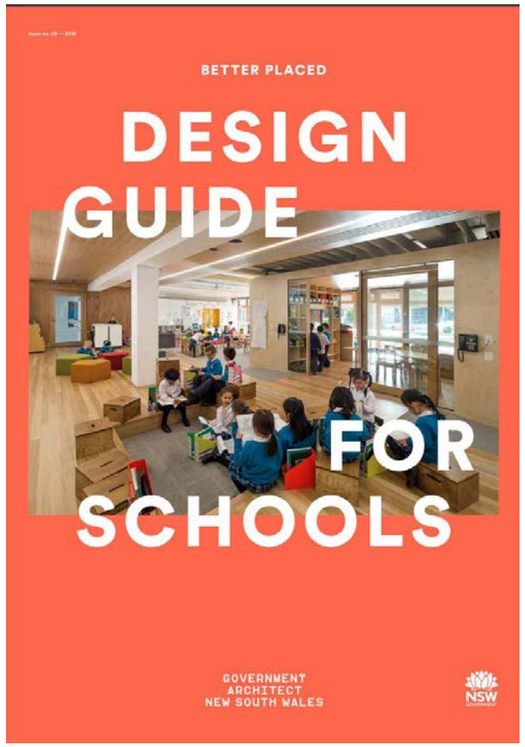

Figure 1:Design Guide for Schools, Government Architect, NSW

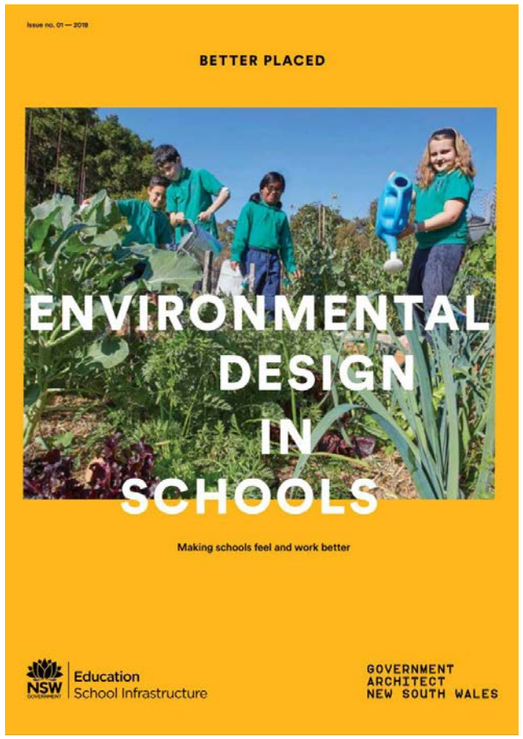

Figure 2: Environmental Design in Schools, Government Architect, NSW

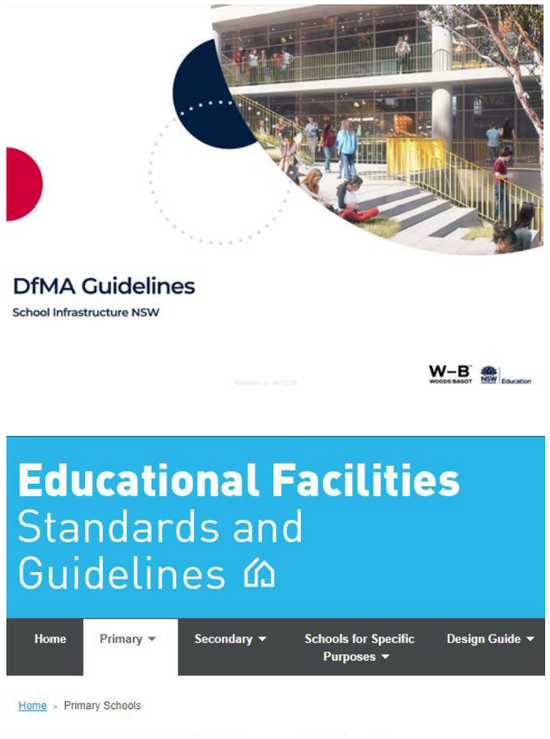

Figure 3: Top: SINSW, DfMA (Modern Methods of Construction) Guidelines

Figure 4: Bottom: SINSW, Education Facilities Guidelines (EFSG) website

1.0 Executive Summary

1.03 Connecting with Country

The site on which Narrabeen Education Precinct is built lies within the area occupied by the Cammeraygal clan. The High School site is located on a former swamp, which provided an abundance of food for the first nations people. The swamp and its surrounds were a site visited during celebrations by the Cammeraygal people.

A visit to the Narrabeen Education Precinct site was conducted by DesignInc with Indigenous Elder Uncle Dennis Foley on 28/03/2022.

The following stories and history were discussed whilst walking the site with Uncle Dennis:

- **The High School site has a precolonial history as a swamp. In post-colonial times the swamp was infilled by refuse and used as a tip.**
- **The site to the west of the Public School was used as a scrap yard.**
- **Carvings** on sandstone noted as being located nearby
- **Angophora trees** noted as being highly significant to the local Indigenous people with regard to fertility and death.
- **Dislike of red brick due to colonial associations.**

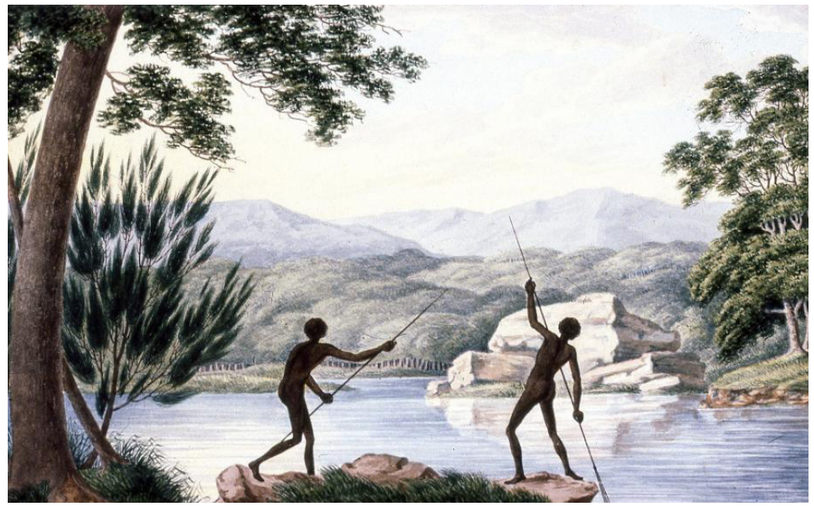

Figure 5: Right: Uncle Dennis at Narrabeen North Public School

Figure 6: Top right: Two Aborigines spearing eels, circa 1817, by Joseph Lycett, , approximately 1775-1828. Image No.: nla. pic-an2962715-s10, courtesy National Library of Australia.

Figure 7: Middle: Mural at Narrabeen North Public School

Figure 8: Bottom right: Angophora leaves

1.0 Executive Summary

1.04 Existing Development and Need for the Upgrades

The Narrabeen Education Precinct Schools are subject to a Business Case that was submitted to Treasury in 2020 by School Infrastructure NSW. This business case identified the requirement to upgrade existing facilities and accommodation within the campus.

"The NEP project will upgrade and redevelop NNPS and NSHS on their existing sites to significantly improve educational outcomes and support the delivery of modern pedagogical learning. The project increases capacity to meet projected demand at the schools (including the selective sports stream at NSHS), replaces all demountables, and provides future focused learning spaces and the appropriate core facilities."

The Business Case itemises the following current deficiencies at Narrabeen North Public School

- Missing EFSG core facility requirements, including general learning spaces, bathrooms and a hall
- A significant proportion of classrooms with issues in terms of size, functionality and fit-for-purpose capabilities for delivery of current best practice pedagogies
- Power outages due to overloading of the current system
- A high utilisation of aged demountables (50% of total learning spaces)
- A lack of DDA compliance and accessibility.

The Business Case itemises the following current deficiencies at Narrabeen Sports High School:

- Missing EFSG core facility requirements, including technical spaces, general learning spaces and bathrooms
- A lack of ambulant accessible facilities in the school, as well as insufficient storage and unsuitable staff areas
- Many rooms have been required to be re purposed due to lack of space, impeding on delivery of modern pedagogies
- Lack of space to support the delivery of specialist sports streams.
- Aged and dislodged roof tiles, which have fallen from the ceiling numerous times and present significant safety risks.

1.0 Executive Summary

1.05 Pedagogy Summary

Modern methods of teaching and learning, coupled with significant technological and societal changes, have shifted the paradigm of what is expected of educational facilities.

Design guidelines prepared by SINSW outlines the following opportunities in relation to pedagogy and the design of schools:

> "The role of schooling is in rapid change following recent social and technological upheaval. In the past a teacher would be mainly imparting knowledge. Today, with the free availability of knowledge, the aim is to provide guidance on use of this knowledge and to harness skills in critical thinking, problem solving, collaboration skills as well as the more traditional skills in numeracy and literacy.
>
> We are already seeing the adoption of co-teaching and open learning, where multiple class groups learn together. In the future, it is predicted that the curriculum will shift towards a more cross disciplinary mode of learning. In meeting the challenge of DfMA [MMC] schools, the spaces created will need to enable this type of pedagogy, as well as traditional modes and future flexibility."

The design of learning spaces should adapt accordingly. Classrooms must be able to flex on a daily (or even hourly) basis between traditional and open plans, to support the requirement of specific learning activities.

The SINSW learning hubs spatially align these teaching methodologies to a MMC grid measuring 7.5 x 9 meters, offering classrooms with sliding partitions.

EFSG General Educational Principles

Education Principle 1:

- First and foremost, focus on the needs of learners and learning.

Education Principle 2:

- Build community and identity and create a culture of welcome, inclusion and belonging that reflects and respects diversity within the school's community.

Education Principle 3:

- Be aesthetically pleasing.

Education Principle 4:

- Provide contemporary, sustainable learning environments that:
  - Promote learning for students and teachers through collaboration, social interaction and active investigation
  - Encourage learner self-management and self-direction
  - Support a full range of teaching strategies from direct explicit instruction to facilitation of inquiry and authentic project and problem based learning
  - Facilitate learning and connection anywhere, anytime by providing seamless access to ICT and integration of learning resources throughout the learning spaces
  - Be integrated into, and maximise the use of the natural environment
  - Enable aspects of the buildings, building design and outdoor spaces to be learning tools in themselves—for example, learning from the ecologically sustainable features of the design and associated energy management systems
  - Are age and stage appropriate

Education Principle 5:

- Embed the potential for re-configurability, both in the present for multi-purpose use and over time for changing needs.

Figure 9: Library area at Ultimo Public School. Photograph Brett Boardman

Figure 10: Practical Activities Area at Ultimo Public School. Photograph Brett Boardman

1.0 Executive Summary

1.07 Responses to Council Comments - Narrabeen North Public School

A Pre-DA meeting was held on 14th July 2022 via Zoom Video Conference.

The following were in attendance:

Attendees for Council:

Jordan Davies – Principal Town Planner
Daniel Milliken – Development Assessment Manager
Jeff Cooke – Urban Designer
Robert Blackall – Bushland and Biodiversity
Brendan Gavin – Heritage Officer
Jeanne Thuez – Environment Officer (Coast and Catchments)

Attendees for Applicant:

Amy Cropley and Robert Player – Consultant Town Planner

Priya Mekala – Project Manager
Chis King and David Lewis – NSW School Planning
Rachel Faber and Jacqueline Ong – Architects
Michael Doak – Landscape Architect
Kerime Danis – City Plan Heritage

The following is a response to the Pre-lodgment Meeting Notes

"Comprehensive context & site analysis identifying the character of the area; Site Analysis is an active, coordinated design exercise that needs to convey information graphically as a meaningful explanation of physical conditions, considerations and challenges, special qualities, and coordinated with consultant inputs as a connected spatial exercise rather than a simplified 2-dimensional pictogram information. Consider: -Connection to Country – Topography - Public domain and ground plane - Water as a natural and connected system – Tree Canopy and deep soil and natural and connected systems - Spatial arrangement and hierarchy - Vehicular movement and pedestrian access – How pedestrian amenity & safety is ensured – How the existing vehicle entries will be incorporated - Vegetation – Solar access – Noise...."

Connecting with Country

Refer to *Connecting with Country* section & *Architectural Statement* in the Design Report.

The main inspiration for the project is to design from country, drawn from inspiration of stories told by Indigenous Elder Uncle Dennis Foley. The project aims to celebrate being amongst the existing trees on-site, drawing inspiration from the spiritual significance that the Angophora tree has to the Aboriginal community.

Topography

Refer to *Site Contours Diagram* in Design Report.

The topography of the Public School at its highest point is at the centre of the site where the Binidomes are located, then falls steeply away to the west. The new buildings are placed above the natural ground level and above the predicted Probable Maximum Flood Level. The east-side of the new buildings marry in to the natural ground levels and provide level access into the new buildings.

The challenge of the project is to provide accessible entry paths from the main street entrance at Namona Street, and from the out of hours access to the west. This is done carefully through the Coastal Wetland Zone with compliant accessible pathways & ramps.

Public Domain & Ground Plane

Refer to *Landscape Design Statement* & *Landscape Architecture plans* for further details.

A new generous wide entry path from Namona Street into the school site is proposed. The path leads directly to the main Admin foyer and just beyond to the Hall & COLA which can be used by the community after hours. The path is accessible, and a joyful walk through the existing trees and vegetation of the Coastal Wetland, detailed consultation with the project Arborist and Ecologist has been undertaken to ensure the project's impact on this area is minimised. Further enhancement of this landscape area is proposed to ensure it is suitable for a public entry and for the school's needs.

Water as a natural and connected system

Refer to the *Landscape Design Statement* & *Landscape Architecture Plans.*

The Landscape design utilises permeable paving and directs water towards garden areas to incorporate some of the principals of Water Sensitive Urban Design, as much as possible within the project. The project also proposes to re-vegetate the site with locally native plant species, which are wetland coastal species. Those species, especially in the coastal wetland are repairing the natural coastal wetland after the removal of the existing concrete slabs and demountable's.

Tree Canopy and deep soil and natural and connected systems

Refer to *Landscape Architecture design statement* for further details.

As many existing trees are retained as possible, and new planting is proposed to ensure that the removed tree canopy is replaced with new trees within natural deep soils.

Spatial arrangement and hierarchy

Refer to *Architecture Statement, Response to Schedule 8* & *Functional Arrangement* in the Design Report.

The project has placed the core facilities of the new Administration, Hall & COLA as close as possible to the Namona Street main school entrance whilst protecting the existing Coastal Wetland vegetation, so that these facilities are accessible to the community and public.

The new COLA roof frames the heritage Binidomes and provides a clear view of them from the main entry pathway. Views and vistas between the new buildings are proposed to ensure views to the existing trees and Binidomes are enhanced and celebrated.

Vehicular Movement & Pedestrian Access

Refer to *Response to Schedule 8, Traffic Report, & Fencing Design diagram* in Design Report.

The safe vehicular movements around the site have been considered by the Traffic Engineer, with proposals to improve safety for vehicles, pedestrians and cyclists provided in the Traffic Report. The project site provides two generous entry points and accessible pathways into to the school, one from Namona Street, the other from the western boundary. Secure site fencing is maintained at the site boundary and a second secure line is provided to direct the public to the main administration foyer entrance.

Vegetation

Refer to L*andscape Architecture design statement & plans* for further details.

The project proposes to re-vegetate the site with locally native plant species, which are wetland coastal species. The new buildings are placed outside of the Coastal Wetland zone. The project proposes to re-vegetate a part of the Coastal Wetland area where demountables are currently placed and proposed for removal.

Solar access

Refer to *Architecture Statement & Response to Schedule 8* in the Design Report.

All habitable spaces in the project have access to natural daylighting in compliance with NCC & EFSG requirements. Where required, sun-shading or veranda's have been provided to provide shade to glazing, in consultation with the ESD consultant.

The following project aims and constraints have informed the placement of the new Admin and Hall buildings:

- Replace as many existing classroom demountable's with new permanent classrooms and retain as many existing permanent classroom building structures as possible to improve student learning environments;
- Retain as many existing trees as possible;
- Protect the Heritage Curtilage around the Binidome;
- Enhance a major heritage Binidome view corridor from the main Namona Street entrance, and frame this view with the new COLA roof;
- Protecting and re-vegetating the Coastal Wetland zone by placing the new Administration Building & Hall outside of this zone;
- Ensure the new Admin & Hall is directly accessible from the main Namona Street entrance for the public and after hours use entry to the west; and
- Provide as much open play-space as possible for the students to meet educational objectives.

The new Administration and Hall buildings are hence placed directly adjacent to each other as the site is very constrained. The non-habitable service spaces of the Main Switch Room and Main Communications Rooms are placed in the area of the new Admin building which does not receive natural light or ventilation as these places are unlikely to be relocated in the event that the Admin building is re-planned or re-purposed to meet future needs. The floor plate is kept clear for future flexibility with minimal columns interrupting the space.

Noise

Refer to *Response to Schedule 8* in the Design Report.

The school site has only one quiet street cul-de-sac interface. The new development is to the west of the site, whilst the existing adjacent residents are to the east of the site. The Acoustic Engineer has informed the detailed design to ensure any noise mitigation measures are in place for the project.

1.0 Executive Summary

1.07 Responses to Council Comments - Narrabeen North Public School

"Flood analysis/study – which should feed into the context & site analysis."

Refer to *Site Flooding* in the Design Report.

All new buildings at the Public School are set above the predicted PMF level as advised by the project Civil Engineer. The east-side of the new buildings marry in to the natural ground levels and provide level access into the new buildings.

"A comprehensive solar analysis that addresses the issues raised in this report, including view from sun illustrating compliance for all neighboring properties and the subject development, & responds to the guides & controls."

Refer to *Sun-shadow diagrams*.

As shown on the winter sun-shadow diagrams, the longest shadows cast by the new development at 3pm at the winter solstice will only reach the Binidome B & the existing school building Block K, both of which are located within the school site, approximately at the centre of the site. The shadows cast by the new buildings do not reach the adjacent residential properties to the eastern side of the site, and therefore have no impact on them.

Solar access to all habitable spaces within the project has been provide in compliance with NCC guidelines and in consultation with the ESD consultant. Non-habitable spaces such as store rooms, communications or electrical switch board rooms are located in areas which generally do not have direct solar access, and will unlikely be moved in future fit-outs due to the expense involved in re-cabling etc.

"A natural ventilation analysis that addresses the issues raised in this report & responds to the guides & controls. Illustrate how the site planning & spatial arrangement of the buildings is designed to maximise access to sunlight, natural ventilation, & outlook."

Refer to *adjacent diagrams* and above response to *Solar Access*.

The adjacent diagrams illustrate how natural ventilation is provided to all habitable spaces of the new Admin & Hall building.

Cross-flow ventilation is provided to the Hall space with operable louver windows proposed to both sides of the building, as well as large overhead doors which can be opened to provide a direct connection between the Hall & the COLA.

Summer breezes from the south-east of the Hall through the COLA space will help to cool the Hall in summer. The south east breezes will help cool the Admin clerical room and offices which are located along the south-east facades in summer time. In the winter time, the outdoor COLA play space is protected from prevailing winds from the west by the new Hall, providing a pleasant space for students to play.

"A diagram illustrating how CPTED principles have been incorporated."

Refer to *Landscape Fencing Diagram* & *Response to Schedule 8.*

The project retains the existing site boundary fencing and also provides an additional second line of security fencing at the new main Administration building foyer. Wide and generous pathways are provided from the street entrance and western boundary entrance with clear sight-lines and new lighting proposed along the pathways.

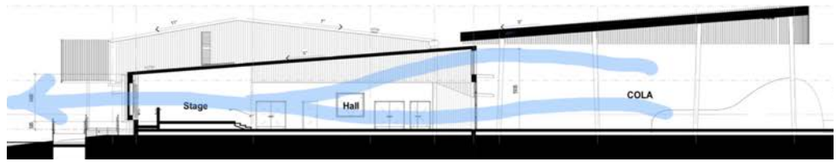

Figure 11: East-West Section through new Hall & COLA

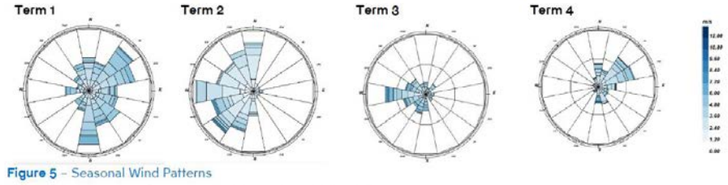

Figure 13: Steensen Varming Wind Patterns diagram, Page 11 of Building Services Report

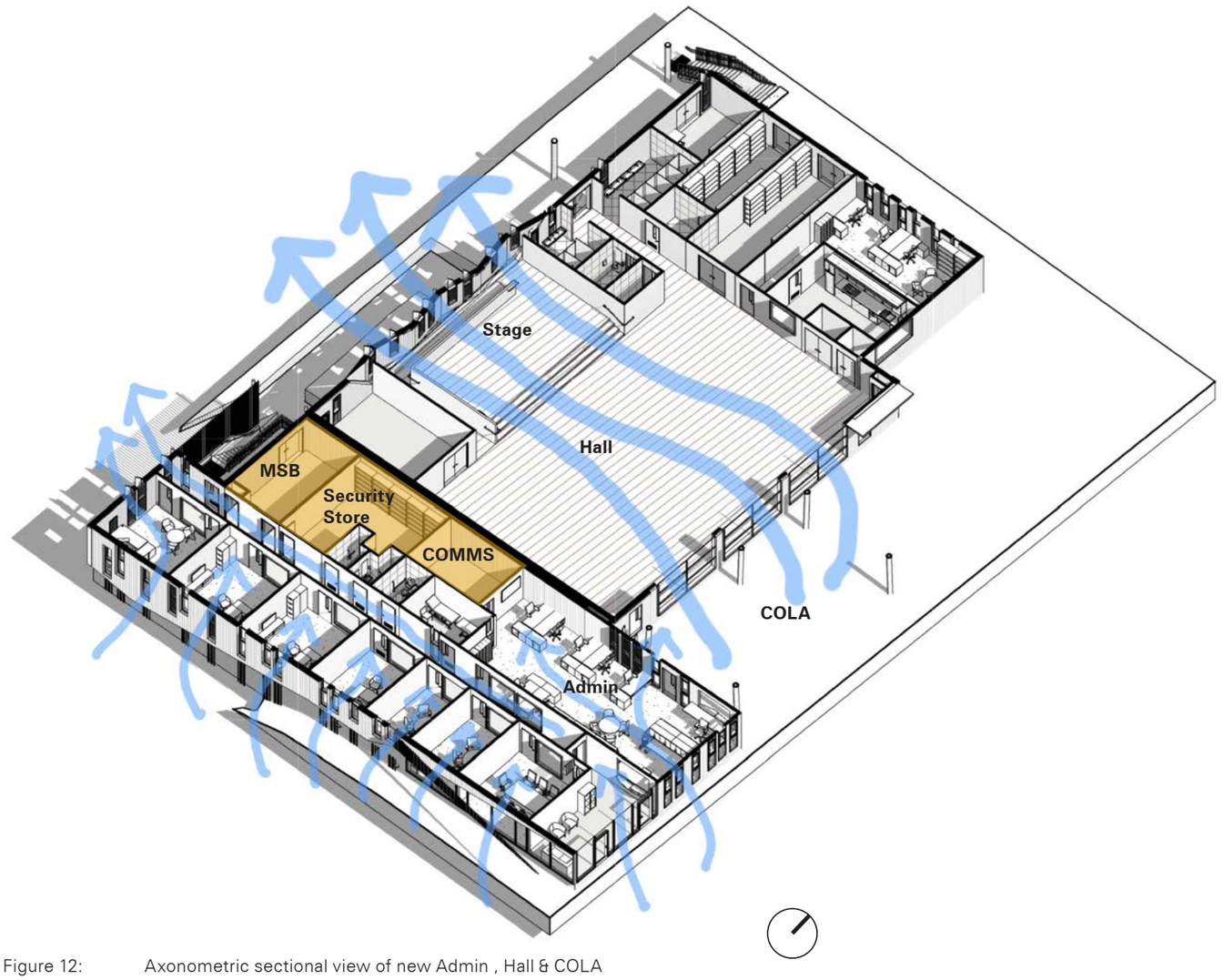

Figure 12: Axonometric sectional view of new Admin , Hall & COLA

1.0 Executive Summary

1.07 Responses to Council Comments - Narrabeen North Public School

"A diagram showing the spatial arrangement & spatial adjacencies required by the school."

Refer to *Functional Arrangement Diagram*.

The new core facilities including the new Administration, Hall & COLA are located as close as possible to the main street entrance as per the EFSG master-planning guidelines, whilst protecting the Coastal Wetland area.

The functional arrangement between the new Stage, Hall & COLA is maintained to ensure that school assemblies can spill out from within the Hall space into the COLA if needed to provide a space for an all-school assembly.

"A design & design documentation that clearly shows how the school has been designed to respond & enhance the existing context; including the trees, and the design & spatial organisation of buildings and the spaces between them should be informed by the site context, and landscape integrated into the design. The documentation should clearly show the process of how the design, and how the design is a response to the specific characteristics of the context."

Refer to ***Architectural Design Statement*** and *Design Report.*

"Larger/clearer elevations & several axonometric drawings of the existing and proposed buildings, context & topography of the context."

Refer to *1:100 Elevations & Design Report* and adjacent ***Axonometric Diagrams***.

"Illustrate how the design has responded to all Design Considerations in the Design Guide for Schools and include a Design Verification Statement."

Refer to *Architecture Statement & Response to Schedule 8* in the Design Report.

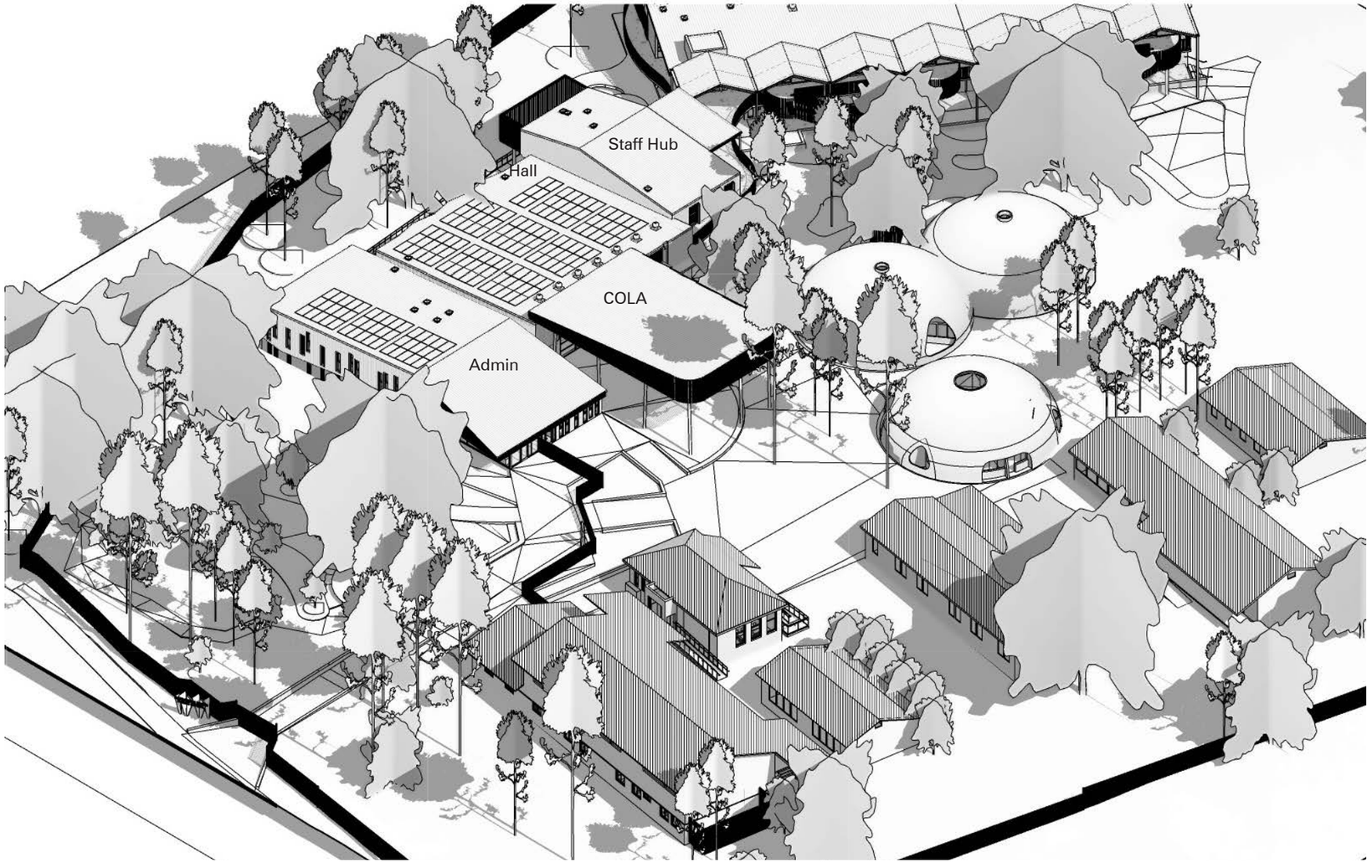

Figure 15: South-East 3D Axonometric view of New Admin, Hall & COLA in the context of the existing trees and buildings

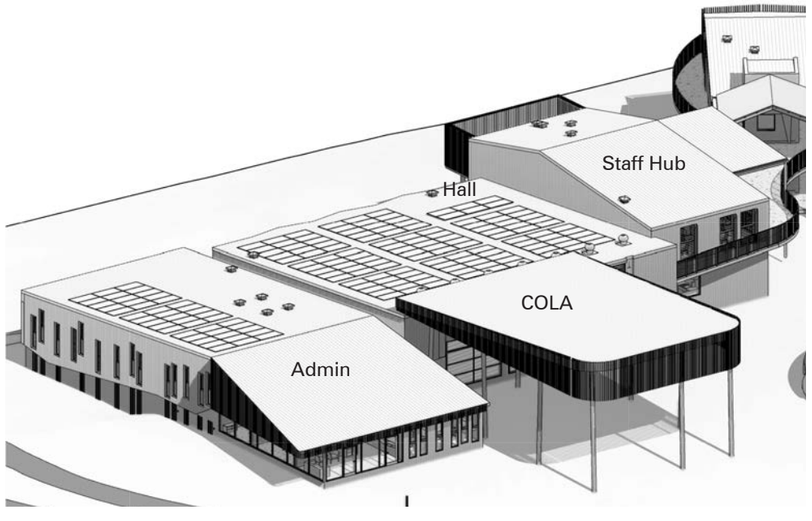

Figure 14: South-East 3D Axonometric view of New Admin, Hall & COLA

1.0 Executive Summary

1.07 Responses to Council Comments - Narrabeen Sports High School

A Pre-DA meeting was held on 14th July 2022 via Zoom Video Conference.

The following were in attendance:

Attendees for Council:

Jordan Davies – Principal Town Planner
Daniel Milliken – Development Assessment Manager
Jeff Cooke – Urban Designer
Robert Blackall – Bushland and Biodiversity
Brendan Gavin – Heritage Officer
Jeanne Thuez – Environment Officer (Coast and Catchments)

Attendees for Applicant:

Amy Cropley and Robert Player – Consultant Town Planner

Priya Mekala – Project Manager
Chris King and David Lewis – NSW School Planning
Rachel Faber and Jacqueline Ong – Architects
Michael Doak – Landscape Architect
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The following is a response to the Pre-lodgment Meeting Notes

"Comprehensive context & site analysis identifying the character of the area; Site Analysis is an active, coordinated design exercise that needs to convey information graphically as a meaningful explanation of physical conditions, considerations and challenges, special qualities, and coordinated with consultant inputs as a connected spatial exercise rather than a simplified 2-dimensional pictogram information. Consider: -Connection to Country – Topography - Public domain and ground plane - Water as a natural and connected system – Tree Canopy and deep soil and natural and connected systems - Spatial arrangement and hierarchy - Vehicular movement and pedestrian access – How pedestrian amenity & safety is ensured – How the existing vehicle entries will be incorporated - Vegetation – Solar access – Noise..."

Connecting with Country

Refer to *Connecting with Country* section & *Architectural Statement* in the Design Report.

The project references stories of the land passed to us by Indigenous Elder, Uncle Dennis Foley, who was consulted early in the design process.

The High School is located on a former swamp, which served as a major food source for the Indigenous People, so was a place that was visited by the people for ceremonies ad celebrations.

The proposed design references the site history within the use of colour of the new building facade, and in the pedestrian flow around the site, which forms a circuit through the central part of the school site.

Topography and Flood Analysis

Refer to *Site Contours Diagram and Site Flooding Diagrams* in Design Report.

The High School topography is low lying and relatively flat; reflective of the site's history as a swamp connected to the Lagoon. This low RL means that the school ground is susceptible to flooding.

To mitigate against flooding risks the following measures have been undertaken:

- Ground Floor FFL is raised 130mm above the external ground level. This enables the Power Outlets to be positioned at 900mm AFFL, which is above the 1% AEP Flood Level.
- Location of New Build habitable spaces at Level 1, unless adjacency with the ground plane is required.
- Non-habitable spaces located at Ground Floor

The FFL of Level 1 of the new building is above the PMF. This upper level is intended to act as a flood refuge for occupants present in the building in a flood scenario. As such a number of criteria must be met:

- Structural Engineering for the new building considers the pressure that may be applied to the structure by ingress of flood water onto the site and within the ground floor of the building.
- Access to drinking water is required on Level 1, which is provided within the washroom basins.

Refer to *Site Flooding* in the Design Report.

Public Domain & Ground Plane

Refer to *Landscape Design Statement* & *Landscape Architecture plans* for further details.

Connections to the Public Domain are unchanged at the High School.

Water as a natural and connected system

Refer to the *Landscape Design Statement* & *Landscape Architecture Plans.*

The Landscape design utilises permeable paving and directs water towards garden areas to incorporate some of the principals of Water Sensitive Urban Design, as much as possible within the project.

Tree Canopy and deep soil and natural and connected systems

Refer to *Landscape Architecture design statement* for further details.

As many existing trees are retained as possible, and new planting is proposed to ensure that the removed tree canopy is replaced with new trees within natural deep soils.

It has been identified that there is a lack of shade associated with the outdoor seating. The design has addressed this by introducing new trees in the plaza area to the south of the new building.

Spatial arrangement and hierarchy

Refer to *Architecture Statement, Response to Schedule 8* & *Functional Arrangement* in the Design Report.

The proposed design configures the new building to the west of the Gymnasium, placing the new stage in a structurally advantageous location to minimise impact on the existing Gym building. Facilities within the new building provide new Change Room and WCs, to support the Gymnasium and stage function. At level 1 two new Physical Education General Learning Spaces and a Movement Studio have been included to support the PE programme undertaken within the Gym.

Entry to the Gym remains unchanged, providing access close to the Main School entry for ease of wayfinding.

Figure 16: Vegetation at Narrabeen Lagoon

1.0 Executive Summary

1.07 Responses to Council Comments - Narrabeen Sports High School

Vehicular Movement & Pedestrian Access

Refer to *Response to Schedule 8, Traffic Report, & Fencing Design diagram* in Design Report.

Safe vehicular movements around the site have been considered by the Traffic Engineer, with proposals to improve safety for vehicles, pedestrians and cyclists provided in the Traffic Report.

Secure site fencing surrounds the site and pathways within the site boundary are separated from vehicular movement. The car park to the south of the NBISC facility is being reconfigured to meet the requirement of the Public School Drop Off.

Vegetation

Refer to L*andscape Architecture design statement & plans* for further details.

The project seeks to increase vegetation on the High School Site. The offset for trees being removed from the adjacent Public School site is being used on the NSHS site, which is currently lacking shade through some of the outdoor seating areas.

Solar Access

Refer to *Architecture Statement & Response to Schedule 8* in the Design Report.

All habitable spaces in the project have access to natural daylighting in compliance with NCC & EFSG requirements. Where required, sun-shading or veranda's have been provided to provide shade to glazing, in consultation with the ESD consultant.

The following project aims and constraints have informed the design of fenestration on the new building at NSHS:

- Vertical find to the western fenestration.
- Horizontal and vertical shading to the northern fenestration.
- Views considered in respect of window placement.

"A comprehensive solar analysis that addresses the issues raised in this report, including view from sun illustrating compliance for all neighboring properties and the subject development, & responds to the guides & controls."

Refer to *Sun-shadow diagrams*.

Solar analysis diagrams, which are illustrated within this report, demonstrate that all overshadowing exceeding the 8.5 metre height plane impact only the school site.

Solar access to all habitable spaces within the project has been provided in compliance with NCC guidelines and in consultation with the ESD consultant.

Noise

Refer to *Response to Schedule 8* in the Design Report.

The new building is located well within the site boundary. It is located at the end of a quiet cul-de-sac and has no interfaces with residential properties.

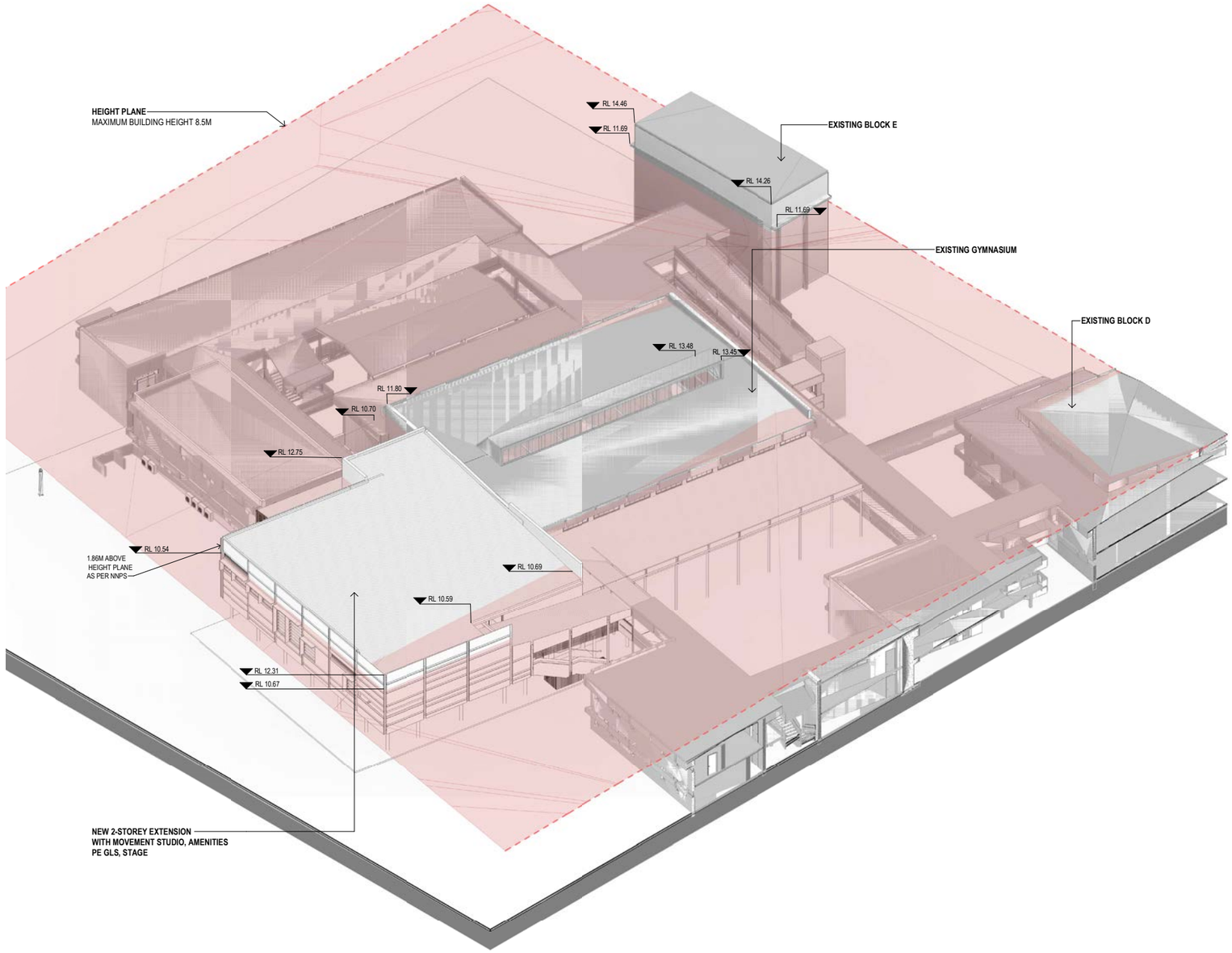


Figure 17: Axonometric view of Block A

1.0 Executive Summary

1.07 Responses to Council Comments - Narrabeen Sports High School

Ventilation

"A natural ventilation analysis that addresses the issues raised in this report & responds to the guides & controls. Illustrate how the site planning & spatial arrangement of the buildings is designed to maximise access to sunlight, natural ventilation, & outlook."

Natural ventilation has been considered for all new build habitable spaces at the High School. As per the EFSG standards, a metric for operable windows (aperture) of 6.25% of the floor area per room has been applied to the design.

Views from the Movement Studio and PE General Learning Spaces provide a westerly outlook over sports fields towards Mullet Creek. As discussed under Solar Access, restriction of excess solar gain has been considered within the design of fenestration.

CPTED

"A diagram illustrating how CPTED principles have been incorporated."

Refer to *Landscape Fencing Diagram* & *Response to Schedule 8.*

The project retains the existing site boundary fencing, which includes high fencing and gates.

Functional Arrangements

"A diagram showing the spatial arrangement & spatial adjacencies required by the school."

Refer to *Functional Arrangement Diagram*.

The new stage is located adjacent the existing Gym to provide a dual use of the space for sports in addition to presentation and performance.

Other PE associated facilities have been located within the new building to benefit from the new Change Facilities.

"A design & design documentation that clearly shows how the school has been designed to respond & enhance the existing context; including the trees, and the design & spatial organisation of buildings and the spaces between them should be informed by the site context, and landscape integrated into the design. The documentation should clearly show the process of how the design, and how the design is a response to the specific characteristics of the context."

Refer to ***Architectural Design Statement*** and *Design Report.*

Documentation

"Larger/clearer elevations & several axonometric drawings of the existing and proposed buildings, context & topography of the context."

Refer to *1:100 Elevations & Design Report and adjacent* ***Axonometric Diagrams***.

"Illustrate how the design has responded to all Design Considerations in the Design Guide for Schools and include a Design Verification Statement."

Refer to *Architecture Statement & Response to Schedule 8* in the Design Report.

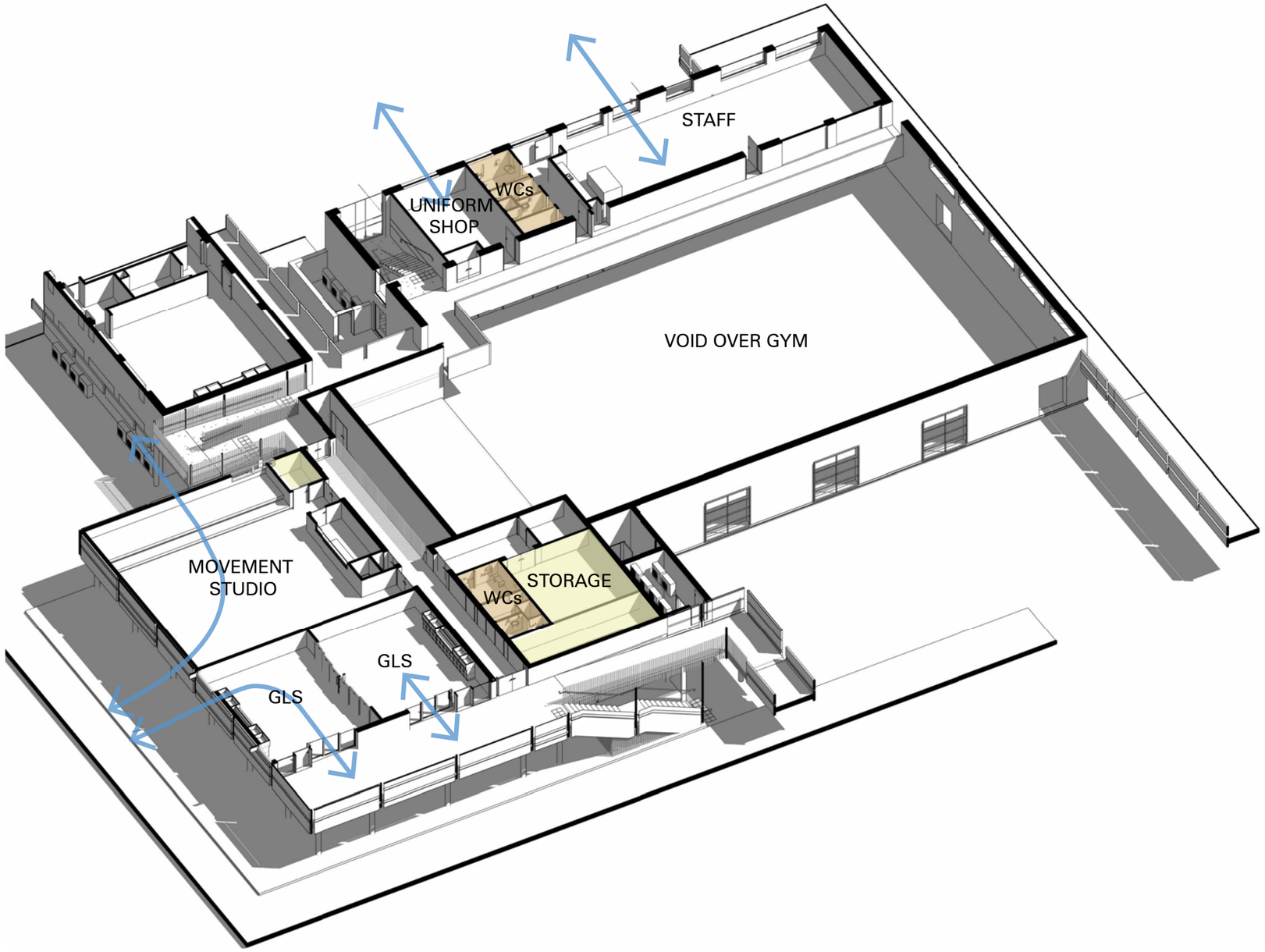


Figure 18: Ventilation to habitable spaces

1.0 Executive Summary

1.08 Existing Site and Proposed Masterplan

Existing Site

Masterplan

“Education is not preparation for life; education is life itself”

John Dewey

2.0
Site Analysis

2.0 Site Analysis

2.01 Site Analysis - Narrabeen North Public School

Existing site features and functional connectivity have been assessed when commencing the design process.

When collated these factors have formed the basis for the new masterplan.

Site Analysis has entailed an assessment of the following factors:

Heritage Curtilage, Coastal Wetlands & existing trees

The Heritage Curtilage around the Block B Binidome and the Coastal Wetlands to the south of the site have been mapped on the site plan on advice from the Heritage Consultant and the Ecologist. The new buildings carefully consider the position on-site in relation to these sensitive zones, in consultation with these consultants and the project Arborist.

Condition of existing buildings

An assessment of the condition of existing buildings has been undertaken to understand which buildings on-site are suitable for renovation and re-use. Refer to the Site Analysis - Existing School Buildings section of the Design Report for further details.

Sun Path & Prevailing Winds

A review of the sun path and has been considered when determining building position to minimise overshadowing of the neighboring dwellings. Assessment of building orientation has been undertaken with the ESD Consultant to determine fenestration design to minimise excess solar gain. Prevailing summer and winter breezes are considered to provide a comfortable space for occupants during the two seasons.

Noise

To assist in determining acoustic inputs required into the new design the extent of noise generated from both within the site and surrounding roads is being assessed by the Acoustic Consultant.

Site Levels

Falls across the site are from RL2.0m AHD at the site boundary to RL5.0m AHD, which lies at the centre of the site.

Views

To assist in determining orientation of the building and organisation of internal spaces, views around the site have been carefully considered in consultation with the project Heritage Consultant.

Refer to ***Views and Connection to Nature*** section of the Design Report.

Transport and Vehicular Access

On site car parking is provided for staff as per the existing condition. This is the only vehicular access point onto the site. This will provide maintenance and emergency access to the site. Bike storage will be provided within the site. Refer to the ***Landscape Plans*** for further information.

End of Trip Facilities are provided for staff within the Staff room in the form of an Accessible WC with Shower. Lockers are located nearby.

Garbage collection is to occur kerbside as per the existing condition. Refer to the ***Waste Management Report*** for further information.

Refer to ***School Travel Plan*** prepared by the Traffic Engineer for further information in relation to transport.

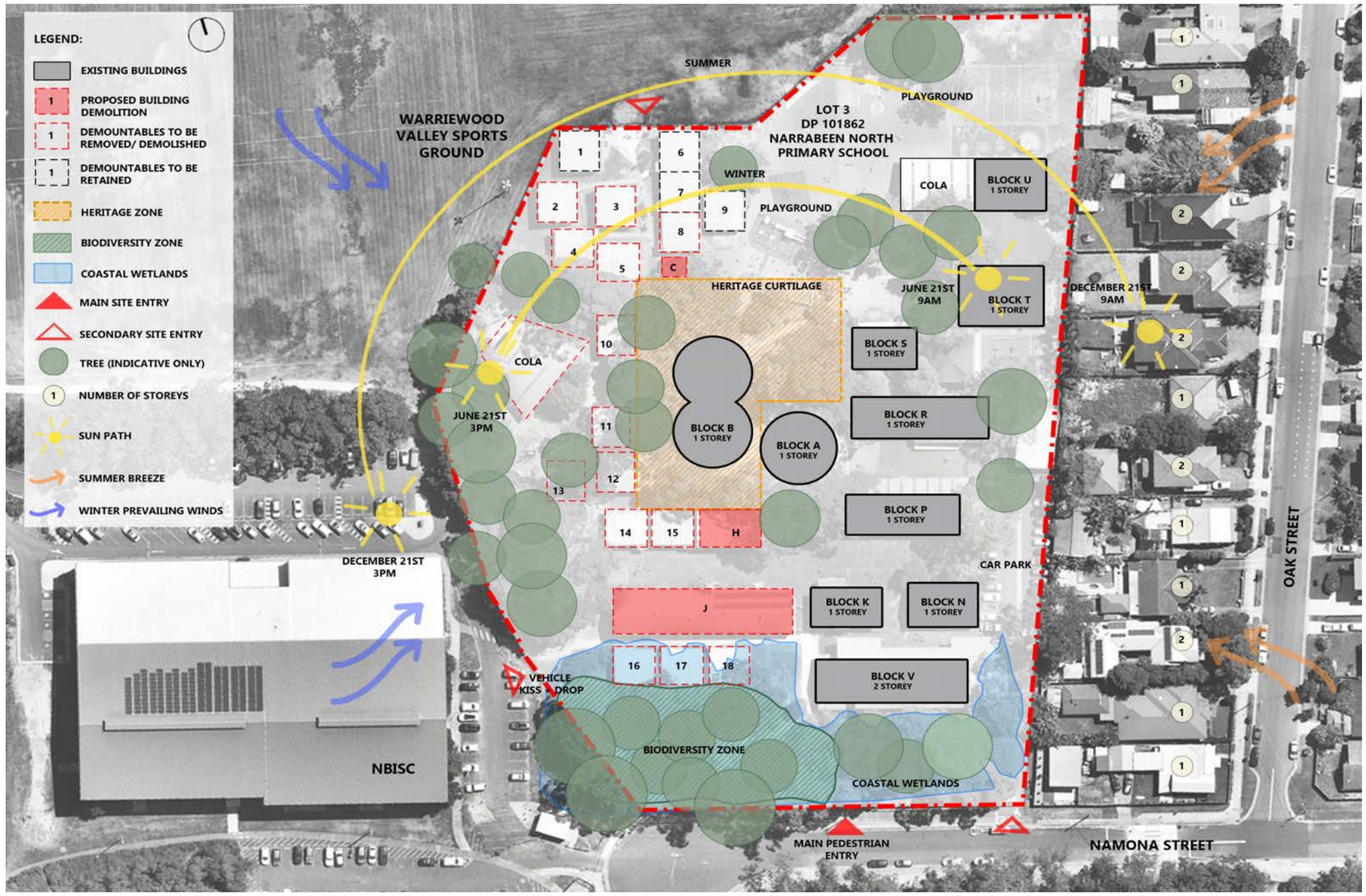


Figure 19: Site Analysis Plan

2.0 Site Analysis

2.02 Site Analysis - Narrabeen Sports High School

Although located opposite the Public School on Namona Street, the High School topography and vegetation differs significantly.

Site Analysis has entailed an assessment of the following factors:

Sun Path

Review of the sun path and has been considered within the design of Landscaping and orientation of glazing. Assessment of building orientation has been undertaken with the ESD Consultant to determine fenestration design to minimise excess solar gain.

Condition of existing buildings

Buildings on site typically date from the 1970s and form the remainder of separate Girls and Boys High Schools which previously occupied the site , An assessment of the condition of existing buildings has been undertaken to understand which buildings on-site are suitable for renovation and re-use. Refer to the Site Analysis - Existing School Buildings section of the Design Report for further details.

Noise

To assist in determining acoustic inputs required into the new design the extent of noise generated from both within the site and surrounding roads is being assessed by the Acoustic Consultant.

Site Levels

The site is predominantly flat, and due to the low RL is susceptible to flooding. Refer to section xxxx of this report for further information.

Views

View from new build spaces have been considered within the design of fenestration.

Transport and Vehicular Access

On site car parking is provided for staff as per the existing condition. This is the only vehicular access point onto the site. This will provide maintenance and emergency access to the site. Bike storage will be provided within the site. Refer to the ***Landscape Plans*** for further information.

End of Trip Facilities are provided for staff within the Staff room in the form of an Accessible WC with Shower. Lockers are located nearby.

Garbage collection is to occur kerbside as per the existing condition. Refer to the ***Waste Management Report*** for further information.

Refer to ***School Travel Plan*** prepared by the Traffic Engineer for further information in relation to transport.

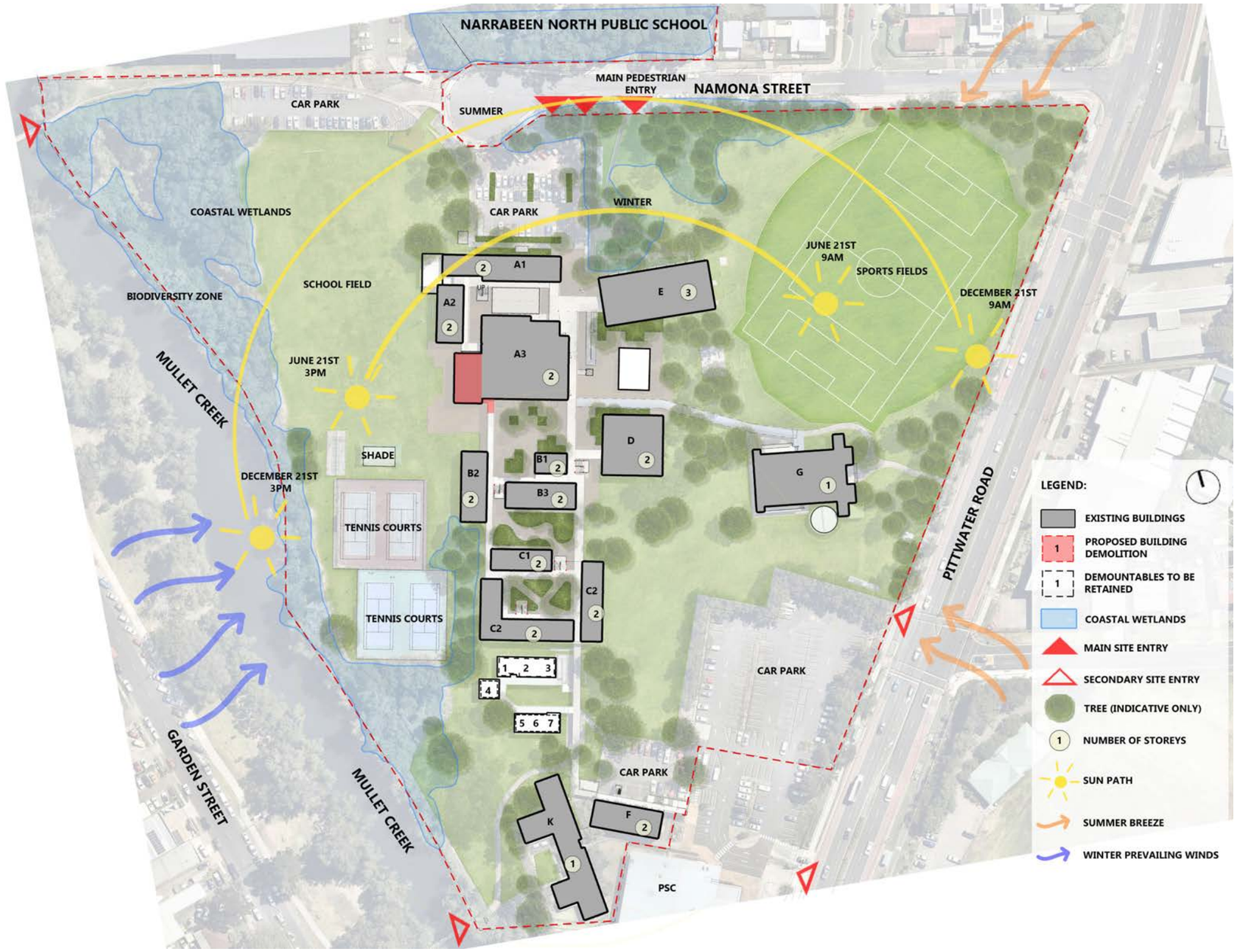


Figure 20: Site Analysis Plan

2.0 Site Analysis

2.03 Context Analysis

Located west of the busy arterial route of Pittwater Road, Narrabeen Education Precinct is situated in the Northern Beaches area of Sydney.

Much of the immediate context of the school campus comprises of low density residential development, public sporting facilities and commercial premises.

Nearby properties to the opposite side of Pittwater Road, which is a busy arterial road include commercial retail premises and single residential properties.

To the west of the Public School site lies the Warriewood Valley Sportsground and the Northern Beaches Indoor Sports Centre (NBISC) and beyond that Mullet Creek. There are several bridge links across Mullet Creek which lead to residential properties and a few retail shops.

Directly adjacent to the Public School site to the east lies single dwelling residential properties. They comprise of a mix of single storey and two storey timber weatherboard clad or brick residential dwellings.

To the south of the High School is located the Pittwater Sports Centre (PSC) and beyond that further south is the inlet of Narrabeen Lagoon.

Figure 21: View West on Namona Street. Source: Google Street view

Figure 22: Corner of Oak and Namona Streets. Source: Google Street view

Figure 23: NBISC and High School Car Parkat western end of Namona Street. Source: Google Street view

2.0 Site Analysis

2.03 Context Analysis

Figure 27: Garden Street to south west of Mullet Creek. Source: Google Street view

Figure 24: Service Station on Pittwater Road at the junction of Namona Street. Source: Google Street view

Figure 25: Warriewood Valley Sportsground. Source: Google Street view

Figure 28: Pittwater Road. Source: Google Street view

Figure 26: Oak Street. Source: Google Street view

2.0 Site Analysis

2.04 Narrabeen Public School - Existing School Buildings

The existing school buildings contain a mix of 1950's & 70's timber weatherboard buildings, brick buildings built in 1938 and between 2001-2018 and the Binidomes built in 1973.

The project retains the newest building on-site (Block V) built during the Building the Education Revolution (BER) in the 2000s as a new Library on the Ground Floor with classrooms on Level 1. This is proposed as a good sustainable outcome by re-purposing a relatively new building.

The project proposes to demolish the existing Timber 1950's building Block's H & J which have been assessed as being in poor condition. By demolishing these building's, a new view corridor is opened up from Namona Street towards the Binidome Block B building.

The new buildings are inspired by the existing timber weatherboard building character and it's open-gable roof aesthetic, interpreting this within the new buildings proposed, through the use of timber weatherboard look FC cladding and an open gable style roof with playful angles.

Figure 29: Block P - Timber Weatherboard building 1973

Figure 30: Block K - Original brick schoolhouse building 1938

Figure 31: Block J Timber building 1950's, Block B Binidome 1973, Block K Original brick schoolhouse building 1938.

Figure 32: Block A Binidome 1973 and Block P Timber Weatherboard building 1973

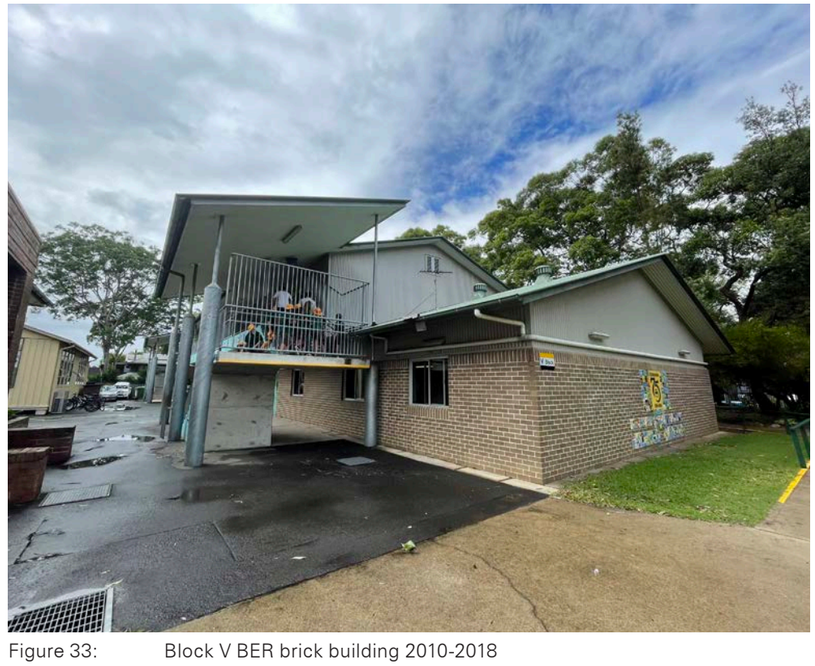


Figure 33: Block V BER brick building 2010-2018

2.0 Site Analysis

2.05 Narrabeen Sports High School - Existing School Buildings

The Narrabeen Sports High School campus comprises of buildings dating from the mid 20th Century.

Educational facilities on the site were originally established as Narrabeen Girls' High School and Narrabeen Boys' High School. The schools merged in the 1970s to create a co-educational facility.

The existing buildings are of varying condition, with many being in need of upgrade to meet the requirements of a modern pedagogy.

Most of the existing buildings are located to the north of the site, and date from the Narrabeen Boys' High School. Block K, which is located to the south, is a remnant of the Narrabeen Girls' High School.

Mot of the buildings comprise of brick and concrete, with the exception of Block K, which is a lightweight weatherboard structure.

Figure 34: Narrabeen Sports High School Main Entry

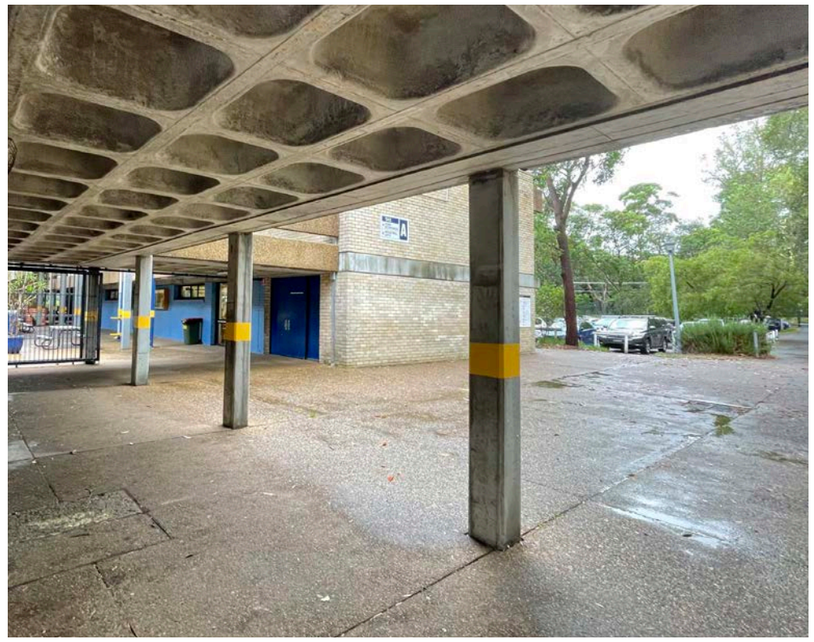


Figure 35: Waffle slab in Main Entry

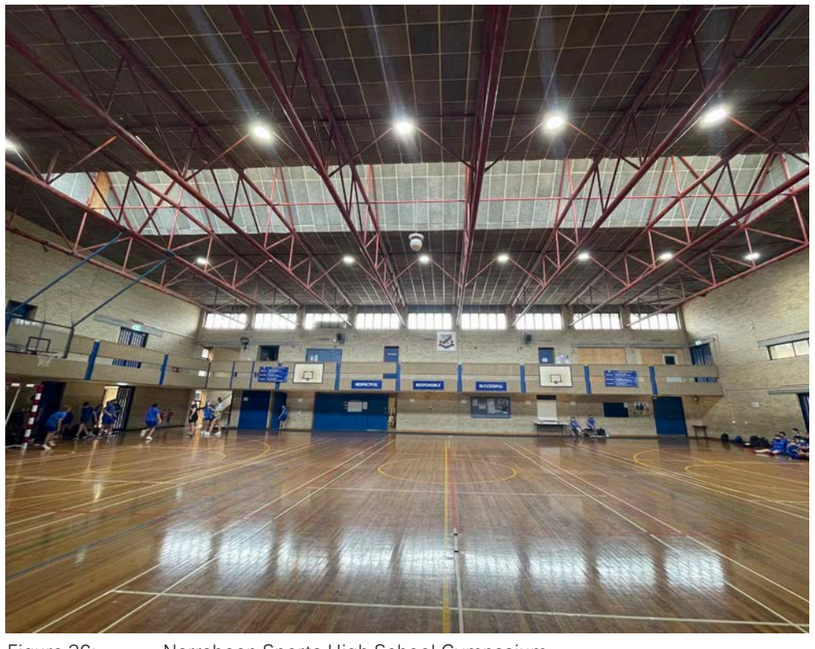


Figure 36: Narrabeen Sports High School Gymnasium

Figure 37: Narrabeen Sports High School covered walkways

Figure 38: Narrabeen Sports High School Courtyard between Blocks B and C

2.0 Site Analysis

2.06 Pittwater LEP: Building Height and Zoning Constraints

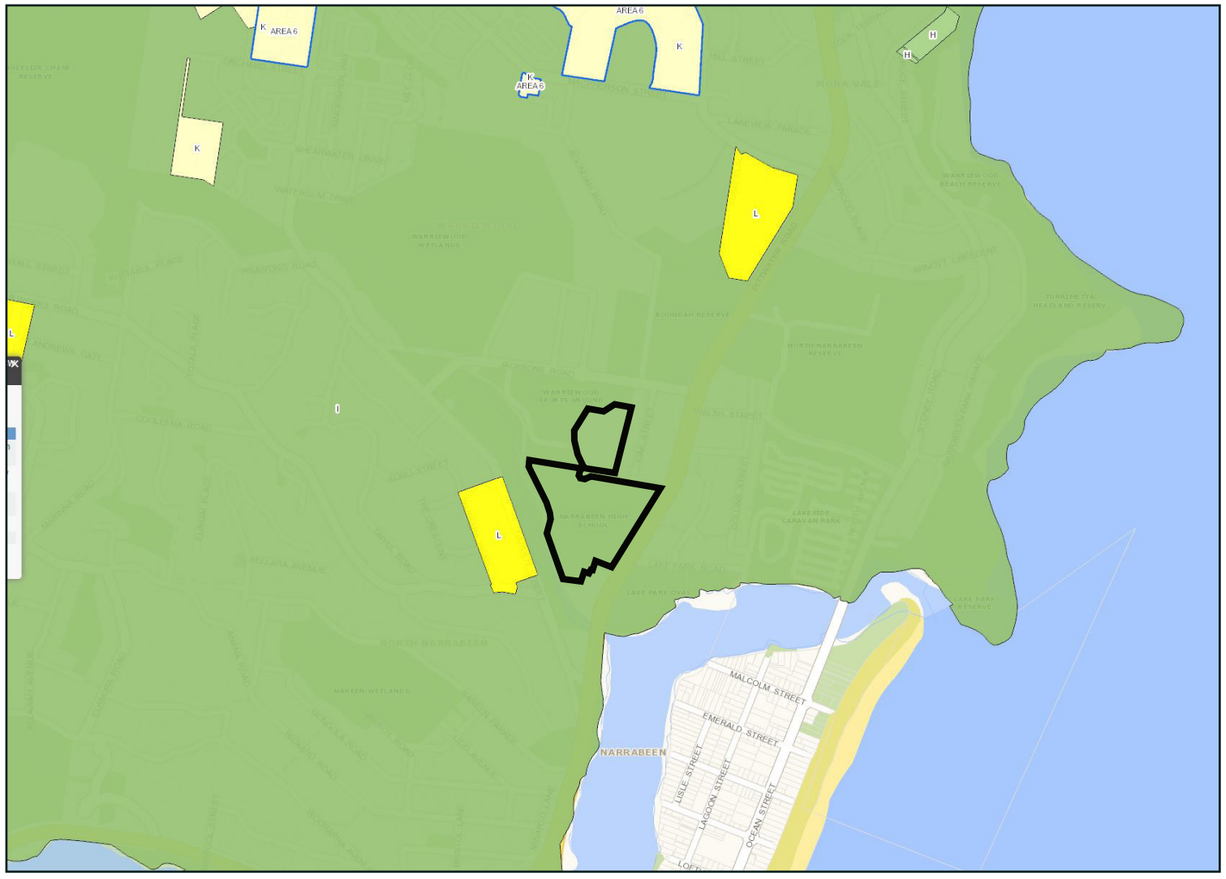


Figure 39: Pittwater LEP. Height Restriction Mapping

LEP: Building Heights:

The Pittwater LEP outlines a height restriction of 8.5 meters for the Narrabeen Education Precinct site, which is exceeded slightly by some of the proposed new Buildings. However, it should be noted that all overshadowing associated with the new development occurs within the site boundaries of the two schools.

The Planner has proposed a Clause 4.6 application to increase the height restriction. This will be based on mitigating factors associated with existing buildings on site exceeding this level, and the lack of impact beyond the site boundaries.

Height Restrictions Key:

- I: 8.5 metres
- M: 12 metres
- O2: 16 metres
- Park
- Site

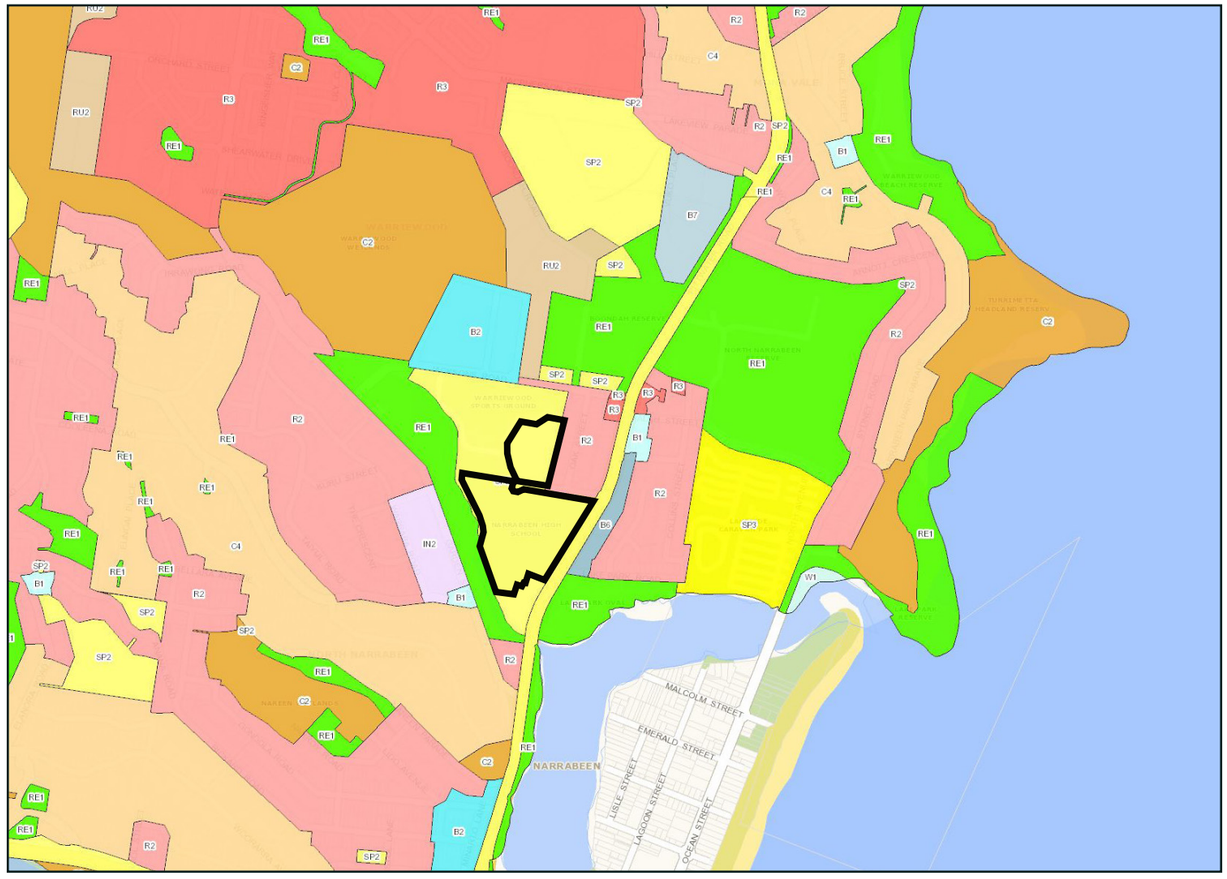


Figure 40: Pittwater LEP. Zoning Mapping

LEP: Zoning:

The Narrabeen Education Precinct site, zoned SP2, is adjacent to and in proximity of several residential properties to the east of the Public School.

To the west and south of the site other community facilities the NBISC centre and Pittwater College are situated.

The High School site is bordered to the west by Mullet Creek, beyond which are residential properties.

Although Namona Street is a quiet secondary road, the High School is bounded to the east by Pittwater Road, which is a busy local arterial route,

Land Zoning Key:

- R2: Low Density Residential
- R3: Medium Density Residential
- R4: High Density Residential
- B1: Neighbourhood Centre
- B3: Commercial Core
- B4: Mixed Use
- SP2: Infrastructure
- RE1: Public Recreation
- E2: Environmental Conservation
- Site

2.0 Site Analysis

2.07 Pittwater LEP: Heritage and Biodiversity

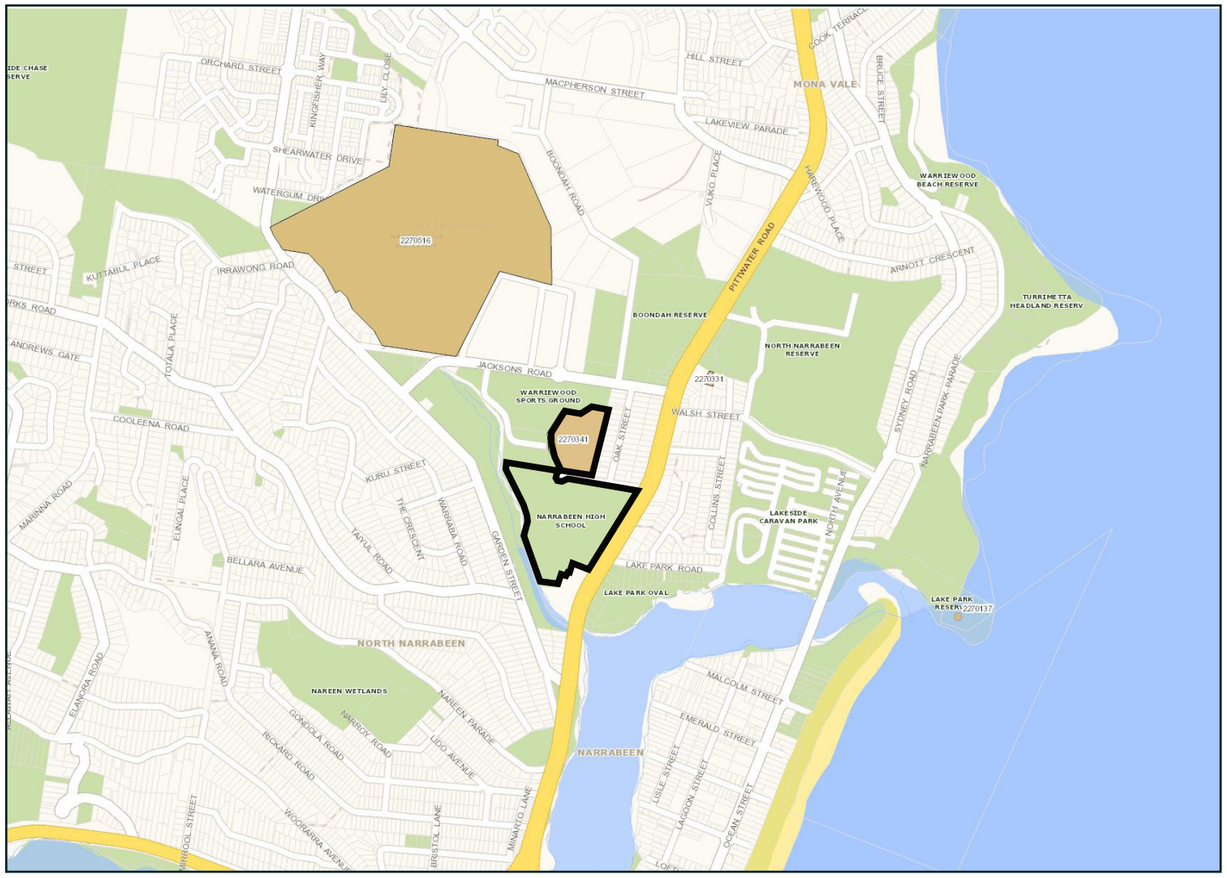


Figure 41: Pittwater LEP, Heritage Map

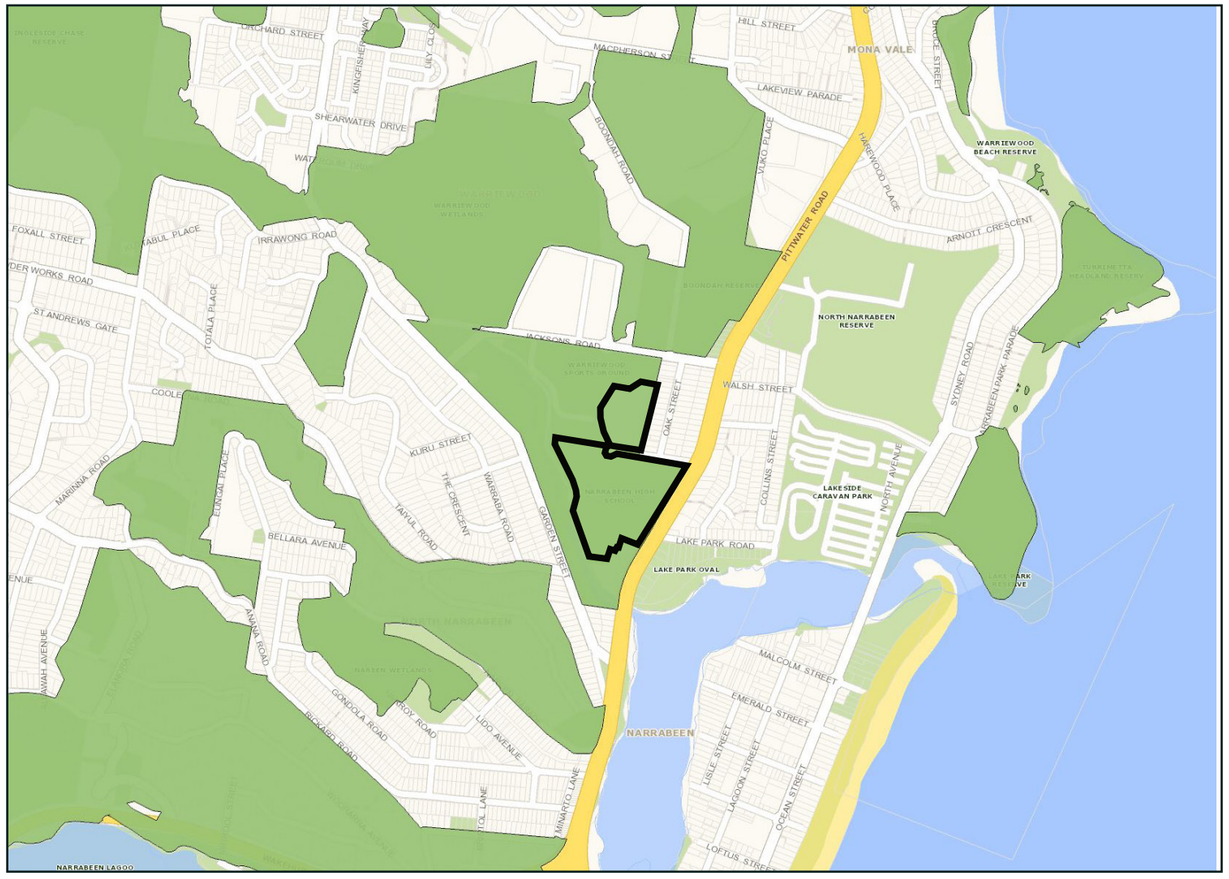


Figure 42: Terrestrial biodiversity map

LEP: Heritage

Narrabeen North Public School contains heritage listed structures: Two Binidomes, which are positioned centrally within the Primary School site. These date from the 1970s.

Binidome B, which is the original Library block is being refurbished and re purposed as a library under a separate application.

Older structures in the site, including the original school house building on the Public School site are not heritage listed.

Heritage Key:

- General
- Landscape
- Conservation Area
- Site

LEP: Biodiversity

The school sites within Narrabeen Education Precinct contain areas which are highlighted as being of importance regarding Biodiversity.

Additionally the sites are impacted by Coastal Wetlands zoning which restricts build-able areas throughout the sites.

Biodiversity Key:

- Biodiversity
- Site

2.0 Site Analysis

2.08 Pittwater LEP: Bushfire and Flooding

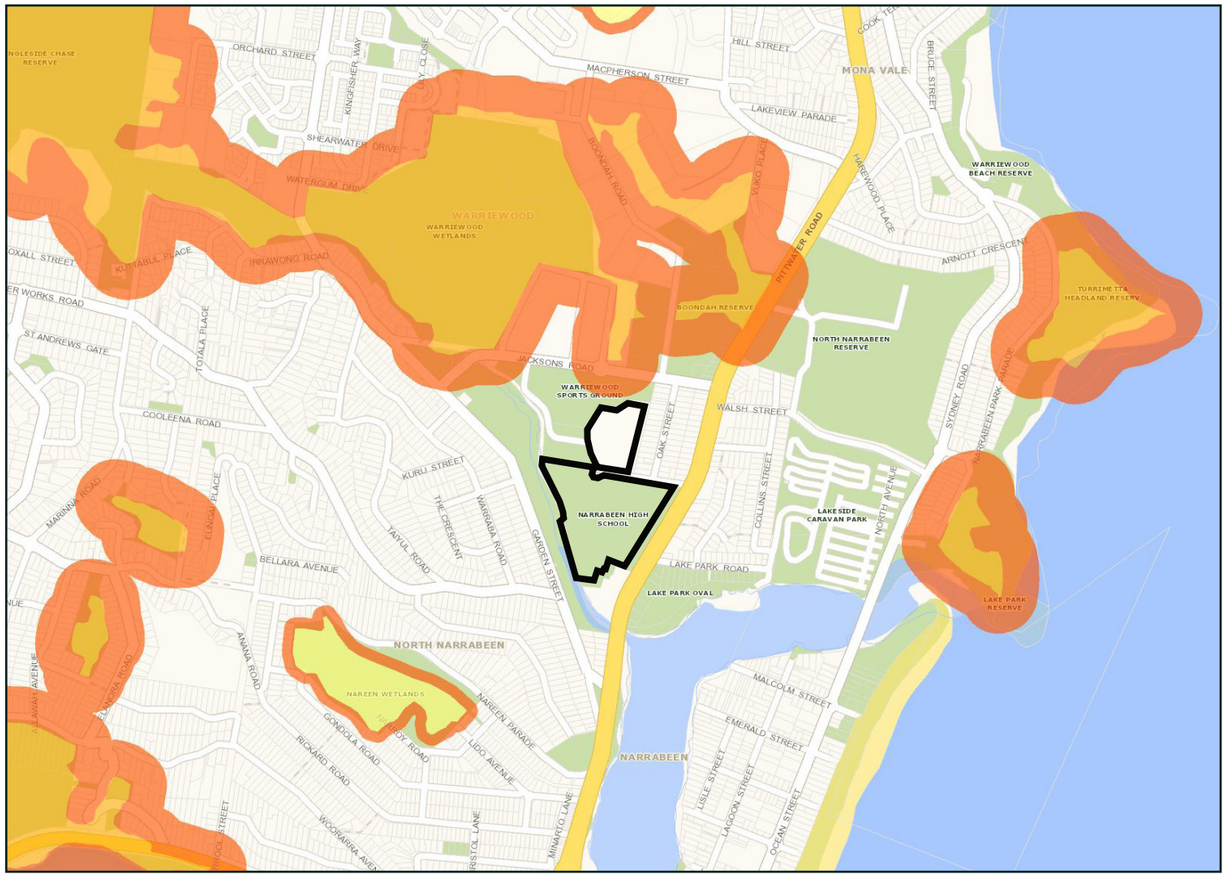


Figure 43: Pittwater LEP, Bush Fire Prone Land Map

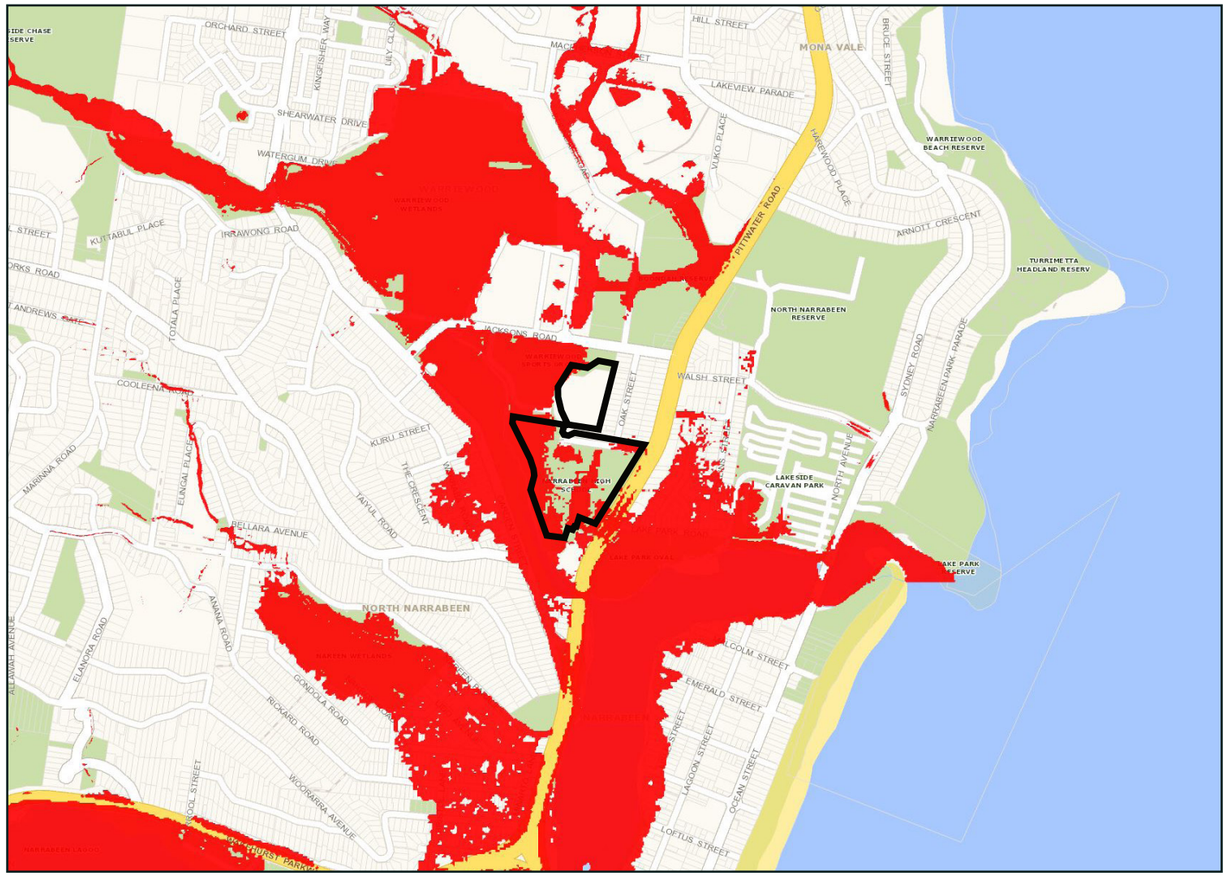


Figure 44: Pittwater LEP, High Flood Risk Planning Precinct

LEP: Bushfire

Warriewood sports pitches, immediately to the north west of the school sites falls within zones impacted by Bushfire restrictions. However, the school boundaries lie outside the area of bushfire restrictions illustrated within the LEP.

Bushfire Prone Land Key:

- Vegetation Buffer
- Vegetation Category 1
- Vegetation Category 2
- Site

LEP: Flooding

The LEP demonstrates that the High School site is susceptible to flooding risks.

As part of the design process this has been assessed, as indicated within the following diagrams.

High Flood Risk Key:

- High Risk Precinct
- Site

2.0 Site Analysis

2.09 Site Contours Diagram

The highest point of the Narrabeen Education Precinct is around the existing Binidomes at the Public School.

The highest point of the site is at RL 5.0m AHD, and falls down to RL 1.5m AHD.

Public School

At the Public School, the Binidomes sit upon the top of the hill at RL 5.0m AHD, and then falls down steeply to the west generally to RL 2.0m AHD.

The project Civil Engineer has advised that the Probable Maximum Flood (PMF) level is at RL 4.90m AHD. The new buildings at the Public School has been placed at RL 4.95m AHD to be just above the predicted maximum flood level, yet to still have the ability to marry into the existing site levels to the east of the building to allow accessible entries into the new buildings.

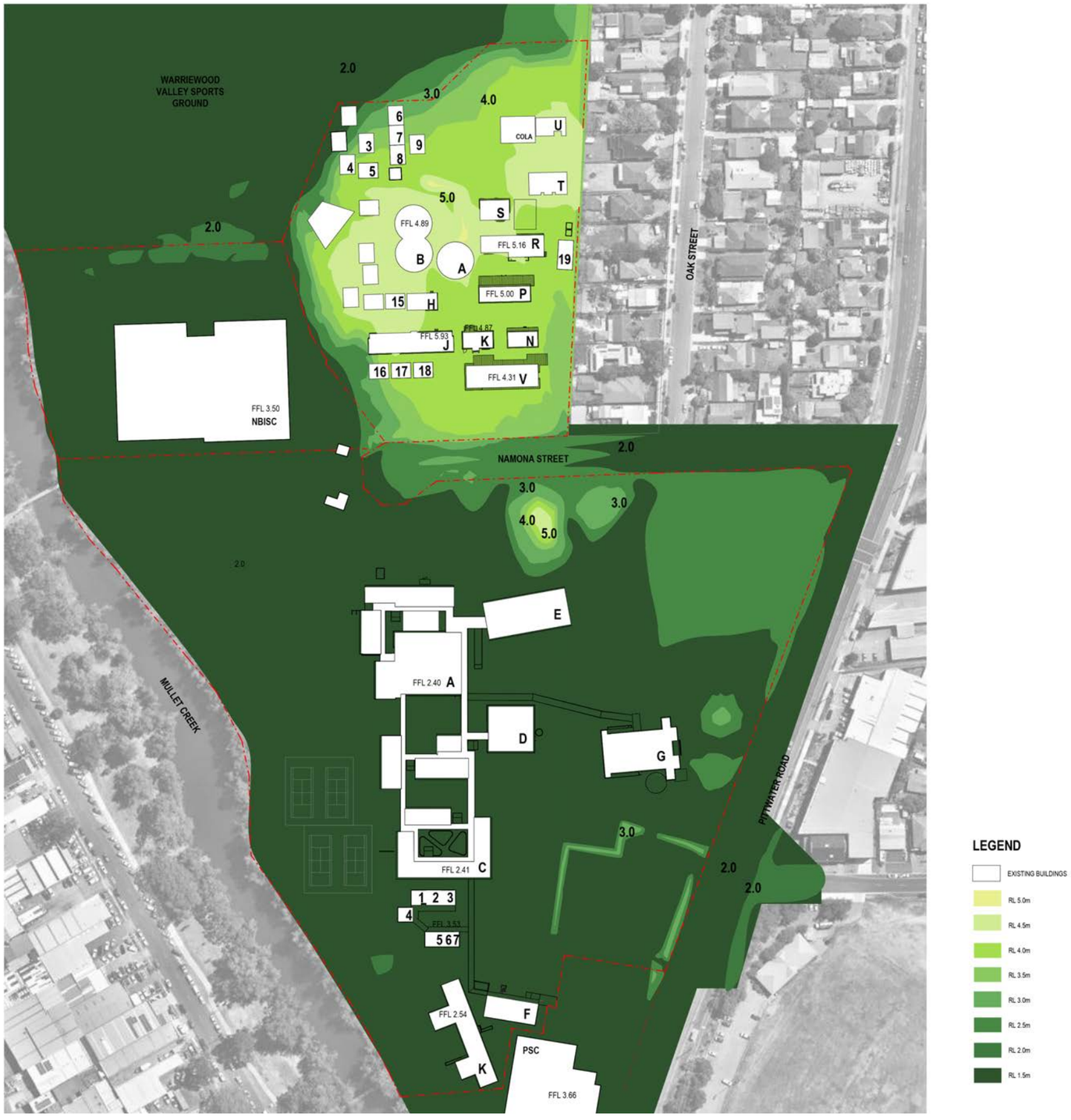
The challenge of the project is to provide accessible entry paths from the main street entrance at Namona Street, and from the out of hours access to the west. This is done carefully through the Coastal Wetland Zone with compliant accessible pathways & ramps.

High School

At the High School most of the site is below the 1% AEP Flood Level of RL 2.95m AHD advised by the project Civil Engineer, generally at RL 2.0m AHD.

Hence all of the existing buildings at the High School are below the 1% AEP Flood Level at the Ground Level, except for the recently installed demountable buildings which are set above the 1% AEP Flood Level. The Level 1 portion of the existing High School buildings are above the 1% AEP Flood Level.

Refer to Site Analysis - Flood Diagrams in the next section of the report for flood analysis.

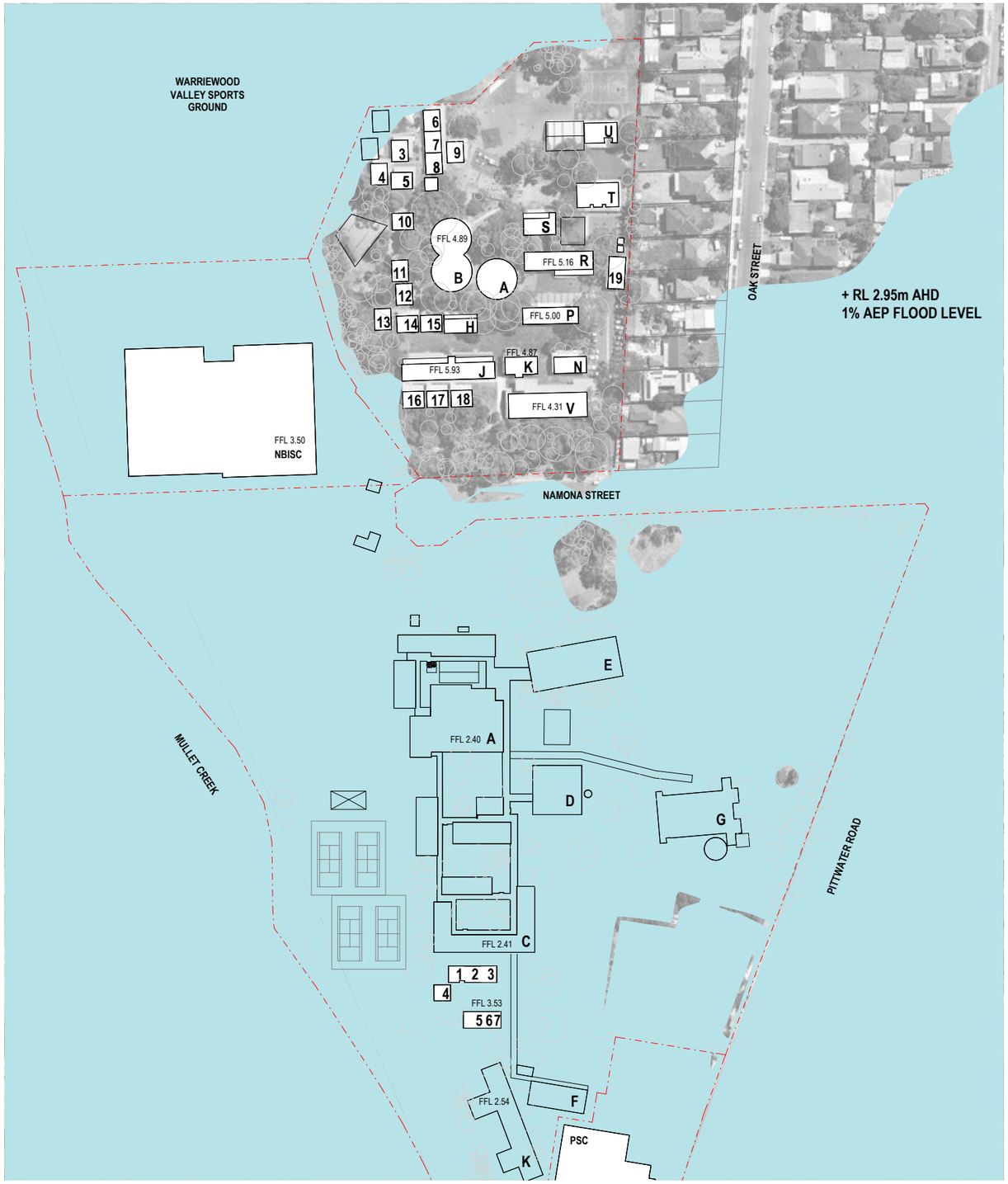


2.0 Site Analysis

2.10 Site Flooding - Ground Floor

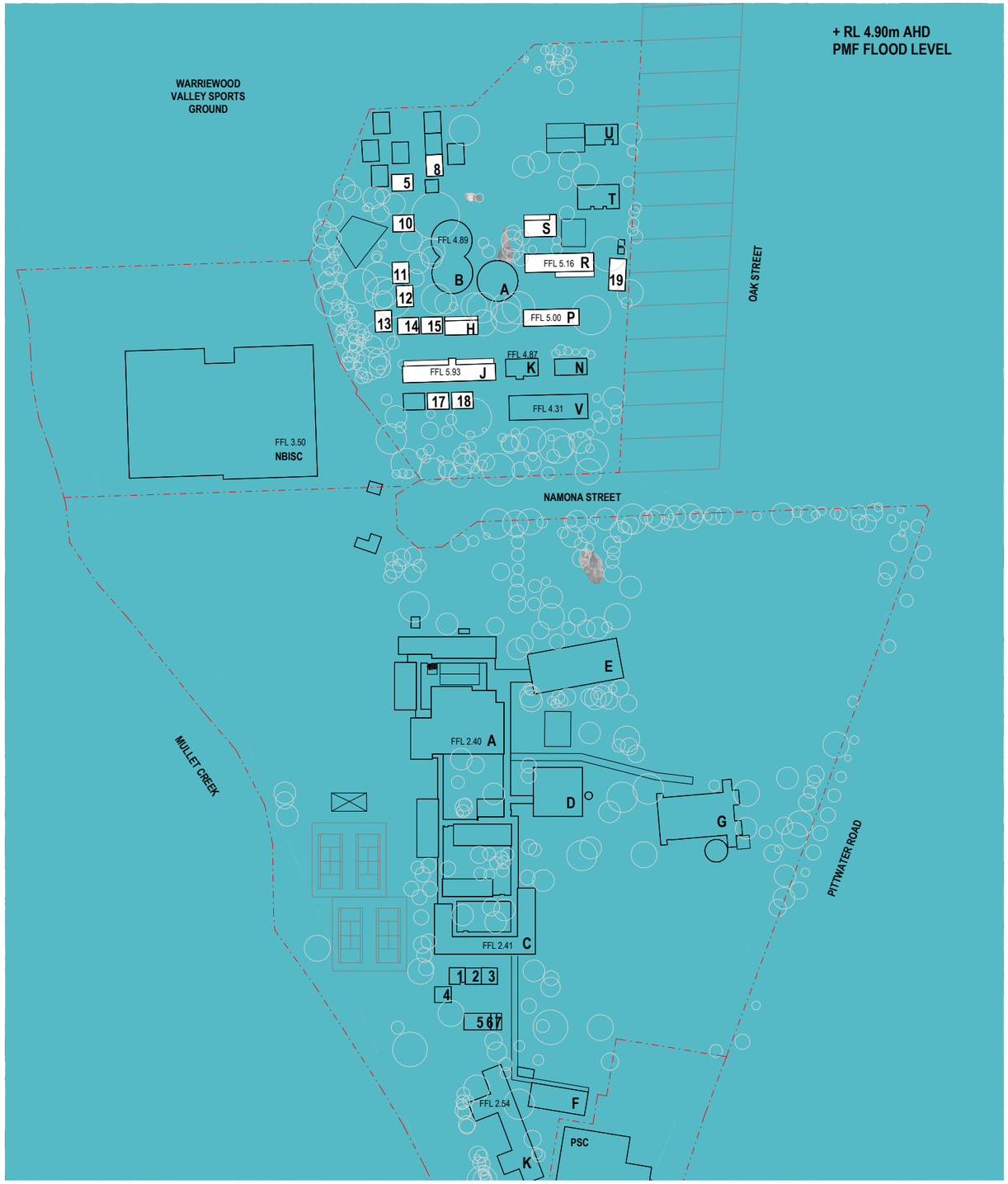
1% AEP Flood Level

Flood Levels at Ground Floor Level of existing School Buildings. Buildings above the 1% AEP Flood Level (RL 2.95m AHD) shown in White.



Probable Maximum Flood Level

Flood Levels at Ground Floor Level of existing School Buildings. Buildings above the PMF Flood Level (RL 4.90m AHD) shown in White.

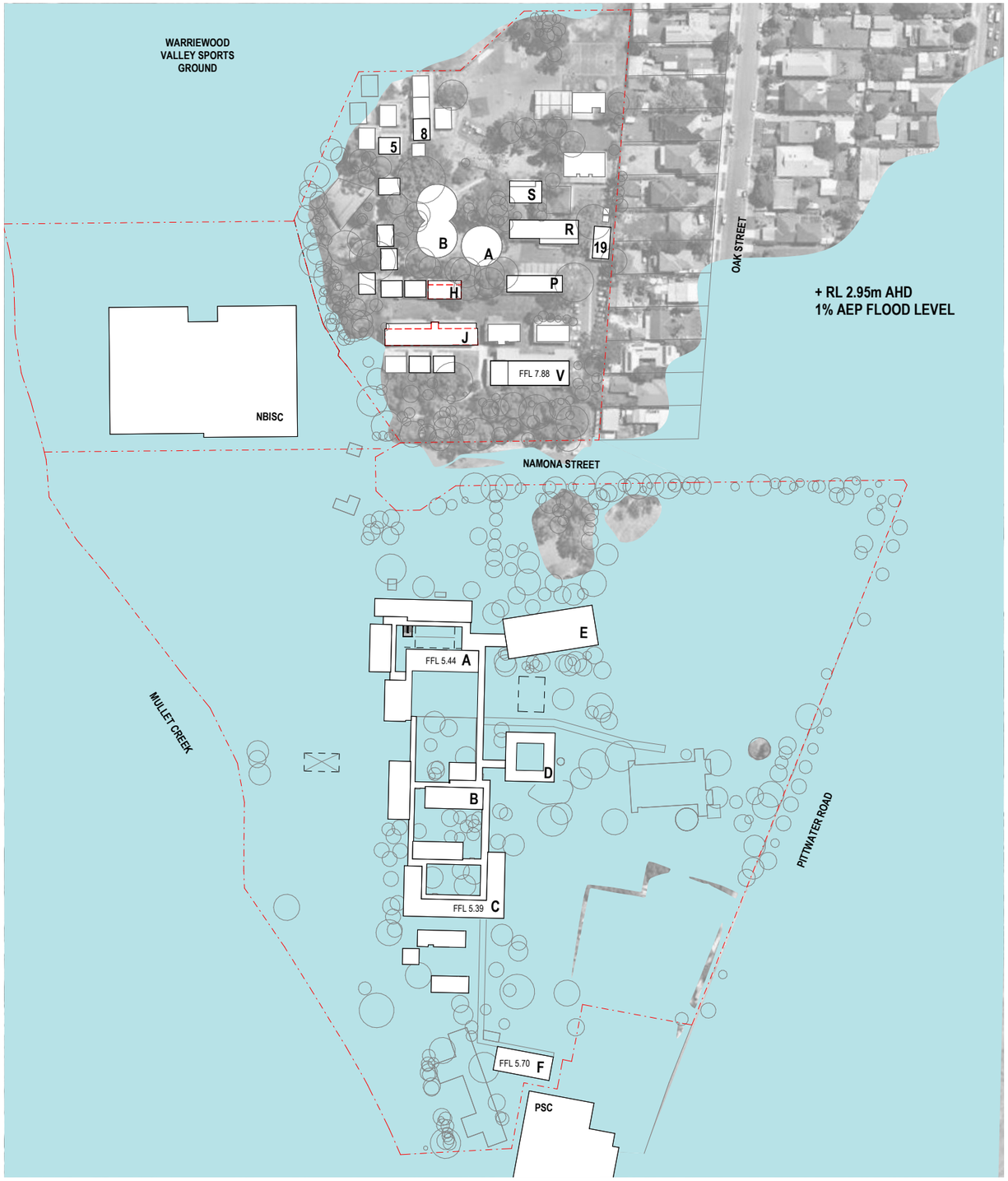


2.0 Site Analysis

2.11 Site Flooding - Level 1

1% AEP Flood Level

Flood Levels at Level 1 of existing School Buildings. Buildings above the PMF Flood Level (RL 4.90m AHD) shown in White.



Probable Maximum Flood Level

Flood Levels at Level 1 of existing School Buildings. Buildings above the PMF Flood Level (RL 4.90m AHD) shown in White.

“Education is the most powerful weapon which you can use to change the world.”

Nelson Mandela

3.0
Architecture Design Objectives - Narrabeen North Public School

3.0 Architecture Design Objectives - Narrabeen North Public School

3.01 Architecture Statement - Narrabeen North Public School

The many trees on site are celebrated by the design of the new buildings, which are located amongst them.

This concept is inspired by the stories told to us by Uncle Dennis Foley, a Gai-mariagal man from northern Sydney, who told us stories of the spiritual significance of the Angophora tree in Aboriginal culture, which can be found on-site.

The new buildings have been positioned to allow the core facilities of the school campus to be located within easy access to the main Namona street entrance.

A new welcoming entrance and accessible pathway is proposed from Namona Street, which has been carefully positioned through the existing Coastal Wetland Zone, leading straight to the main foyer of the new administration building and new hall. The position of the new school buildings has been carefully considered to retain as many existing trees as possible, retain and enhance the existing vegetation within the Coastal Wetland zone, and to also open up new views and vistas to the existing heritage Binidome whilst also respecting the heritage curtilage. The new buildings are lifted up off the natural ground level and above the predicted Probable Maximum Flood level.

Concept Design

From the outset the project has sought to Design from Country, to be inspired by the rich Aboriginal cultural heritage of this land and by the stories told to us by Uncle Dennis Foley. The buildings celebrate being amongst the existing trees and within nature, providing views and vistas to the tree tops or at ground level to the understorey shrub, providing a strong connection to nature and allowing for many opportunities for indoor-outdoor learning. Studies showing that a strong connection with nature provides better focus, creativity and enhanced cognitive ability.

Bulk & Scale

The size of the buildings is driven by the SINSW standard hub layout with a planning grid of 7.5m x 9m to allow for possible modular modern methods of construction. The design seeks to break down the scale of the buildings along the facade to make them more playful and friendly for the Primary School children.

The two storey buildings proposed are generally within Council's Maximum Building Height of 8.5m however slight incursions above the height plane occur as the site slopes steeply towards the west. The buildings are set above the natural ground level and above the predicted Probable Maximum Flood level as advised by the project's Civil engineer, which further impacts the height of the buildings

Heritage

Inputs received from the Heritage Consultant have further informed the design. The new buildings aim to be a backdrop to the heritage Binidomes using colours inspired by nature, allowing the white colour of the Binidome to be the focus of the site. Existing trees within the Heritage Curtilage are retained as much as possible to preserve the landscape setting of the Binidomes.

Walking from the upgraded Namona Street entrance, the view towards the Binidomes is now opened up (through the removal of Block H & J), and now framed by the new COLA roof which is set higher than the Binidome.

Materiality & Facade Design

The materiality of the school buildings draws inspiration from the Angophora tree, timber, and timber weather-board cladding which is a common material used in the surrounding site context, whilst proposing a more cost-effective and robust alternative with "weather-board look" fiber-cement cladding.

The composition of the facade aims to break-down the monolithic scale of the SINSW hub layout to make the classrooms feel more accessible to the small primary school children.

The facade of the building is articulated with a darker colour cladding to the ground floor, inspired by a typical Australian native bushland "understorey" helping to the ground the buildings. Medium tone cladding and aluminum battens are proposed to the upper portion of the Hall & Admin facade and COLA structure, inspired by the Angophora Tree Canopy. A lighter tone cladding and colourful sun shading elements are proposed for the upper level of the classroom building inspired by the light-coloured bark of Native trees. A saw-tooth walkway roof form to the verandah of the upper floor classrooms, which is inspired by tree-houses, helps to further break-down the scale of this building and enhance the tree-house concept to make these spaces feel more playful and accessible to the school children.

Playground Area

The position of the new buildings is carefully placed towards the west-side of the site which creates a new open play space for the school towards the south, which is partially shaded by the new COLA. The site is still slightly under the EFSG requirement for 10m2 of open play space per student (approximately 9m2), however the adjacent Warriewood sports field allows the school to spill out onto the open grass field to make up for the deficiency.

Figure 45: Articulation of facade inspired by native trees & tree-houses

3.0 Architecture Design Objectives - Narrabeen North Public School

3.01 Architecture Statement - Narrabeen North Public School

3.0 Architecture Design Objectives - Narrabeen North Public School

3.02 Table of Responses to Schedule 8 Design Principles of the Transport and Infrastructure SEPP

Design of the new school building and refurbishment of existing facilities at Narrabeen North Public School has been developed in relation to Schedule 8 Design Principles of the Transport and Infrastructure SEPP

Schedule 8 Schools—design quality principles (Section 3.36(6)(a))

Principle 1—context, built form and landscape

"Schools should be designed to respond to and enhance the positive qualities of their setting, landscape and heritage, including Aboriginal cultural heritage. The design and spatial organisation of buildings and the spaces between them should be informed by site conditions such as topography, orientation and climate.

Landscape should be integrated into the design of school developments to enhance on-site amenity, contribute to the street scape and mitigate negative impacts on neighboring sites.

School buildings and their grounds on land that is identified in or under a local environmental plan as a scenic protection area should be designed to recognise and protect the special visual qualities and natural environment of the area, and located and designed to minimise the development's visual impact on those qualities and that natural environment."

This development extends accommodation at Narrabeen North Public School within the existing site boundary, on land already zoned as SP2.

The position of the new school buildings has been carefully considered to retain as many existing trees as possible, and to also open up new views and vistas to the existing heritage Binidome, and create more open play space for the students. The buildings celebrate being amongst the existing trees and enhancement of existing landscape is proposed. This concept is inspired by the stories told to us by Uncle Dennis Foley, a Gai-mariagal man from northern Sydney, who told us stories of the spiritual significance of the Angophora tree in Aboriginal culture which can be found onsite.

The new buildings are raised above the existing ground level and above the Probable Maximum Flood level to ensure the new buildings are suitable for future climates. The positioning of the buildings is restricted by the Heritage Curtilage around the Binidomes at the center of the site, and also the Coastal Wetlands to the south of the site. The school currently has 18 demountable classrooms on-site which is not a good learning environment for the students. The project aims to retain as many permanent classroom buildings for the school as possible to the east of the site, whilst removing existing demountables & a COLA structure to the west of the site.

There is minimal change to the streetscape. Much of the new development is not visible form the Street, as it is positioned beyond the densely vegetated Coastal Wetlands located at the south of the site. Neighboring residential accommodation is located only to the east, with the Warriewood sports pitches and NBISC to the north and west.

Principle 2—sustainable, efficient and durable

"Good design combines positive environmental, social and economic outcomes. Schools and school buildings should be designed to minimise the consumption of energy, water and natural resources and reduce waste and encourage recycling.

Schools should be designed to be durable, resilient and adaptable, enabling them to evolve over time to meet future requirements."

Sustainability has been a key consideration of the design process. Inputs have been sought from the ESD Consultant, with inputs targeting sustainable improvements which provide improved educational outcomes.

SINSW's EFSG design guidelines seek to enhance opportunities for creating sustainable, resilient and adaptable developments. At Narrabeen North Public School this includes:

- Solar control through use of sun shading and verandahs to reduce excess solar gain and glare.
- Good cross-flow ventilation.
- Photovoltaic panels.
- Use of building components which include recycled content.
- Consideration of WELs and energy ratings when specifying products.
- Flexible layouts to allow for adaptation and future school needs.
- The buildings have been raised above the Probable Maximum Flood level to ensure that the buildings and occupants are safe in the event of a flood.

Principle 3—accessible and inclusive

"School buildings and their grounds should provide good way-finding and be welcoming, accessible and inclusive to people with differing needs and capabilities.

Note—

Way-finding refers to information systems that guide people through a physical environment and enhance their understanding and experience of the space.

Schools should actively seek opportunities for their facilities to be shared with the community and cater for activities outside of school hours."

The Landscape Design for the school has been informed by the need to create accessible paths of travel across the site, with steep level changes managed from Namona Street and from the Western boundary out of hours access entry, though selective positioning of the new entry pathway's to minimise the impact on existing trees. The landscape design aids way-finding from the street to the school office, and provides a journey through nature as part of the process of arrival to site with generous widths of paths to accommodate the high pedestrian peak times of day.

The new school hall can be used out of hours including for before and after school care, and has been positioned as close as possible to the Namona Street entrance to provide ease of access for the community, whilst still protecting the Coastal Wetland vegetation zone.

Principle 4—health and safety

"Good school development optimises health, safety and security within its boundaries and the surrounding public domain, and balances this with the need to create a welcoming and accessible environment."

The new site entry provides a warm generous opening to the street, providing a positive and inviting entrance to the school. An accessible path of travel is provided from the street into the school.

Design of fences is carefully considered to provide adequate security for the school, and safety for students, whilst also considering impact on the site boundary. A secondary line of fencing is provided to guide visitors into the school reception and secure the playground.

Principle 5—amenity

"Schools should provide pleasant and engaging spaces that are accessible for a wide range of educational, informal and community activities, while also considering the amenity of adjacent development and the local neighborhood.

Schools located near busy roads or near rail corridors should incorporate appropriate noise mitigation measures to ensure a high level of amenity for occupants.

Schools should include appropriate, efficient, stage and age appropriate indoor and outdoor learning and play spaces, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage and service areas."

The new hall and adjacent covered outdoor learning area provide a generous space for the school's educational requirements as well as a space for Out of Hours School Care and other community uses.

The new classroom buildings provide the opportunity for future focused learning environments that are highly adaptable for different methods of learning. The learning spaces are based on SINSW's hub layout which maximises flexibility. To the east of the building, the classrooms are provided the opportunity to open up to the landscape with large glazed sliding doors at ground level or to a generous walkway at level 1 which has wonderful views of the existing tree tops, to allow for indoor-outdoor learning and a direct connection to nature.

3.0 Architecture Design Objectives - Narrabeen North Public School

3.02 Table of Responses to Schedule 8 Design Principles of the Transport and Infrastructure SEPP

Landscape Design strategy for the playground considers the differing play preferences of children - open spaces for ball games and more active play; spaces for imaginative play, and spaces for quiet conversation. Where possible the existing play equipment has been retained.

Principle 6—whole of life, flexible and adaptive

"School design should consider future needs and take a whole-of-life-cycle approach underpinned by site wide strategic and spatial planning. Good design for schools should deliver high environmental performance, ease of adaptation and maximise multi-use facilities."

The spatial design of the school is based on SINSW's hub layout, which maximises opportunity for flexibility through daily use or long-term change of function. General Learning Spaces are grouped to enable team teaching. Co-location of GLS with Learning Commons spaces increases the variety of learning settings which can be accessed by students through the course of a school day.

The structural system is based around a 9x7.5 meter grid and locates shear walls to allow for future adaptability of the floor-plate.

Principle 7—aesthetics

"School buildings and their landscape setting should be aesthetically pleasing by achieving a built form that has good proportions and a balanced composition of elements. Schools should respond to positive elements from the site and surrounding neighborhood and have a positive impact on the quality and character of a neighborhood.

The built form should respond to the existing or desired future context, particularly, positive elements from the site and surrounding neighborhood, and have a positive impact on the quality and sense of identity of the neighborhood."

The project at the outset aimed to design from country, to be inspired by the rich Aboriginal cultural heritage of this land. The buildings celebrate being amongst the existing trees. This concept is inspired by the stories told to us by Uncle Dennis Foley, a Gai-mariagal man from northern Sydney, who told us stories of the spiritual significance of the Angophora tree in Aboriginal culture which can be found onsite.

The materiality of the school buildings draws inspiration from trees, timber, and timber weather-board cladding which is a common material used in beach-side towns such as Narrabeen, whilst proposing a more robust alternative with "weather-board look" fiber-cement cladding.

The composition of the facade aims to break-down the monolithic scale of the SINSW Hub-layout to make the classrooms feel more accessible to the small primary school children. The scale of the buildings is articulated with a darker colour cladding to the ground floor, inspired by a typical Australian native bushland "understory." Medium tone cladding or aluminium battens are proposed to the upper portion of the Hall & Admin facade and COLA structure, inspired by the Angophora Tree Canopy. A lighter tone cladding and sun shading elements are proposed for the upper level of the classroom building along with a saw-tooth level 1 walkway roof, helping to further break-down the scale of this building and enhance the tree-house concept to make these spaces feel more playful and accessible to the school children.

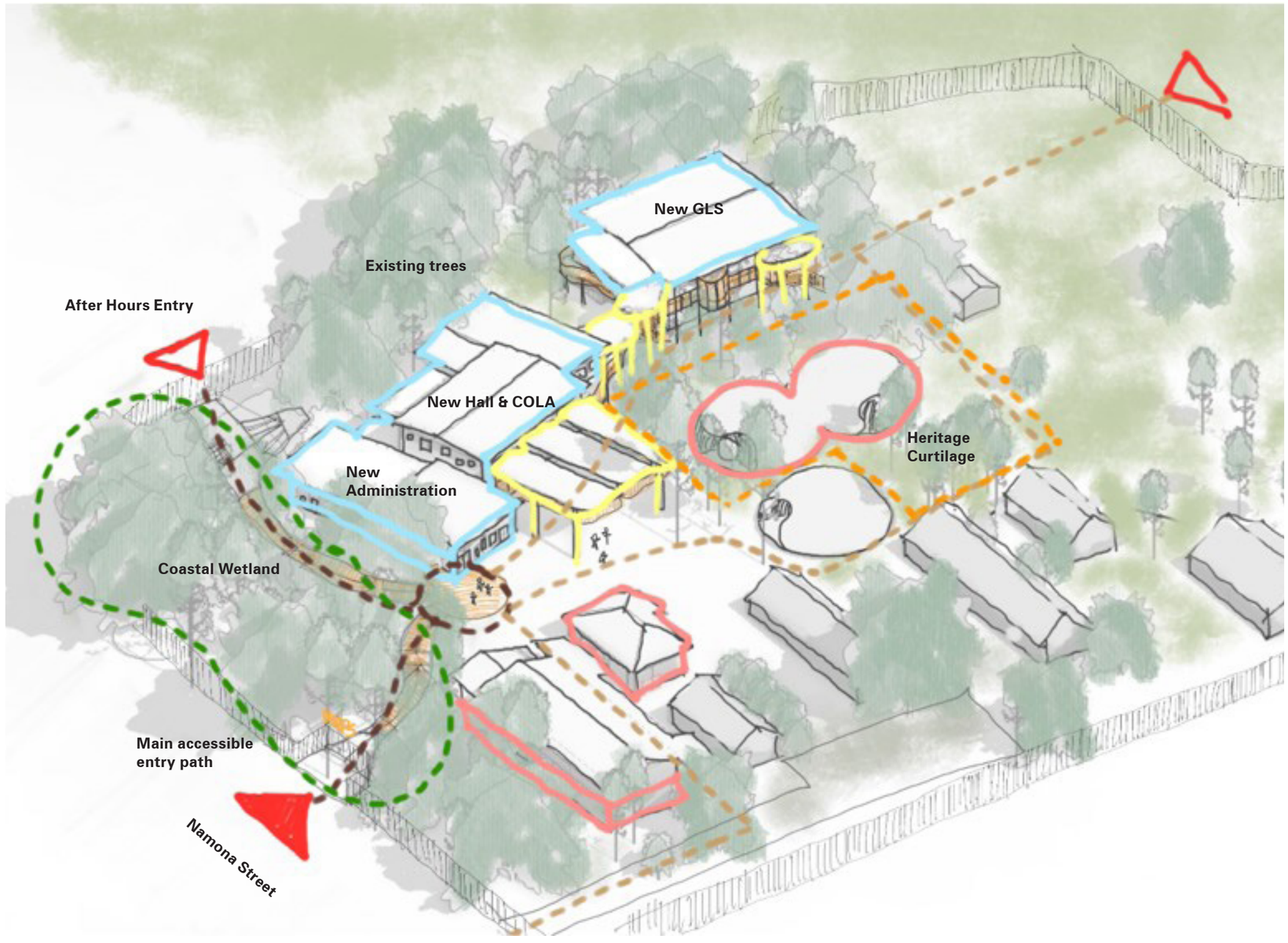


Figure 46: 3D sketch view of Site Masterplan showing new buildings in Blue, COLA in yellow and refurbished buildings in pink. The new entry pathway's culminate at the main Administration entry foyer and at a new open playground space.

3.0 Architecture Design Objectives - Narrabeen North Public School

3.03 Functional Arrangements

The design strategy to maximise permanent General Learning Spaces seeks to maximise opportunities for future focused learning.

The Spatial Planning of the new building considers spaces requiring connection to the ground plane. Programs located at Ground floor are those which require direct access for the public (reception and administrative spaces), or a direct connection with the playground (COLA, Hall, and OSHC).

The Staff Room is located on level one, providing passive surveillance over the site.

Functional Arrangements:

The spatial planning of the new building has been resolved to match SINSW's grid of 7.5 x 9 meters, and the EFSG hub layouts.

Master-planning for Narrabeen North Public School is impacted by numerous factors relating to the existing function of an operational school with heritage listed buildings, environmental constraints, and significant trees.

Where possible the design has been has been considered within the context of the following SINSW / EFSG guidelines:

- "Standard Hub Layouts: Primary Schools", Version 1.0, dated 09/06/2021.
- "MMC Guidelines", Version 4, dated 10/12/2020

Standard Hub Layouts Primary Schools - Functional Relationships

The desirable adjacency of spaces as per the Functional Relationship diagram in the document by SINSW have been adhered to in the project, with due consideration for the Coastal Wetland Zone, existing trees and Heritage Curtilage.

The new Admin is located at the end of the main entry path from Namona Street.

The new Hall & COLA is located with direct access from Namona street and also to an alternative after hours entrance from the western site boundary.

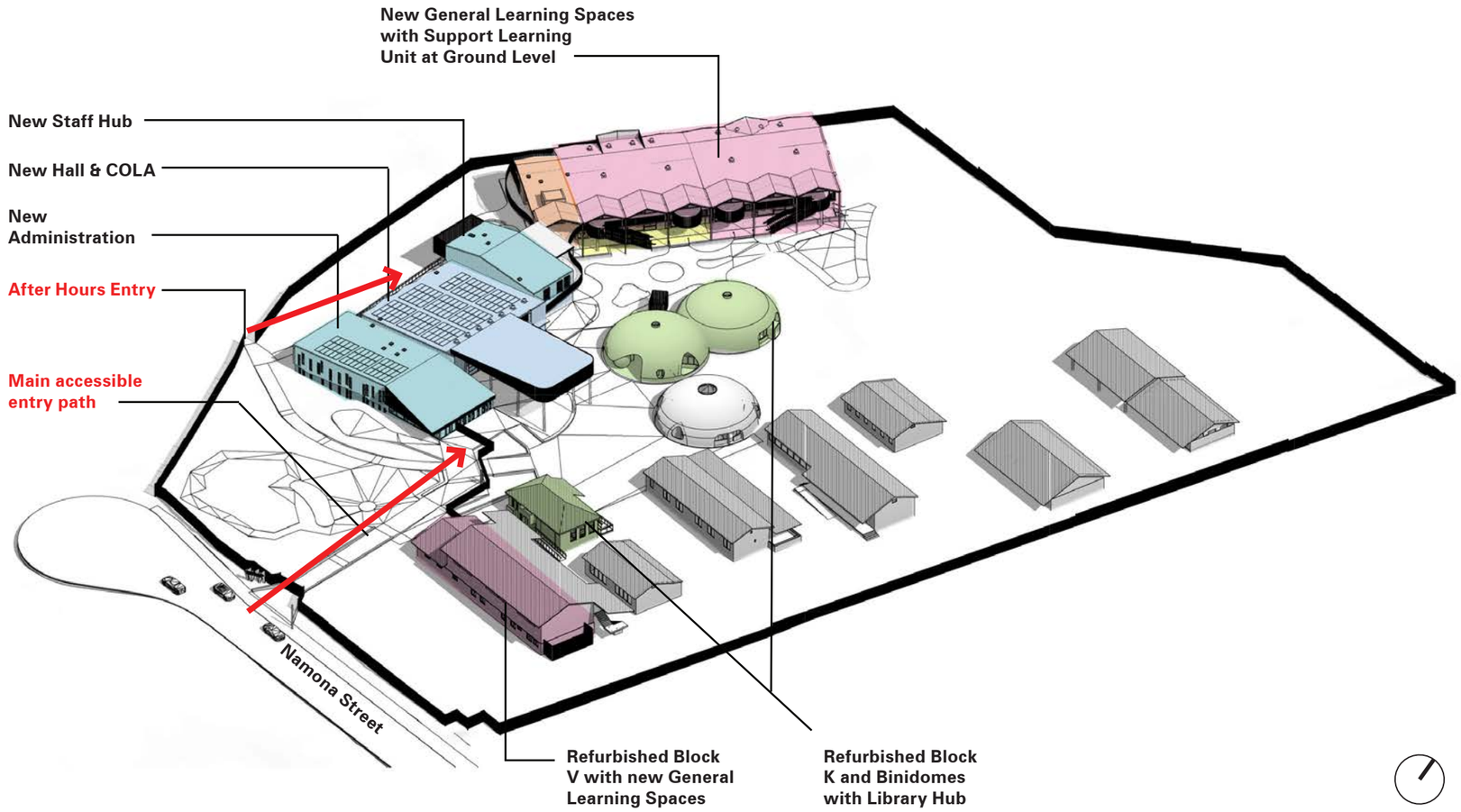


Figure 47: 3D Axonometric view of Functional Arrangement of proposed new buildings

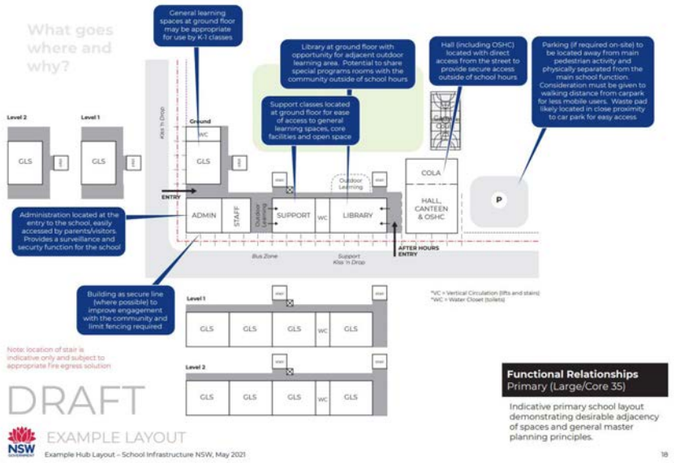


Figure 48: EFSG Functional Relationships diagram for a Primary School (Large)

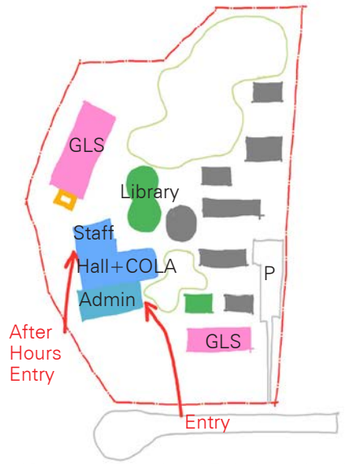


Figure 49: Functional Relationships diagram for Narrabeen Public School

3.0 Architecture Design Objectives - Narrabeen North Public School

3.04 Views and Connection to Nature

Opportunities to enjoy views of nature from learning spaces can enhance the learning environment. Maximising passive surveillance of the playground from staff spaces is a key factor in the design of schools.

The design seeks to optimise views of the Binidomes, from both within the school campus and outside the site boundary.

New buildings are located within the trees, providing views into the tree canopy and understorey from the new buildings.

The design seeks to celebrate being amongst the tree tops as the buildings are set higher above the ground to avoid the flood plain. Studies have shown that a direct connection with nature helps to support children's ability to focus, enhance cognitive abilities and supports creativity.

Figure 52: Existing fig tree adjacent to Binidome B which is retained

Figure 50: View from underneath new COLA looking towards Binidomes

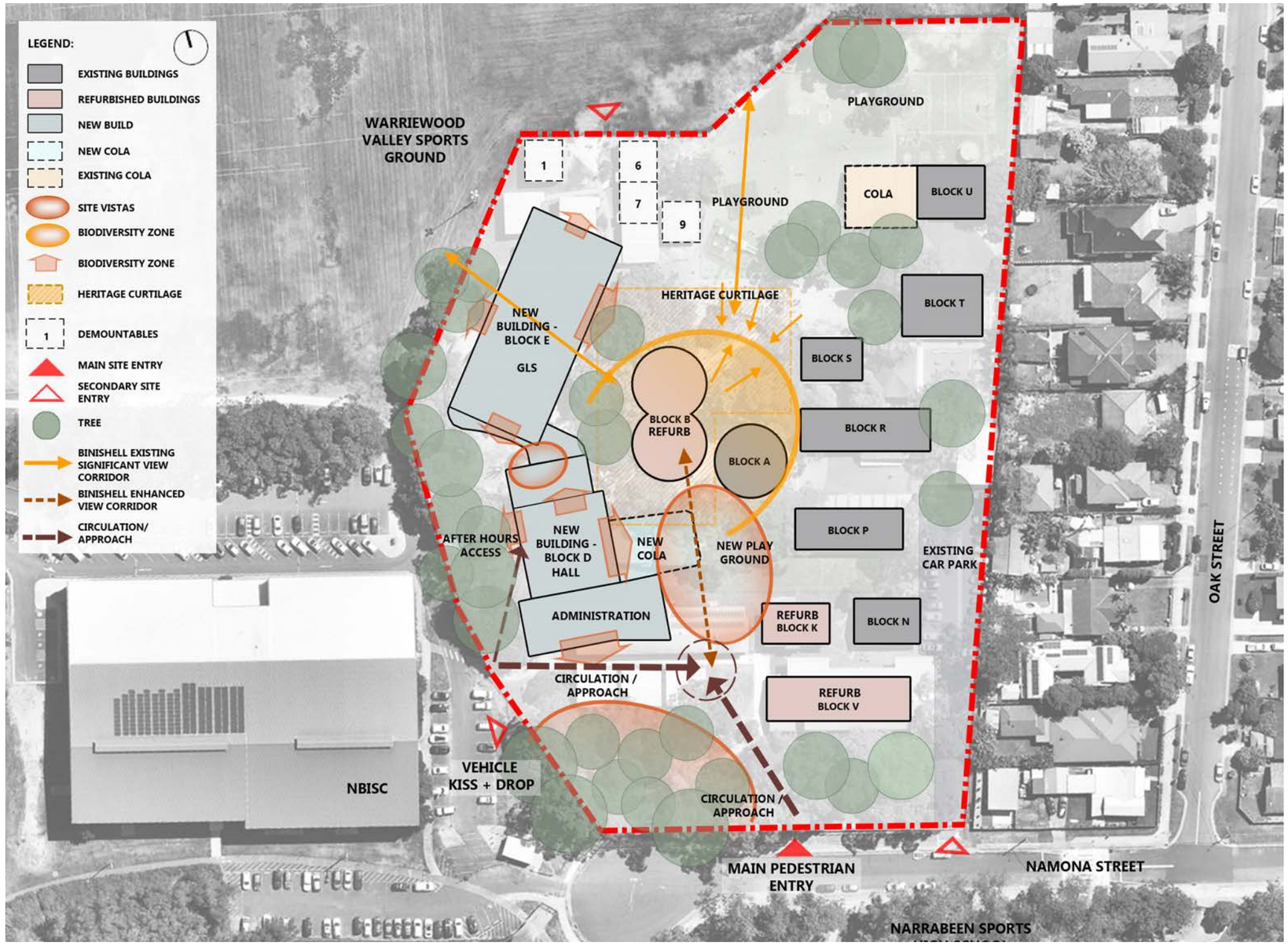


Figure 51: Views & Vista's Site Plan

3.0 Architecture Design Objectives - Narrabeen North Public School

3.05 Render - View from new main entry path to New Administration, Hall & COLA

3.0 Architecture Design Objectives - Narrabeen North Public School

3.06 Render - New Administration, Hall & COLA

3.0 Architecture Design Objectives - Narrabeen North Public School

3.07 EFSG GLS Hubs

The SINSW GLS hubs are designed to adapt on a daily basis between different learning modes from traditional classroom settings to open plan learning and team / collaborative teaching.

The aim is to be future flexible for ease of transformation, allowing for transition to future-focused, project based and cross-disciplinary learning, which requires a more open plan learning environment combined with seminar rooms and specialist learning facilities.

Hub Layouts:

As a Core 35 school under the previous EFSG guidelines, the Narrabeen Public School design has been adapted to the "Large" sized Hub, as referred to in the guide: "Standard Hub Layouts: Primary Schools", Version 1.0, dated 09/06/2021.

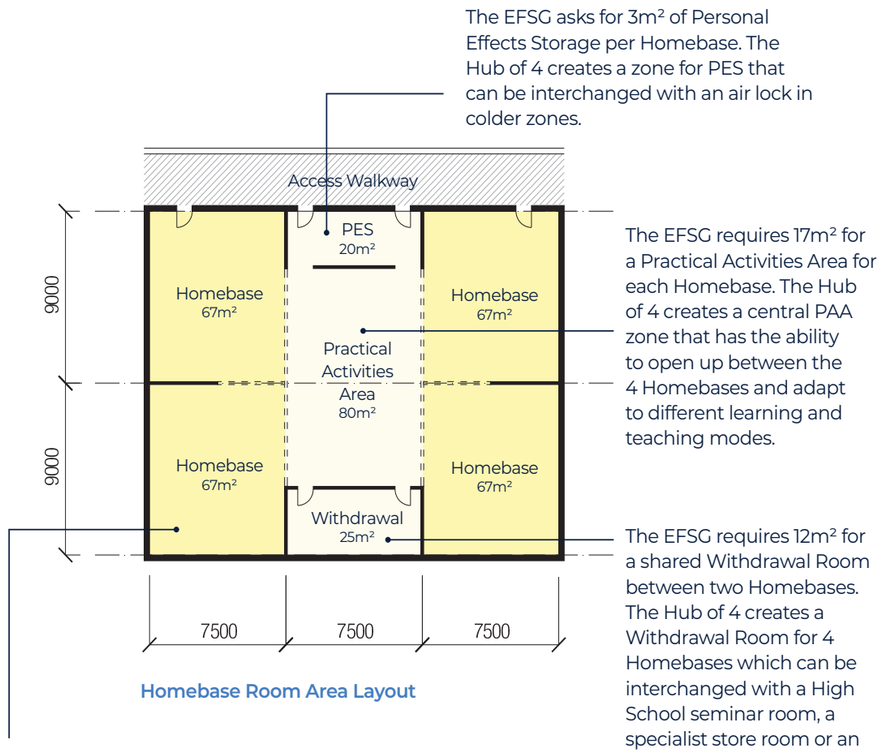
This describes the hub layouts and the associated grid system as follows:

> "The hub layouts have been developed to align with contemporary pedagogy (flexible learning environments) and developed in collaboration with SINSW subject matter experts. A set of design principles accompanies each plan to clarify the intent of the layout and highlight important considerations for the design."

SINSW: "Standard Hub Layouts: Primary Schools", Version 1.0, dated 09/06/2021, Page 1

The possible shift to cross-disciplinary curriculum in the future could mean a more diverse teaching space that is more akin to an office workplace – with open plan, collaboration rooms and shared specialist spaces. The flexibility of the hub GLS plans allows schools to transition gradually to modern methods of teaching if/when preferred.

SINSW Example of Homebase Hub and Spatial Flexibility



Homebase Room Area Layout

The EFSG requires 60m² for a Homebase and 6m²for store. The areas have been combined with storage being integrated into the storage elements. The Homebase and storage can be interchanged with a GLS or a Special Education Learning Classroom.

Figure 53: Homebase Hub Layouts, SINSW. Source: "MMC Guidelines", Version 4, dated 10/12/2020, Page 42.

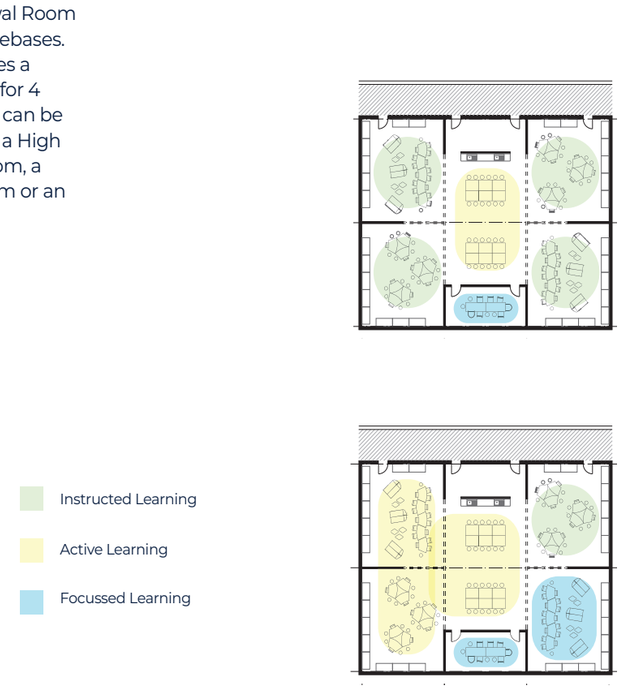


Figure 54: Homebase Hub Layouts, SINSW

3.0 Architecture Design Objectives - Narrabeen North Public School

3.08 Structural Grid

Modern Methods of Construction offers numerous benefits for the design and construction of educational facilities. Schools Infrastructure NSW are strategically optimising school developments utilising the benefits of MMC.

Schools Infrastructure NSW have developed a strategy for easily replicated hubs of accommodation based on a standardised grid. This grid optimises opportunities for the spaces to flex, allowing for adoption of co-teaching and open learning, where multiple class groups learn together. In the future, it is predicted that the curriculum will shift towards a more cross disciplinary mode of learning. This strategy and layout is being applied by SINSW across all Public School developments.

> "The spaces have been designed to fit within the planning grid of 9m x 7.5m to allow for Modern Methods of Construction (MMC), whether via a volumetric or 'kit of parts' approach. The areas have been determined in alignment with the existing Schedule of Accommodation.
>
> The layouts have been designed efficiently and demonstrate a reduction in internal areas purely for the purpose of movement, and the provision of floor space that is able to be accessed appropriately and used flexibly"

Source: SINSW: "MMC Guidelines", Version 4, dated 10/12/2020.

SINSW - 7.5 x 9 meter structural grid

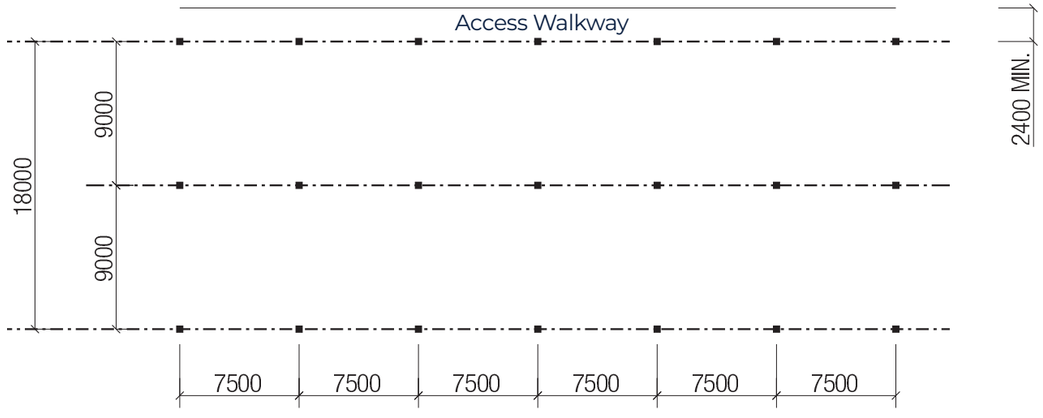


Figure 55: SINSW - MMC Guide, Page 38

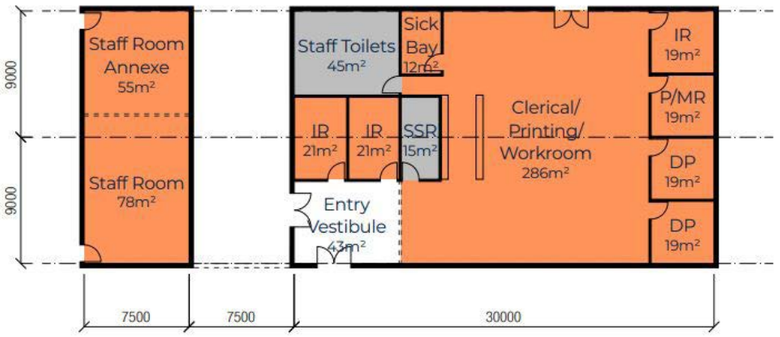


Figure 57: SINSW - MMC Guide, Administration Hub layout, Page 68

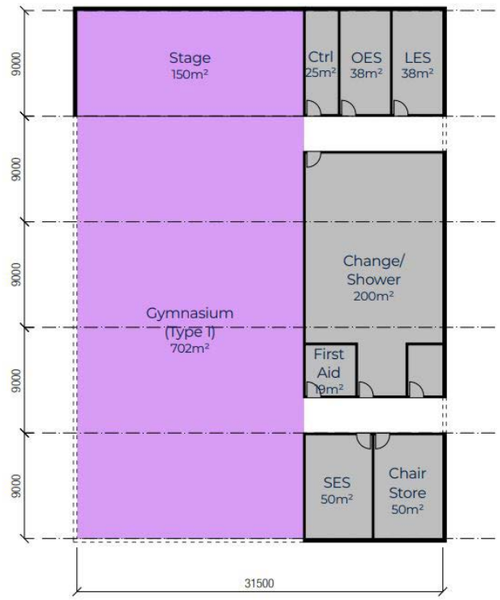


Figure 58: SINSW - MMC Guide, Hall Hub layout, Page 66

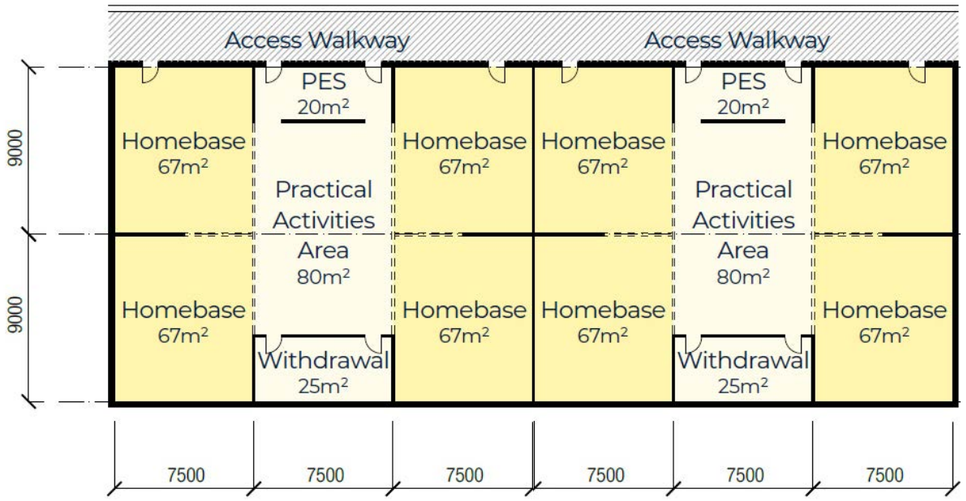


Figure 56: SINSW - MMC Guide, Two SINSW standard Homebase Hubs located adjacently, Page 44.

3.0 Architecture Design Objectives - Narrabeen North Public School

3.09 Materiality - Connecting with Country

DesignInc have consulted with Indigenous Elder Dennis Foley of Carranggel Consulting to engage with First Nations stories associated with the site and it's context.

Uncle Dennis Foley told the team many stories about the site. The Public School site once bordered a swamp, which provided a gathering place for celebrations due to abundance of food. Uncle Dennis showed us the claw marks up tree trunks being from small animals climbing up the tree, and pointed out how much cooler it was standing on-site under the canopy of the large fig. He pointed to a very old tree stump located at the highest part of the site near the Binidomes, which confirmed his recollection that the lower portion of the site was once a swamp, and that we stood upon what would have been dry-land.

The story which resonated the most was about the spiritual significance of the Angophora trees to Aboriginal culture. These trees had spiritual value for times of fertility and death and are very important in Aboriginal culture during these times. There are several angophora trees located on-site, and from this story the design team drew inspiration from.

The design seeks to celebrate being amongst the tree tops as the buildings are set higher above the ground to avoid the flood plain. Studies have shown that a direct connection with nature helps to support children's ability to focus, enhance cognitive abilities and supports creativity.

The facade is articulated as follows:

Understorey

The facade of the building is articulated with a darker colour cladding to the ground floor, inspired by a typical Australian native bushland "understory" helping to the ground the buildings.

Canopy

Medium tone cladding and aluminium battens are proposed to the upper portion of the Hall & Admin facade and COLA structure, inspired by the Angophora Tree Canopy.

Tree-houses

A lighter tone cladding and colourful sun shading elements are proposed for the upper level of the classroom building inspired by the light-coloured bark of Native trees. A saw-tooth walkway roof form to the verandah of the upper floor classrooms, which is inspired by tree-houses, helps to further break-down the scale of this building and enhance the tree-house concept to make these spaces feel more playful and accessible to the school children.

Lighter tone Eucalypt Bark -"Tree-house"

Angophora Tree Leaves -"Canopy"

Australian Native Bush - "Understorey"

Precedent study

Concept Sketch showing the articulation of the facade with a darker "understorey," a medium "canopy" tone for the upper portion of the Admin, Hall & COLA and a lighter tone for the upper level of the new GLS building "tree-houses."

3.0 Architecture Design Objectives - Narrabeen North Public School

3.10 Heritage Constraints - Binidomes

Pedagogical function of the buildings is a key consideration for the existing buildings to enable modern methods of teaching as part of the refurbishment strategy.

Renovation of the heritage listed double Binidome involves restoring it to its original function as a library.

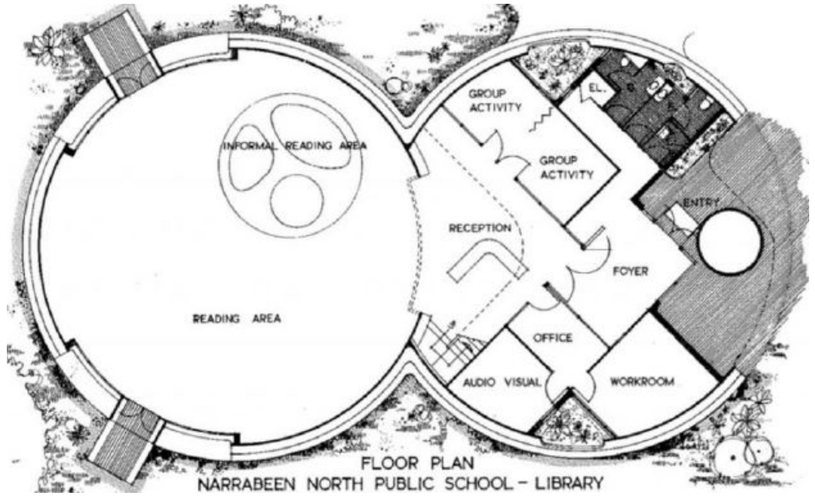
This will better express and celebrate the original/early form of the heritage building.

Heritage Consultant City Plan has been engaged by SINSW to advise on proposed work impacting the heritage buildings.

Key considerations for the refurbishment of heritage educational building:

- Align the facilities more closely with modern pedagogies and the spatial provision of the EFSG.
- Advise on refurbishment of finishes and on any other changes to the heritage structure.

Works to the heritage buildings will be discussed more extensively within the Heritage Consultant's report during Schematic Design.



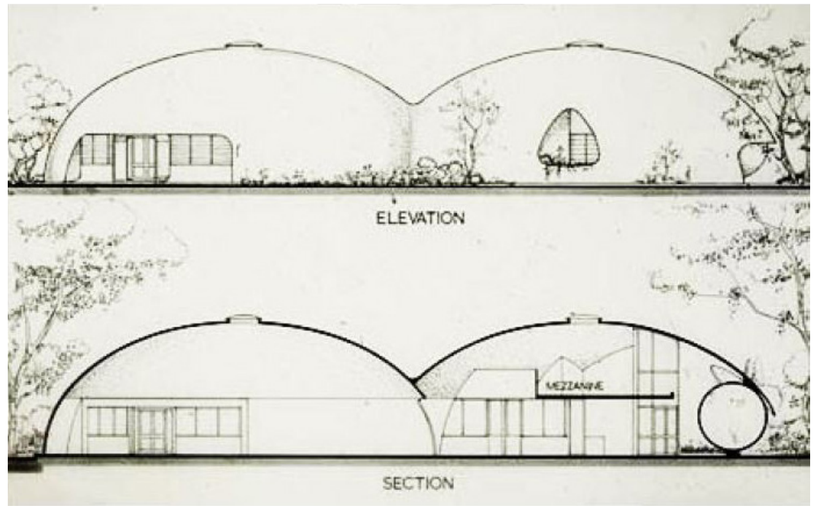


Figure 59: Top left: North Narrabeen Primary School Binishells, 1975. Source: NSW State Archives And Records, Gpo 2 – 47287, File No. Fl2347486

Figure 60: Top right: View of Binidomes under construction. Source: https://www.thevintagenews.com/2016/04/26/binishells-nsw-schools-fine-example-academic-architecture-hailed-revolutionary-time/?chrome=1&D2c=1&A1c=1

Figure 61: Bottom left: Narrabeen North Primary School Library, Floor Plan 1974 (Binishell B). Source: Binisystems.com

Figure 62: Bottom right: Narrabeen North Primary School Library, Elevation 1974 (Binishell B). Source: Binisystems.com

3.0 Architecture Design Objectives - Narrabeen North Public School

3.11 View Impacts

The character of the site and views of the Binidomes has been assessed with a view to minimising the impact of the proposed development.

The new buildings have been designed as a backdrop to the Binidomes, with the COLA roof raised up to frame views of the Binidomes when entering the site from Namona Street.

View from Namona Street

- Extensive vegetation to the south of the school building obscures much of the new buildings.
- New accessible path of entry and signage will be visible from the street to mark the entrance.
- Once past the existing Coastal Wetland zone to the south of the site, visitor's will have a new enhanced view towards the heritage Binidome Block B, as the existing timber school building has been removed and the new COLA roof now frames the view towards the Binidome.

View from Warriewood Sports Pitches

- The buildings covered by this Development Application are obscured from view by the new GLS building and existing vegetation.
- The new GLS building (which is covered by a REF application process) will be visible from the Warriewood Sports pitches. This elevation of the building has been broken down in bother the vertical and horizontal axis to reduce the bulk and scale.

Figure 63: View from the new proposed main accessible pathway entry from Namona Street

Figure 64: Existing view from a similar location to the render above. The existing timber school building in poor condition is removed to open up views to the heritage Binidome B.

3.0 Architecture Design Objectives - Narrabeen North Public School

3.12 Signage

The architectural team will develop an external signage system that uses the NSW DoE EFSG principles, and relevant guidelines adapted to suit the architectural language of this particular site and context.

Signage with the school name will be located outside the fence at the main entry to identify the school to the wider community from a distance.

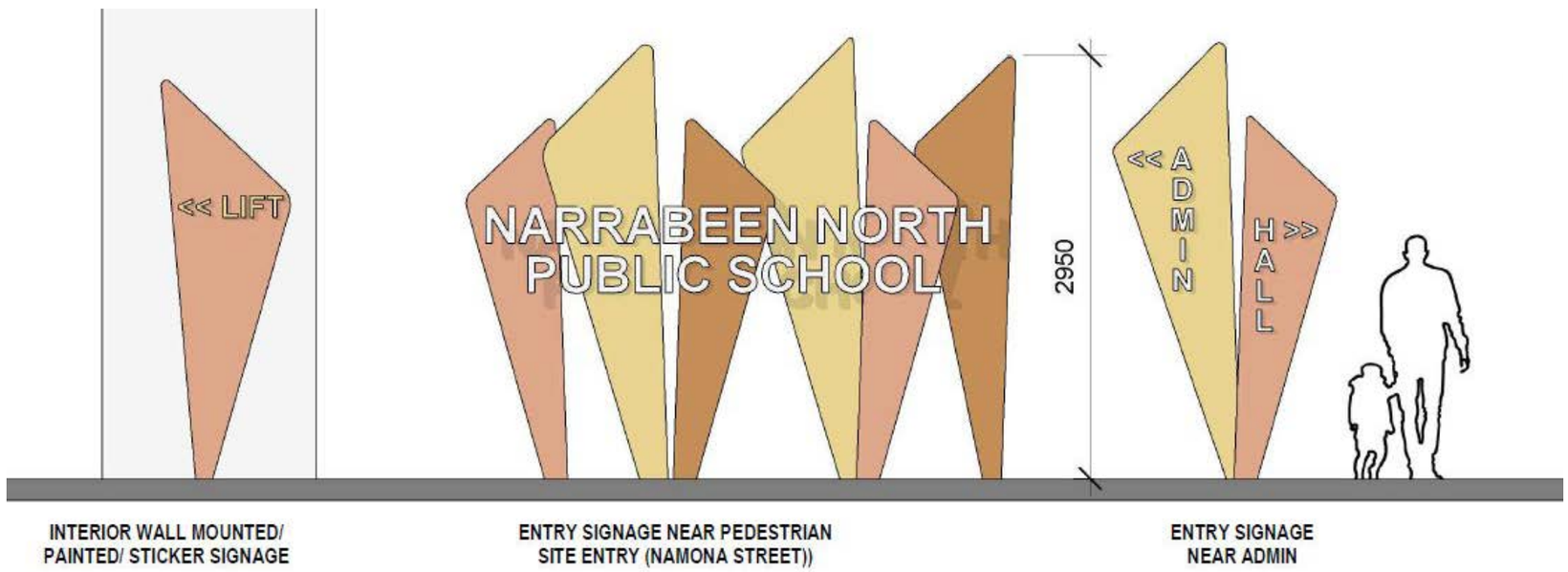
Within the school boundary (not street facing) way-finding signage will be developed to provide a creative, subliminal communication for all, supporting the idea of buildings as learning tools. The signage within the school will also direct visitor's to the main Administration foyer supporting clear way finding. This will be in addition to any required statutory signage requirements.

The design of the signage draws inspiration from the shape and colours of the Angophora leaves.

Subject to a separate planning pathway

Figure 65: View of the site entry from Namona Street

Figure 66: Angophora Tree Leaves providing inspiration for new signage



“High quality, well designed schools create a sense of pride, identity and ownership for the communities they serve. They also help deliver better educational results.”

Design Guide for Schools, Government Architect, NSW

4.0
Landscape Design Objectives - Narrabeen North Public School

4.0 Landscape Design Objectives - Narrabeen North Public School

4.01 Landscape Design Statement

The primary strategy with the landscape design is an emphasis on the end user with a strong focus on connection and circulation whilst treading lightly within the existing vegetation.

An uplift and refurbishment of the existing landscape included an expansion of outdoor learning space opportunities for children of differing ages.

Entry

The proposed design for the main entry provides a greater sense of arrival which significantly assists with wayfinding and contributes to the overall sense of place. A generous entry threshold combined with a widened entry path provides unencumbered access to the school with views directed towards the heart of the school and the heritage bini-domes. The clear lines of sight through the vegetated entry improve CPTED aspects and the utilisation of bespoke signage at the entry enhances the entry aesthetic and provides significant uplift in street prescence.

Masterplan

The proposal succeeds in improving connections from main and secondary entry points to the new administration area and thorugh to the main COLA and classrooms. The design has carefully considered, and ensures connection with, the existing site features thorughout the school which includes sensitive vegetation zones and large existing trees.

The design allows for a more open spatial arrangement at the core landscape areas in the center of the school. The COLA becomes the heart of the school and secondary path networks branch away to classrooms and outdoor learning and active play areas.

Site Levels

The existing site grades predominately from the East down to the West with a fall of approximately 2.4m. The middle of the site is generally level with the majority of level changes located adjacent the boundaries within areas of heavy vegetation.

Proposed levels for the new landscape areas relate to the proposed school building levels which have been raised to be approximately 700mm above existing grades. The proposed grades for the site retain the intent of the existing situation with new access path and ramps grading from the boundary acess points up to the new school classrooms and hall situated in the middle of the site.

The increase in height from existing has resulted in earthworks through the landscape spaces in order to achieve compliant access to the classrooms and to the school entries.

Changes in level have been dealt with sensitively thorugh the landscape around existing site features. The use of tactile indicators and handrails, which would fragment landscape spaces and cause potential hazards, has been kept to a minimum by ensuring path grades are as gentle as possible.

Playground Zones

Our design team focused on the creation of multifunction spaces within the school, maximising usage within a footprint constrained by existing trees and sensitive site features. The proposal focuses on spaces surrounding the new classrooms and hall buildings and provides multiple outdoor learning and sitting areas whilst maintaining the existing large active play areas to the North of the site.

The proposal includes;

- Multiple shaded outdoor learning and passive recreation spaces,
- Bush gardens with native vegetation,
- Special needs play and reflection space,
- Handball courts,
- Flexible undercover open play space within the COLA,

The new play and learning zones will provide the children with a number of textural and sensory play elements which will aid in their development.

Tree and Vegetation Management

The existing school site is heavily vegetated with native and exotic tree and vegetation species.

Due to the constraints of the site and the need to upgrade entry paths to be compliant for accessibility, forty existing trees are proposed to be removed of varying sizes and health, however the proposed tree offsetting strategy for the site will, over time, mitigate the negative impact and restore an ecological balance.

The Vernon st setback has been identified as containing important and sensitive vegetation classified as Swamp Oak Tall Forest and zoned Coastal Wetland. The intent is to tread lightly through this sensitive area and to maintain all vegetation that is not directly impacted by the proposed works. A detailed vegetation retention strategy is provided in conjunction with the project arborist and ecologist which will be continue to be updated in the design and documentation phases of the project for implementation during construction.

Planting Palette

The overall planting palette will reference and supplement the existing vegetation character of the school and the surrounding Narrabeen wetland area. The resulting outcome will be predominately native species which are already well established within the area and suitable to the local ecological conditions.

We will ensure that all proposed planting will be carefully selected to meet EFSG and Australian standards including the elimination of spikes and the specification of a plant palette that is non-toxic and safe for children, while minimizing the need for maintenance.

Boundary Treatment

The design proposal retains the existing landscape character to the project boudnaries. The native wetland vegetation character along the boundaries is a mixture of tall trees, sparse understorey shrubs and dense groundcovers and grasses which provides softening and screening of the proposed and existing school buildings. The proposal retains and enhances this vegetated boundary treatment by removing weeds and revegetating with native understorey plant types.

Figure 67: Existing playground at Narrabeen North Public School

4.0 Landscape Design Objectives - Narrabeen North Public School

4.02 Playground Area

Playgrounds provide far more than a break between structured lessons; they are the heart of the school, offering space for socialising and exercise that is crucial to the developmental needs of students.

It is thought by some that the life skills of negotiation, bargaining, sharing, tolerance and the basic skills of democracy are learned in the playground. Studies have shown that students focus better following breaks outdoors in a natural environment, and there are numerous health benefits associated with connection to the outdoors:

> "Concerns around childhood obesity, nature deficit disorder, awareness of the relationship between wellbeing, the ability to learn and environmental health, underpin the importance of indoor outdoor connections in schools."

"Future Proofing Schools", University of Melbourne, August 2011

In addition to physical and psychological benefits, school playgrounds present the opportunity to incorporate environmental and nature learnings into the pedagogy:

> "School grounds can be the ideal place for schools to demonstrate and encourage environmental awareness. They can provide opportunities to instill a sense of responsible environmental citizenship in students"

"Environmental Design in Schools", Government Architect NSW, 2018

It is evident that provision of adequate playground area is crucial for schools in terms of educational, social and health outcomes.

Outdoor Learning Area Diagram

Key:

- Refurbished Building
- New Build
- COLA
- Playground

4.0 Landscape Design Objectives - Narrabeen North Public School

4.03 Landscape Plan

Key:

1. Main entry gate with new 1:20 walkways orientated to compliment views to heritage binidomes
2. Proposed substation
3. Existing vegetation retained
4. Passive seating and learning area within natural environment
5. Proposed low impact boardwalk for secondary access
6. Proposed native tree plantings
7. Existing secondary gate retained
8. Proposed ramps and walkways for after hours access
9. Entry forecourt with second line of defense fencing and sliding gates
10. COLA
11. Proposed ramps for access to refurbished Block K
12. Line-marking play
13. Proposed planter beds with integrated seating around existing trees
14. Passive seating area with native plants and permeable paving around existing trees
15. Seating and planting opportunity between new buildings
16. Nature play under existing Fig tree
17. Vegetated mound with sliding and climbing boulders
18. Proposed lawn area with native trees
19. Existing lawn retained
20. Proposed bike parking (50 bike hoops/100 spaces)

4.0 Landscape Design Objectives - Narrabeen North Public School

4.04 Playground Zones

The Landscape Strategy for the playground creates zones offers diverse play opportunities to suit the various preferences of students.

The proposed play spaces for the public school provide new opportunity for passive and active play.

Multiple passive recreation spaces have been created throughout the newly formed landscape offering opportunity to sit individually or in small groups, within shaded vegetated areas. The passive seating areas allow enough room for small outdoor learning groups and provide a shaded rest space for students to gather before returning to classroms. Encouraging students to sit and gather within nature will provide a connection for students to the site which reflects initial discussions with Indigenous leaders on the past histories of this wetland site.

The majority of the existing active / open play space is retained to the north of the site providing large areas for running, group sports, organised games and general active free play. A small amount of active play area is designed for selected areas close to the school buildings through the use of linemarking of handball or hopscotch on asphalt. Nature play is proposed in areas of sensitivity around existing trees to ensure ground treatments and sympathetic to the existing vegetation and to provide a further option for play to suit a quieter more immersive element.

Key:

- Refurbished Building
- New Build
- COLA
- Structured Play
- Open/Multi Use Play
- Nature Play
- Passive Recreation

4.0 Landscape Design Objectives - Narrabeen North Public School

4.05 Fencing Design

Fencing is essential to define the boundary of the school and is a requirement of School Infrastructure NSW to secure the site.

Careful consideration has been given to the requirements of the fences depending upon the frontage of the boundary and the space being enclosed.

The existing site is fenced with 2.1m high metal palisade fencing with matching swing gates positioned at the main and secondary entries.

New fencing will include 2.1m high fence and sliding gates to the main Namona St entry to match the existing fencing with a 2.1m high fence realigned to be behind the proposed substation.

1.8m high fencing and gates are proposed within the site close to the new administration building and to the west adjacent the new hall building to esnure the central part of the school can be secure through and outside of school hours.

Investigation into appropriate fence heights and gate opening widths has been conducted to ensure security and traffic flow are balanced.

Fencing Diagram

1. Main entry - 2.1m high fence to match existing with two sliding gates (1.5m wide each)
2. 2.1m high fence to match existing around proposed substation
3. 1.8m high secondary fence with singular 0.9m wide swinging gate
4. 1.8m high secondary fence with 4m wide sliding gate
5. 1.8m high secondary fence with 3m wide sliding gate and singular 0.9m swinging gate
6. 1.8m high secondary fence with singular 0.9m swinging gate
7. 2.1m high swinging carpark gate retained
8. 2.1m high swinging gate to Warriewood Sports oval retained

Key:

- Refurbished Building
- New Build
- Existing 2.1m fence retained
- Proposed 2.1m fence to match existing
- Proposed 1.8m fence

4.0 Landscape Design Objectives - Narrabeen North Public School

4.06 Tree Management

Trees serve an important role in the design and function of School playgrounds and outdoor learning spaces.

In addition to providing much needed shade, a growing body of research into biophilic design indicates the importance of connections to nature and outdoor learning for students to improve mental, physical and spiritual health. This creates a calming educational environment that is connected to country.

As such, the design has sought to retain existing trees wherever feasible with advice from the Arborist. An Arborist Report has been considered as part of the Tree Management Plan and tree retention strategy.

Trees are only proposed for removal where the building works will have a great effect on the health of the tree. The design of the proposed school buildings has taken into account the existing trees with multiple layouts investigated to ensure maximum tree retention whilst still providing the required school infrastructure.

Replacement trees are proposed within the school sites to ensure long term canopy loss is regenerated and the site biodiversity is enhanced.

Tree Management Plan

* Drawing is for diagrammatic purposes. Refer to Landscape sketch SK-210 and Arborist Report for further information.

Key:

- Trees to be retained
- Trees to be removed
- Proposed Trees

“Classrooms are seeing the need to become more of a ‘problem-solving’ environment where students can learn in a wide variety of learning modes – from traditional, explicit learning to various forms of activity-based and individual learning.”

Source: School Infrastructure NSW’s MMC Guide

5.0
Design Objectives - Architecture Narrabeen Sports High School

5.0 Architecture Design Objectives - Narrabeen Sports High School

5.01 Architecture Statement - Narrabeen Sports High School

Positioned on the site of an Indigenous swamp, and comprising of 1970s Brutalist buildings, the NSHS site has an interesting heritage. The design for the Gymnasium extension and the wider refurbishment of the Brutalist Architecture seeks to articulate this dual history of the Narrabeen Sports High School site.

Seeking to Design from Country, our inspiration stems from the rich Aboriginal cultural heritage of Narrabeen and it's water courses, from the stories of the land passed to us by Uncle Dennis Foley; a Gai-mariagal man, who told us stories of the history as a swamp which provided an abundant source of food for the Indigenous people, and was a gathering site for ceremonies and celebrations.

Circulation around the site creates a circuitous route, flowing on both the upper and lower level of the main building, reminiscent of a journey around the lagoon. Outdoor learning areas provide gathering points along this route, culminating around the new COLA area and adjacent new building with outdoor learning on the upper floor.

The existing site masterplaning has a strong north / south circulation spine connection to the circuit. These routes provide glimpses into courtyards and to the vegetation to the west beyond.

The subject of this application, Narrabeen Sports High School Block A, dates from the 1970s and is of Brutalist style featuring pale brickwork, pebblecrete balustrades and shading, and exposed concrete and steel structure.

Compositionally most of the existing buildings, Blocks A, B, C, and D have strong forms, particularly the pebblecrete elements, which form balustrades, parapets, and solar shading, and the steel columns. The concrete elements that form the solar shading and balustrade give the building a striking, very horizontal appearance.

The campus has an appearance of being dull, slightly foreboding, and has repetitive facades, which convolute wayfinding around the site.

At Narrabeen Sports High School the design team have selected colour for the trims and reveals of the new building. This use of colour will then be expanded out into the wider campus through application to the existing steel columns, and use of powdercoat aluminium trims within the gaps of the existing pebblecrete balustrades.

Colours will soften the aesthetic, and align to the early premise of the Brutalist style which combine vibrant colours with raw concrete: This is notable in the work of renowned European Architect Le Corbusier, whose architecture is the genesis of the Brutalist style.

Examples of this style which utilise LeCorbusier's Architectural Polychromy palettes include;

- Chandigarh High Court Building (1962), India
- Unite d'Habitation of Berlin (1959), Germany

Figure 68: Narrabeen Sports High School

Figure 69: Narrabeen Sports High School

Figure 70: Chandigarh High Court Building. Source xxxx

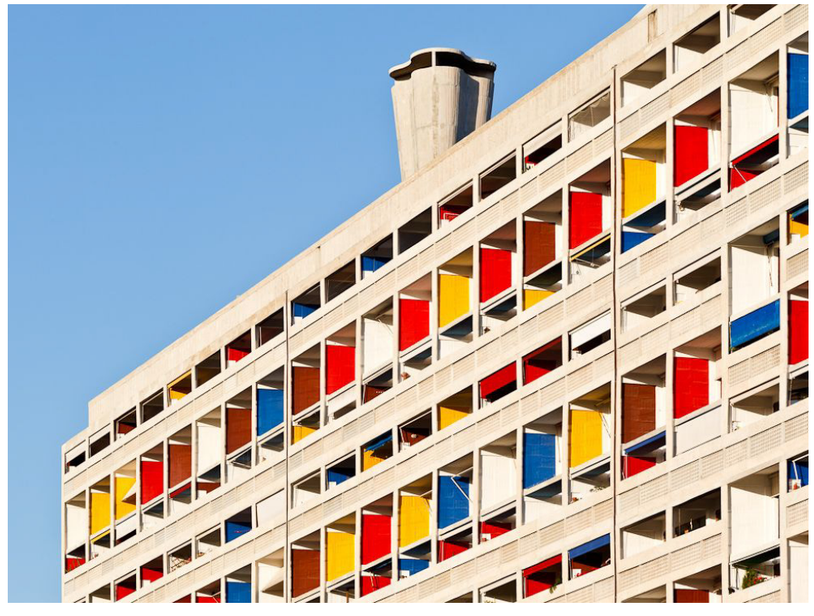


Figure 71: Unite d"Habitation, Berlin. Source xxxx

5.0 Architecture Design Objectives - Narrabeen Sports High School

5.01 Architecture Statement - Narrabeen Sports High School

Conceptually the colours specified at Narrabeen Sports High School will reference both the Indigenous and Brutalist history of the site:

The reeds, mosses, and vegetation surrounding the nearby Narrabeen Lagoon provide a connection to the former swamp upon which the school stands. Colours associated with the yellows, golds, greens, browns, and orange tones of the reeds and moss will be subtle highlights within the facades.

Colour specification also references the Brutalist Architectural Polychromy palette where this overlaps with the Indigenous palette of the Lagoon vegetation throughout the seasons. Considered use of colour will help the new interventions blend in a contemporary manner aligned with the intent of the 1970s architecture.

Bulk & Scale

The existing position of the gymnasium connects to the Canteen and main entry plaza, providing clear wayfinding from the main entry, and adjacency to catering and gathering spaces. As such the existing location of the Gymnasium on site was assessed as being suitable as a performance space, which may host small audiences.

The new building has been positioned west of the Gym, connecting the new stage to the existing gymnasium, thus enabling the gymnasium to facilitate the dual functions of sports and performance.

Spatial planning of the new building to mitigate against flooding has increased bulk at the upper level. Consequently, the new building is articulated as a block over-sailing a smaller plinth, as the upper level overhangs the recessed concrete facade of the ground floor, creating covered walkways between the change rooms and Gymnasium. Change rooms and WCs located at ground floor level are accessed either from the playground, sports pitches, or gymnasium.

The height of the new building exceeds the Maximum Building Height of 8.5 metre limit, which is defined by the LEP. This encroachment is driven by the following factors:

- Functional requirements for services and structure for the ground floor ceiling void and first floor slab, which define the FFL of Level 1.
- School design (EFSG) standards associated with room heights for the Movement Studio and Stage have informed the building height. These height requirements are based on the functions of drama and dance.

The new building parapet, however, is lower than other blocks on the site, and the new building is comparable to the adjacent Gymnasium is terms of bulk. Any additional overshadowing resulting from this incursion is contained within the site boundary. As such a Clause 4.6 has been requested.

Outdoor Learning

As a Sports High School the campus has provision of sports fields, pitches, and courts. However, a lack of quiet seating areas with shade has been identified, which the landscape design strategy seeks to resolve.

Though the site benefits from shade provided by mature trees, this is not consistent though the campus. The Landscape Design includes provision of new trees on the High School site to offset loss of trees at the public school.

A new COLA is included to the south of the existing Gymnasium, providing spill-out space for events. During School hours this will also provide an additional source of shade for the students.

Figure 72: Suggested powdercoat colours

Figure 74: Reeds at Narrabeen Lake

Figure 73: LeCorbusier's Architectural Polychromy palette - 1959. Source: https://www.lescouleurs.ch/en/the-colours

Figure 75: Reeds at Narrabeen Lake.

5.0 Architecture Design Objectives - Narrabeen Sports High School

5.02 Table of Responses to Schedule 8 Design Principles of the Transport and Infrastructure SEPP

The Design of the new school building and refurbishment of existing facilities at Narrabeen Sports High School has been developed in relation to Schedule 8 Design Principles of the Transport and Infrastructure SEPP

Schedule 8 Schools—design quality principles (Section 3.36(6)(a))

Principle 1—context, built form and landscape

"Schools should be designed to respond to and enhance the positive qualities of their setting, landscape and heritage, including Aboriginal cultural heritage. The design and spatial organisation of buildings and the spaces between them should be informed by site conditions such as topography, orientation and climate.

Landscape should be integrated into the design of school developments to enhance on-site amenity, contribute to the streetscape and mitigate negative impacts on neighboring sites.

School buildings and their grounds on land that is identified in or under a local environmental plan as a scenic protection area should be designed to recognise and protect the special visual qualities and natural environment of the area, and located and designed to minimise the development's visual impact on those qualities and that natural environment."

Connecting with Country site walks were undertaken early in the design process by DesignInc with Cammeraygal elder, Uncle Dennis Foley. This enabled the design team to understand and interpret the Indigenous heritage of the site; to create a Designing with Country response articulating the Indigenous heritage.

The land on which the school stands has a precolonial history as a swamp associated with the Narrabeen Lagoon. Vegetation and water sources associated with the swamp meant that food within the area was abundant. Uncle Dennis advised that this abundance of food meant the site was frequently visited by the local Indigenous people during celebrations.

In post colonial times the land has been infilled and direct connection to the lagoon lost. However, the site is still low lying, relatively flat, and susceptible to flooding. This is outlined by the flood mapping undertaken by flooding consultant BMT Global, and illustrated further within this report. Due to flooding risks, all habitable accommodation is located on level one unless direct connections are required to the ground plane or gymnasium.

Master planning of the school considers the existing circulation spine which runs north to south, serving blocks of accommodation separated by courtyards. The new building form extends an existing block maintaining the courtyard views for passive surveillance of students.

Additionally, the siting of the new build element responds to existing functional arrangements on the campus; notably the required functional adjacencies between the existing entry plaza, Gymnasium and proposed new stage.

The new development is located to the south of existing Block A, as such it will be only partially visible from the western end of Namona Street, near the NBISC and High School car park.

Views of the new building from the south and east are obscured by existing buildings, vegetation along Mullet Creek, and/or distance.

Coastal Wetlands zones have been mapped on the site plan and are avoided by the new building.

Landscape Design for the site considers the need to increase shade on the site. Removal of existing trees is minimal on the High School site, and is covered in a different Development Application.

Principle 2—sustainable, efficient and durable

"Good design combines positive environmental, social and economic outcomes. Schools and school buildings should be designed to minimise the consumption of energy, water and natural resources and reduce waste and encourage recycling.

Schools should be designed to be durable, resilient and adaptable, enabling them to evolve over time to meet future requirements."

Durability is a key consideration for the design, particularly due to flood risks associated with the High School site. Materiality of the ground floor facades is concrete, allowing for the materials to be cleaned following any minor flooding incidents. Flood modeling has been undertaken, and the Structural Engineer is factoring in the structural requirements of more severe flooding incidents.

Sustainability inputs have been sought from the ESD Consultant. SINSW's EFSG design guidelines seek to enhance opportunities for creating sustainable developments. At Narrabeen Sports High School this includes:

- Solar control through use of sun shading to reduce excess solar gain and glare.
- Photovoltaic panels.
- Use of building components which include recycled content.
- Consideration of WELs and energy ratings when specifying products.

Adaptability of the design is covered under Principle 6.

Spatial planning for level one of the new build references SINSW's hub layouts, which utilise a regular grid and minimise columns. These layouts maximise flexibility and can be adapted in the future, evolving for future pedagogies and functions.

Principle 3—accessible and inclusive

"School buildings and their grounds should provide good way-finding and be welcoming, accessible and inclusive to people with differing needs and capabilities.

Note—

Way-finding refers to information systems that guide people through a physical environment and enhance their understanding and experience of the space.

Schools should actively seek opportunities for their facilities to be shared with the community and cater for activities outside of school hours."

A new lift has been provided at the main entry to the school, enabling an accessible path of entry to both ground and level one of the High School Campus.

The new building considers pathways through the site at level one, providing accessible ramps to manage the change in levels between new and existing buildings.

Principle 4—health and safety

"Good school development optimises health, safety and security within its boundaries and the surrounding public domain, and balances this with the need to create a welcoming and accessible environment."

The existing High School entry plaza and canteen is retained as the heart of the school, with direct connections provided to the refurbished gymnasium and new performance space.

Accessibility has been enhanced, as described under Principle 3. An accessible path of travel is provided from the site entry on Namona Street to the areas covered within This application.

Fencing around the site and security systems associated with site entry are unchanged.

5.0 Architecture Design Objectives - Narrabeen Sports High School

5.02 Table of Responses to Schedule 8 Design Principles of the Transport and Infrastructure SEPP

Principle 5—amenity

"Schools should provide pleasant and engaging spaces that are accessible for a wide range of educational, informal and community activities, while also considering the amenity of adjacent development and the local neighborhood.

Schools located near busy roads or near rail corridors should incorporate appropriate noise mitigation measures to ensure a high level of amenity for occupants.

Schools should include appropriate, efficient, stage and age appropriate indoor and outdoor learning and play spaces, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage and service areas."

The extension of the existing Narrabeen Sports High School Gymnasium occurs within the existing site boundary, on land already zoned as SP2.

The design allows the existing canteen, and COLA, which form the heart of the school, to be retained adjacent to the main entry zone. The existing gymnasium and proposed Movement Studio also form part of this entry precinct, providing ease of access and way-finding from Namona Street.

The Movement Studio benefits from views over the existing vegetation lining Mullet Creek. Solar shading is applied to the new building, the aesthetic for which is described under Principle 7.

Landscape Design strategy considers the differing preferences of students - open spaces for sports and more active play and spaces for quiet conversation. As a Sports High School there are existing sports pitches and courts, however there is a deficit of quiet shaded areas with seating, which the landscape strategy addresses.

The development at the High School will cause minimal disruption to the surrounding properties: overshadowing occurs solely within the site boundary, and there are no residential properties immediately adjacent the development that may be impacted by noise associated with the new performance facilities at the school.

Principle 6—whole of life, flexible and adaptive

"School design should consider future needs and take a whole-of-life-cycle approach underpinned by site wide strategic and spatial planning. Good design for schools should deliver high environmental performance, ease of adaptation and maximise multi-use facilities."

This Development Application covers the expansion of the school Gymnasium to the west, to include a stage, Movement Studio, two General Learning Spaces, and ancillary accommodation.

The layouts maximise flexibility and can be adapted in the future, evolving to align with future pedagogies.

The ground floor provides cellular facilities such as sports storage, changing rooms, and other amenities which require a connection to the ground plane or gymnasium. As described under Principle 2, habitable accommodation has been avoided at ground floor level where possible.

The spatial design of level one of the new building references SINSW's hub layout, which maximises opportunities for flexibility through daily use or longterm change of function. PE General Learning Spaces are grouped to enable team teaching. Connections from the PE GLS to the adjacent Movement Studio are also possible to provide a larger flexible space.

Refurbishment of existing facilities within Block A is also being undertaken to provide learning spaces better aligned to modern pedagogies, and upgrade services, such as comms and air conditioning.

Principle 7—aesthetics

"School buildings and their landscape setting should be aesthetically pleasing by achieving a built form that has good proportions and a balanced composition of elements. Schools should respond to positive elements from the site and surrounding neighborhood and have a positive impact on the quality and character of a neighborhood.

The built form should respond to the existing or desired future context, particularly, positive elements from the site and surrounding neighborhood, and have a positive impact on the quality and sense of identity of the neighborhood."

Designing with Country has been a key strategy of the design process. The dominant Brutalist aesthetic of the existing gymnasium and surrounding accommodation dates from the early 1970s. Assessment of the existing school has determined that colour is required within the campus to contrast the existing grey pebblecrete and brighten the school. Inspiration for colour selection has been drawn from the natural context of the campus.

Conceptually the design references the vegetation that once grew within the former swamp upon which the existing school stands. These reeds can still be seen around the Narrabeen Lagoon.

The first floor solar shading, balustrades, and walkway screens are interspersed with coloured trims to reference the greens, yellows, and golden tones of the reeds rising from the lagoon.

Refer to Architecture Design Statement within this report for further information.

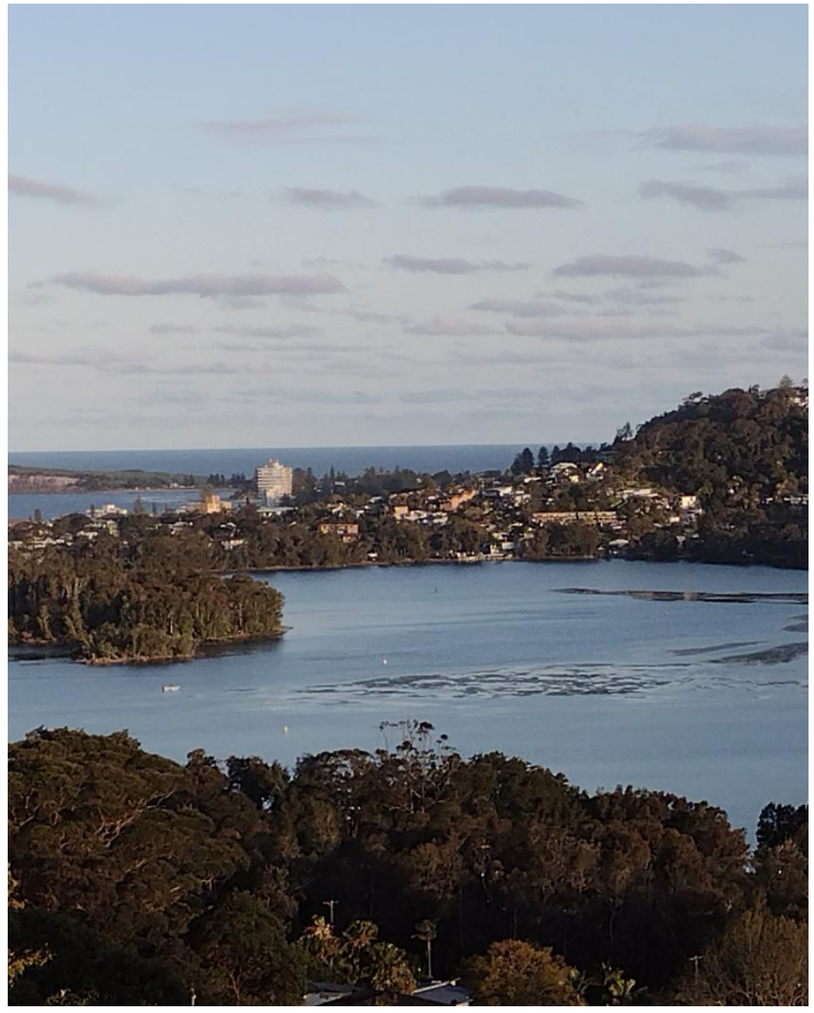


Figure 76: Narrabeen Lake viewed from above

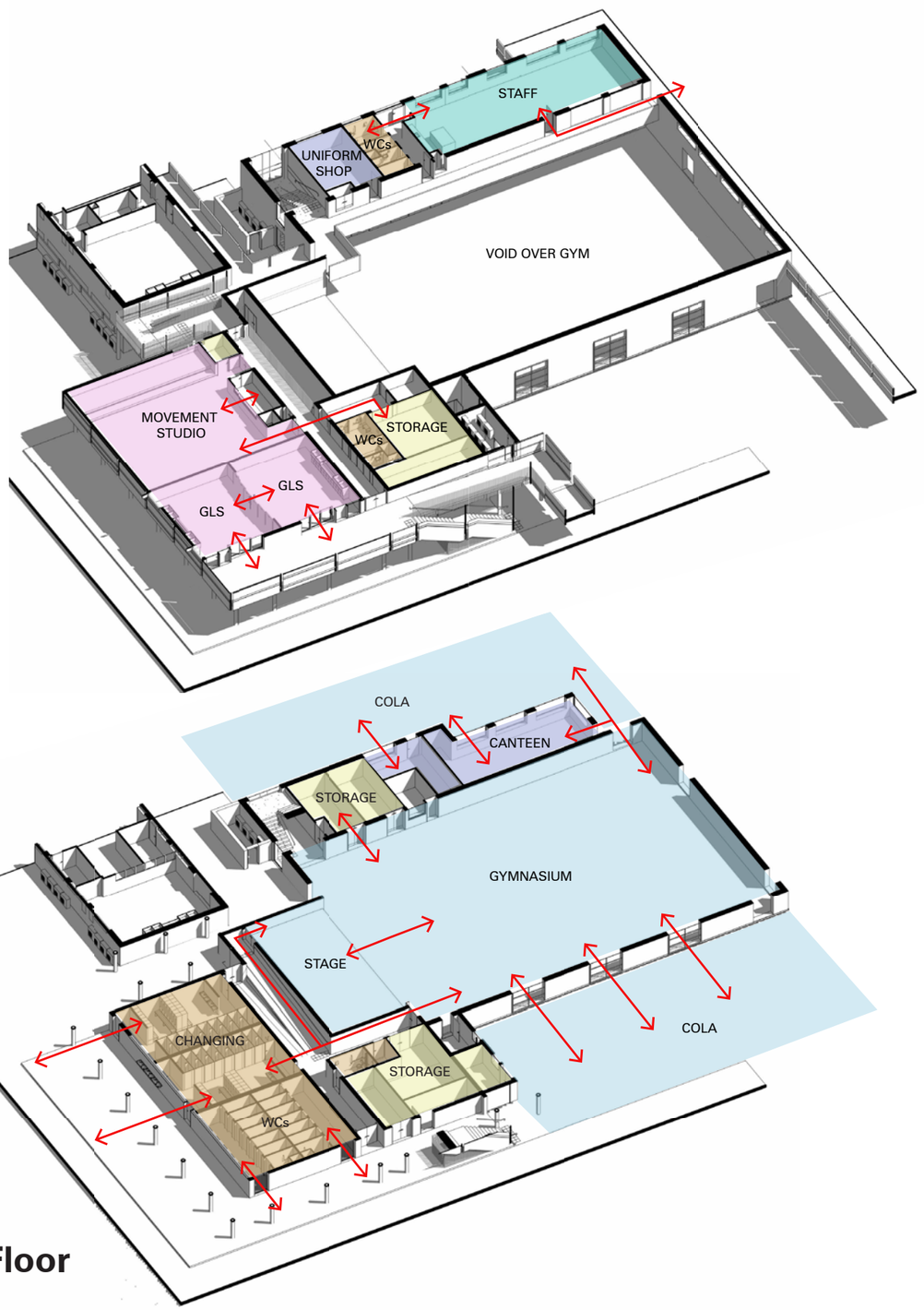
5.0 Architecture Design Objectives - Narrabeen Sports High School

5.03 Functional Arrangements

The design strategy for Narrabeen Sports High School considers factors unique to the site.

This strategy follows the following main criteria:

- Connectivity with existing facilities: Gymnasium, canteen, and main entry plaza.
- Location of habitable spaces at Level 1 to avid flood plane.
- Facilities requiring connectivity to the ground plane, which include the WCs, the ALU Cafe, and the Change-rooms.
- The Movement Studio is co-located with the Gymnasium due to the Physical Education function and opportunity to share use of the Change-rooms.



5.0 Architecture Design Objectives - Narrabeen Sports High School

5.04 Render

5.0 Architecture Design Objectives - Narrabeen Sports High School

5.05 Materiality - Narrabeen Sports High School

Materials utilised for Narrabeen Sports High School focus on durability, ease of maintenance, and ongoing aesthetic appeal.

This has been considered within the constraints of flood risks associated with the site, and the SINSW's standards.

Proposed materiality is as follows:

Ground Floor:

- Pre-cast concrete with textured formliner and warm grey through colour.

Level 1:

- Aluminium facade panels in light grey colour
- Perforated aluminium facade panels in light grey
- Powdercoat coloured trims

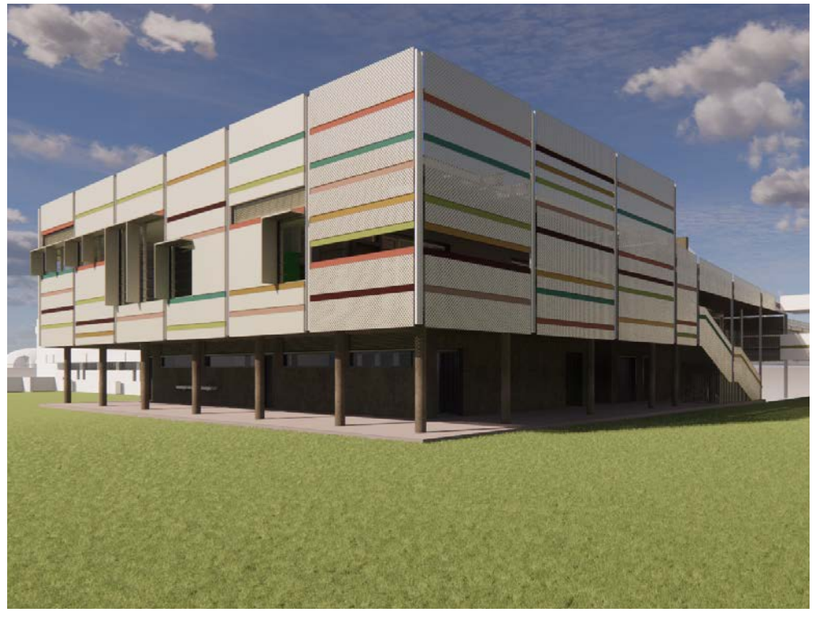


Figure 77: Narrabeen Sports High School - Render

Figure 78: Polychromiy Colours. Source: https://www.lescouleurs.ch/en/the-colours

Figure 79: Aluminium paneling

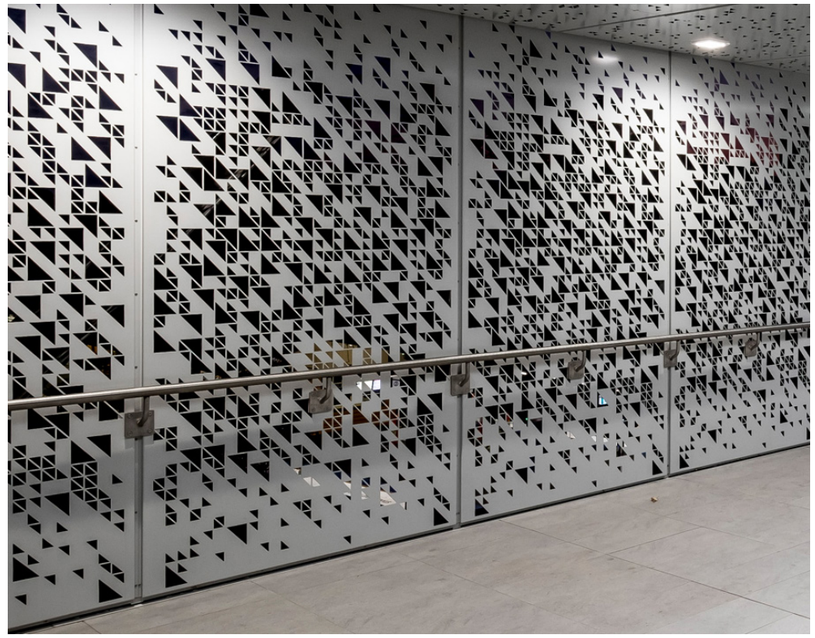


Figure 80: Perforated Screening - pattern to be confirmed

5.0 Architecture Design Objectives - Narrabeen Sports High School

5.05 View Impacts

The character of the site has been assessed with a view to minimising the impact of the proposed development and softening the aesthetic of the Brutalist buildings.

The new building will only be visible from one point outside the site boundary; the western end of Namona Street.

Impacts on the existing view is minimised as follows:

- Existing views of the sports pitch are not impacted by the inclusion of the new building.
- Additional landscaping will be provided near the new building.
- Design will respond to Connecting with Country considerations.

Figure 81: Close up view of the site as existing from the direction of Namona Street

Figure 82: Close up view of the site as proposed from the direction of Namona Street

“High quality, well designed schools create a sense of pride, identity and ownership for the communities they serve. They also help deliver better educational results.”

Design Guide for Schools, Government Architect, NSW

6.0
Landscape Design Objectives - Narrabeen Sports High School

Figure 6.1 Illustration by Laura Bell, Architecture student

6.0 Landscape Design Objectives - Narrabeen Sports High School

6.01 Landscape Design Statement

The primary landscape design objective was to enhance the passive recreation spaces by providing opportunity for student connection.

A refurbishment of the existing landscape included new shaded passive seating areas and relocated informal basketball court providing an uplift for the students recreation time and a further opportunity for outdoor learning.

Entry

The existing entries to the school are retained in the current landscape proposal. Additional trees have been included within the car park area that fronts Namona Street, and will line the Primary School Drop Off adjacent the NBISC.

Masterplan

The masterplan for the school remains largely unchanged in the proposed scheme. Circulation through the school is via a central axis which splits off to gain access to classroom blocks. The new landscape proposal connects to the existing circulation strategy and improves usable space outside the proposed architectural works adjacent the existing gym.

Site Levels

The existing site grades are relatively level with the highest point in the middle of the school site. The western boundary sits adjacent Mullet Creek and is the low point of the site sitting approximately 1m below the level at the centre of the school

The proposed architectural design sits new building floor levels approximately 130mm above existing levels. The adjacent landscape spaces have been raised to marry in with these new floor levels. The increase in height has resulted in minor regrading through the landscape open space in order to achieve compliant access to the classrooms and connected landscape spaces.

Playground Zones

The proposal focuses on refurbishing landscape spaces adjacent the new gym changerooms classrooms. An existing informal basketball court has been relocated away form the buildings to sit adjacent an existing seating area. The relocation of the basketball court has created space for new landscape seating and shaded outdoor learning zones adjacent the new building works.

The proposal includes;

- Relocated basketball court
- Shaded landscape seating for outdoor learning and passive recreation,

Tree and Vegetation Management

The existing school site is heavily vegetated with native and exotic tree and vegetation species. Most trees are being retained on the site and works are not proposed close to the majority of existing trees.

Six existing small trees are proposed to be removed at the south of the school site for ongoing maintenance reasons and to improve the amenity and visual surveillance at the entrance classrooms. The proposed tree offsetting strategy for the site will, over time, mitigate the negative impact and restore an ecological balance.

A detailed vegetation retention strategy is provided in conjunction with the project arborist and ecologist which will be continue to be updated in the design and documentation phases of the project for implementation during construction.

Planting Palette

The overall planting palette will reference and supplement the existing vegetation character of the school and the surrounding Narrabeen wetland area. The resulting outcome will be predominately native species which are already well established within the area and suitable to the local ecological conditions.

We will ensure that all proposed planting will be carefully selected to meet EFSG and Australian standards including the elimination of spikes and the specification of a plant palette that is non-toxic and safe for children, while minimizing the need for maintenance.

Boundary Treatment

The design proposal retains the existing landscape character to the project boundaries. The native wetland vegetation character along the boundaries is a mixture of tall trees, sparse understorey shrubs, groundcovers and grasses which provides softening and screening of the proposed and existing school buildings.

Figure 84: Existing playground at Narrabeen Sports High School

6.0 Landscape Design Objectives - Narrabeen Sports High School

6.02 Landscape Plan

Key:

1. Main entry gate retained as is
2. Existing garden beds located within coastal wetland zone retained as is
3. Proposed bike parking (50 bike hoops/100 spaces)
4. Carpark medians re-established and planted with native species
5. Proposed native tree replacement planting
6. Proposed access path linking to new extension
7. Existing surface repaired within courtyard
8. Existing planter beds re-planted with native species
9. New seating area with raised concrete seating steps and integrated planting
10. Proposed half-basketball court
11. Existing shade structure retained with new surfacing and re-orientated bench seats
12. Existing synthetic field retained

6.0 Landscape Design Objectives - Narrabeen Sports High School

6.03 Landscape Zones

The Landscape Strategy for the playground creates zones, which offer diverse play opportunities to suit the various preferences of students.

The play spaces for the high school remain largely unchanged with minor works to landscape zones adjoining the new building extension to provide an enhanced active basketball court and greater opportunity for passive, shaded seating.

The existing play zones include large areas of open lawns for unstructured active play, along with multiple sports courts and a synthetc multisport lined field. New active play inclusions sees the existing basketball court relocated to sit away from school buildings allowing more passive spaces and unobstructed paths of travel adjacent buildings.

New passive sitting and outdoor learning areas have been created adjoining the new building extension to ensure students have greater opportunity to gather individually or in groups.

Key:

- Refurbished Building
- New Build
- Passive Seating
- Sportsfield/Courts
- Passive Open Space

6.0 Landscape Design Objectives - Narrabeen Sports High School

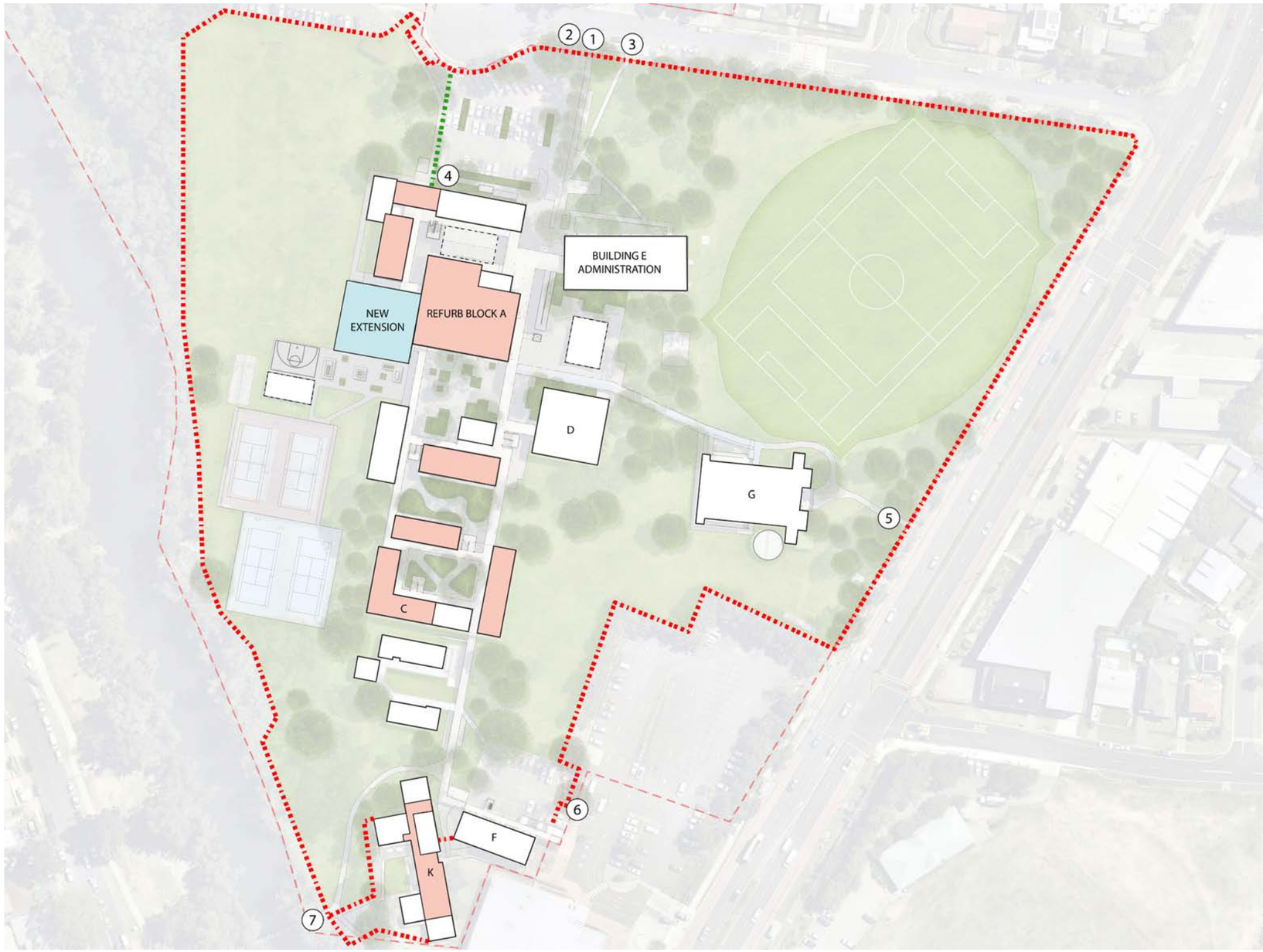
6.04 Fencing Diagram

Fencing is essential to define the boundary of the school and is a requirement of School Infrastructure NSW to secure the site.

Careful consideration has been given to the requirements of the fences depending upon the frontage of the boundary and the space being enclosed.

The existing site is fenced with 2.1m high metal palisade fencing with matching gates positioned at the main and secondary entries. An additional 0.9m high fence sits adjacent the existing carpark to the north.

The existing fencing for the school will remain in place with no changes proposed.



Fencing Diagram

1. Main entry - Existing 2.1m double swinging gate retained
2. Existing double swinging carpark gate retained
3. Existing 2.1m double swinging gate retained
4. Secondary 0.9m fence retained with new swinging gate
5. Existing 2.1m double swinging carpark gate retained
6. 0.9m high secondary fence with singular 0.9m swinging gate
7. Existing gate from mullet creek crossing retained

Key:

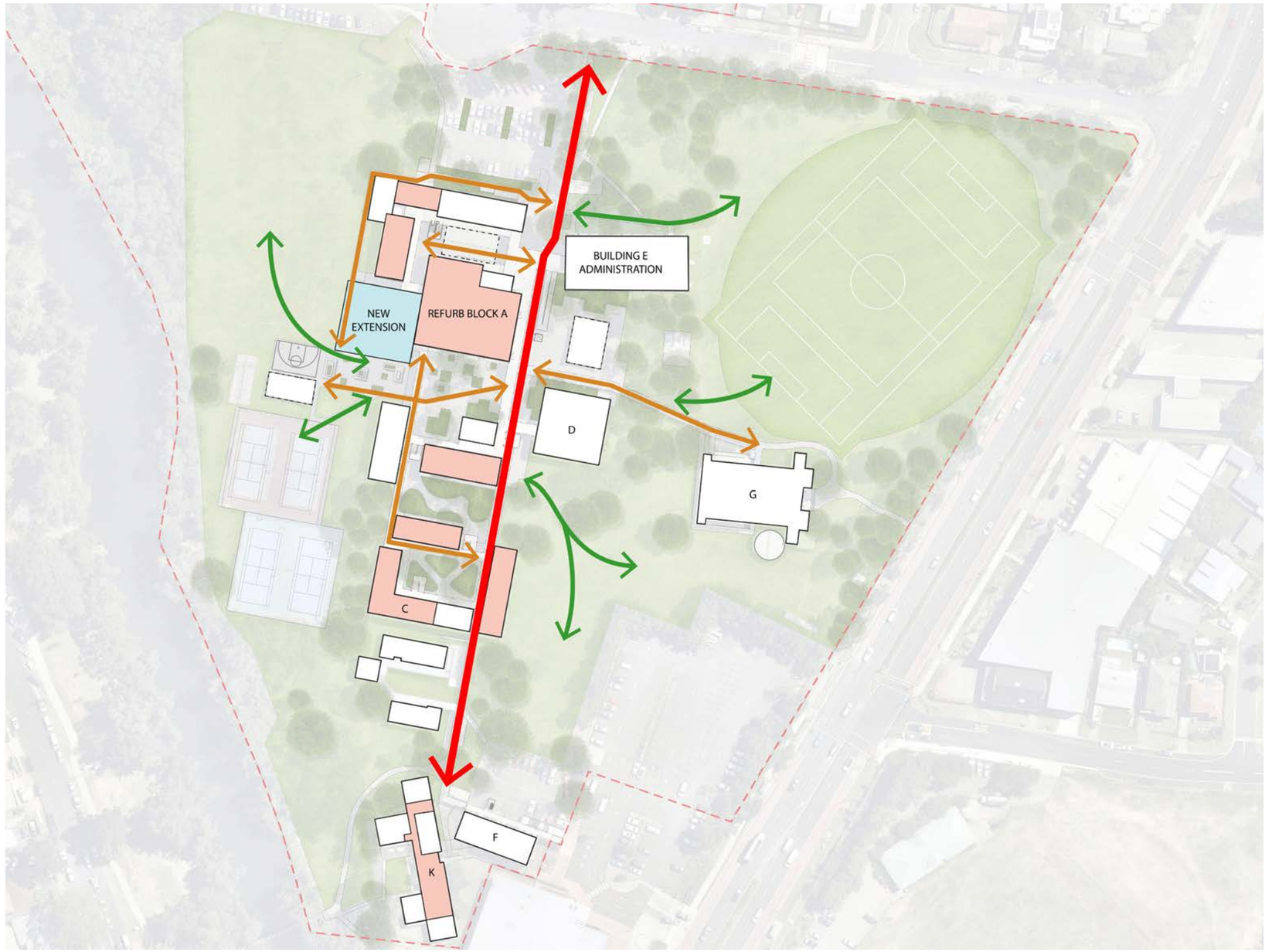
- Refurbished Building
- New Build
- Existing 2.1m fence retained
- Existing 0.9m fence

6.0 Landscape Design Objectives - Narrabeen Sports High School

6.05 Circulation Diagram

The circulation strategy for the site focuses on the main north / south axis across the site.

Secondary routes link sports pitches and buildings through to this main site route.



Key:

- Refurbished Building
- New Build
- Main circulation spine
- Secondary circulation
- Landscape circulation

6.0 Landscape Design Objectives - Narrabeen Sports High School

6.06 Tree Management

Trees serve an important role in the design and function of School playgrounds and outdoor learning spaces.

In addition to providing much needed shade, a growing body of research into biophilic design indicates the importance of connections to nature and outdoor learning for students to improve mental, physical and spiritual health. This creates a calming educational environment that is connected to country.

As such, the design has sought to retain existing trees wherever feasible with advice from the Arborist. An Arborist Report has been considered as part of the Tree Management Plan and tree retention strategy.

Tree Management Plan

* Drawing is for diagrammatic purposes. Refer to Landscape sketch SK-210 and Arborist Report for further information.

Key:

- Trees to be retained
- Trees to be removed
- Proposed Trees

“High quality, well designed schools create a sense of pride, identity and ownership for the communities they serve. They also help deliver better educational results.”

Design Guide for Schools, Government Architect, NSW

7.0
Building Construction and Operation

7.0 Building Construction and Operation

7.01 Existing Services and Operation

The Narrabeen Education Precinct will remain an operational school site during the construction works. The safety of students and teachers once construction commences is a paramount consideration for the entire Project Team.

Safety In Design workshops will occur throughout the design process to consider how risks to site occupants can be mitigated or removed either through modifications to the design, or changes to the construction processes.

These workshops will involve participants from the following organisations:

- School executives
- SINSW
- Project Managers
- Main Contractor
- Architect
- Consultants

Staging of the project through construction will consider the following factors:

- Decanting students from existing buildings impacted by construction works into temporary accommodation.
- Site Access for construction.
- Site accommodation for contractor.
- Fencing to restrict access to construction works.

The Existing services at Narrabeen Education Precinct will be retained wherever possible.

The services design has considered existing in ground services, based on the Services Survey conducted by Clement and Reid Surveyors.

Location of existing services within the playground has been considered when developing the landscape design.

Substation and Main Switchboard:

- A new substation is proposed for the Public School along Namona Street to provide compliant authority access. The location has been discussed in detail with the project Ecologist & Arborist.
- A new Main Switchboard is proposed for the Public School within the new Administration building. The size and location away from habitable spaces has been discussed in detail with the Electrical Engineer.
- The existing MSB located to the south of Block K will be retained with the new electrical utilising as much existing infrastructure as possible.

Main Comms:

- Applications to Telstra and NBN Co. will be submitted by the Department of Education - Information Technology group, for new connections to the school.
- The existing Main Comms Room located in the Block V building will be retained in order to avoid re-cabling. A new Main Comms Room is located in the new Administration building in consultation with the project Electrical Engineer.

Refer to ***Building Services Design Report*** for further details.

7.0 Building Construction and Operation

7.05 Sustainability

Sustainability has been a key component of the design process, with inputs received from the ESD Consultant.

SINSW view sustainability through the lens of prioritising comfort and wellbeing within the learning spaces.

> "The balance in health + wellbeing and operational carbon performance must be carefully considered. Operational carbon reductions must be achieved without compromising the learning environment."

SINSW, "MMC Guidelines", Version 4, dated 10/12/2020, Page 145

This includes passive ventilation, preventing excess solar gain, and offering learning opportunities for student.

The following ideals will be considered within the design of the new building:

- Protect environmentally significant areas
- Emit less carbon in construction and operations
- Be water efficient
- Have improved air, light, acoustics, and product finishes
- Promote physical activity
- Be built with climate change in mind
- Manage environmental impacts during construction
- Embrace the diversity of our population
- Enable practices that reduce operational waste
- Be verified to work

Source: Green Building Council of Australia
https://new.gbca.org.au/news/gbca-news/what-does-new-4-5-and-6-star-green-star-building-look/

EFSG requirements in relation to sustainability are covered under DG 02, which (with the exception of approved departures) will be referenced as the design develops.

Refer to sections 6.04 and 6.06 of this report for further information regarding integration of sustainable design into the services of the new building.

Figure 85: Photovoltaics

Figure 86: Children connecting with Nature through growing produce. Source: "Better Placed Environmental Design In Schools", Government Architect NSW. Image: Tyrone Branigan

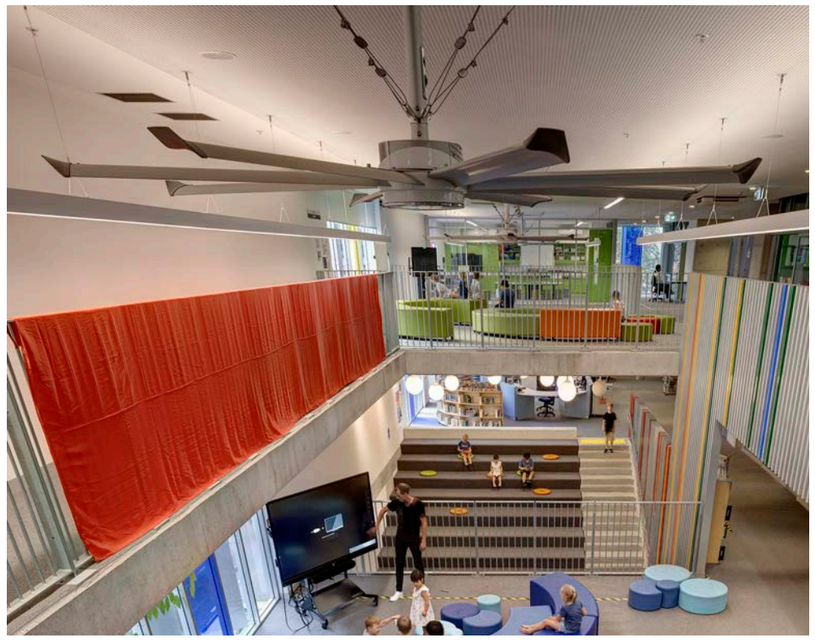


Figure 87: Ceiling fans at Ultimo Public School

"Incorporating exposure to nature within the school program allows the students to learn about natural systems over time, perceiving the changes and evolutions of life in microcosm and in relation to themselves. Involving the students in observations and maintenance of the gardens, the ecosystems and the buildings' sustainability systems and incorporating these observations within their studies allows for a more immersive experience and for better educational outcomes"

– (Franco et al., 2017).

7.0 Building Construction and Operation

7.04 Services Considerations

The ventilation strategy is designed to enhance indoor air quality, to boost comfort, well being, and productivity for building occupants.

Research undertaken by UNSW has indicated that students are particularly vulnerable to the effects of poor indoor air quality;

> "High concentration of CO2 released by the occupants of the classroom can lead to fatigue, concentration loss, and poor learning performance. Elevated CO2 concentrations can cause headache, sleepiness, and tiredness... "Improving indoor thermal and environmental quality is as important as improving the teaching material in the classroom."

https://www.unsw.edu.au/news/2021/04/poor-air-quality-in-classrooms-detrimental-to-kids--wellbeing-an

Opportunities for natural ventilation will be used where ever possible, supplemented with ceiling fans and air conditioning.

Mechanical Plant associated with air-conditioning will be located at ground level (fenced for safety) and integrated into the landscape design.

Services will be designed by the relevant consultants based on the following inputs:

- Coordination with other consultants,
- BCA requirements,
- Australian Standards,
- EFSG requirement,
- Increased consideration of air quality is also associated with minimising the spread of COVID-19.

Light impacts human physiology, mental health, and behavior. Therefore daylighting and artificial lighting within school environments is a critical consideration.

Studies have suggested that poor lighting in school classrooms can negatively affect both children's health and their ability to learn. Adequate lighting within classrooms systems has been shown to improve learning outcomes

"Daylight and School Performance in European Schoolchildren", SINPHONIE Consortium, International Journal of Environmental Research and Public Health, 2021 Jan; 18(1): 258.

Opportunities for daylighting will be optimised wherever possible and considered within the context of window orientation and views. Artificial lighting, power and data provision will be consider the EFSG requirements.

Key EFSG / SINSW requirements relating to Lighting, Power and Comms include the following:

- Electrical distribution board (EDB) to be located one per each building and one per floor by not exceeding a radius of 25m of supply equipment.
- Lighting zones to consist of perimeter and internal zoning, daylighting and dimming control by Digital Addressable Lighting Interface
- Use of photo voltaic solar power grid on-site to offset power consumption cost
- Comms Room dimensional requirements and positioning.

The design of Services systems will consider future flexibility. This will be coordinated during Schematic Design by DesignInc with inputs from all relevant consultants.

SINSW MMC Services Axonometric

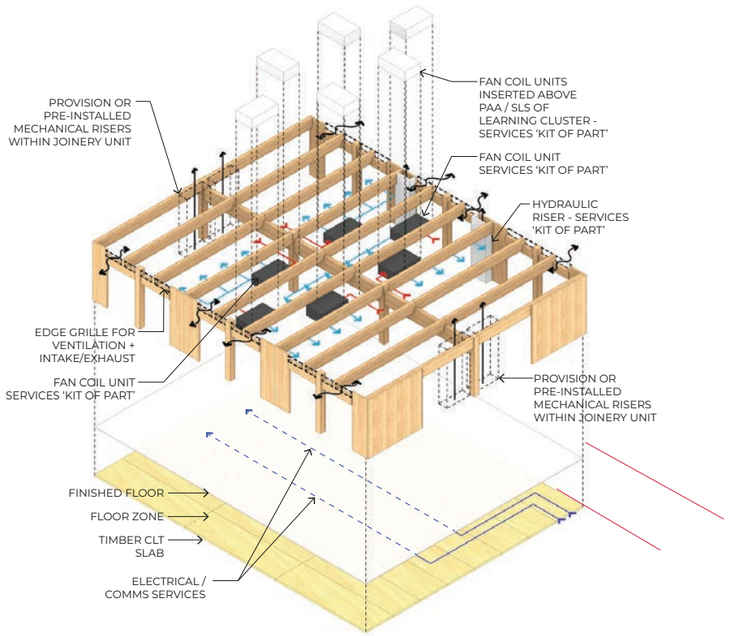


Figure 89: Services axonometric diagram. Source: SINSW. "MMC Guidelines", Version 4, dated 10/12/2020, Page 18. Document received with RFT

Figure 90: Photograph by Brett Boardman

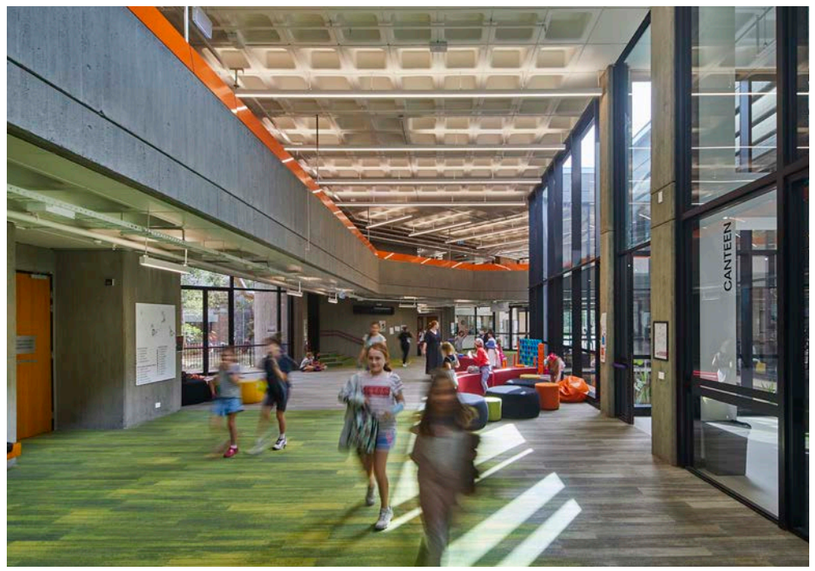


Figure 91: Artificial and natural lighting at Lindfield Learning Village

Figure 92: Connections to nature within the Ultimo Public School Library. Photograph by Brett Boardman

7.0 Building Construction and Operation

7.06 Services Integration

Design Inc have worked with Services Engineers Steensen Varming and their sub-consultants on the development at Narrabeen Education Precinct.

Please refer to the relevant services reports for further information.

Electrical / Comms

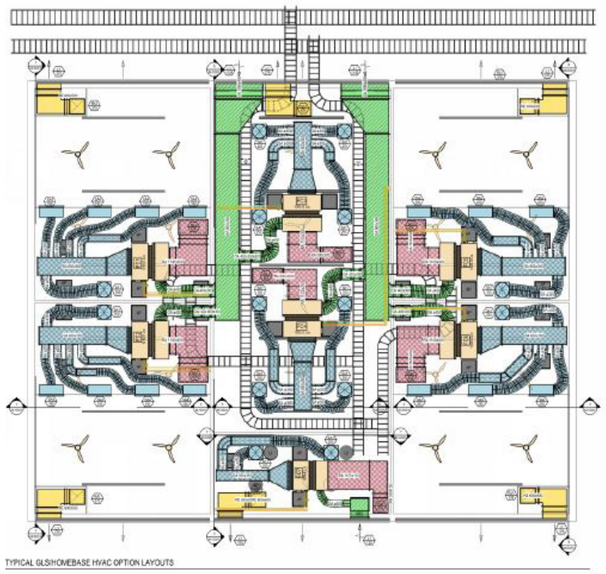
- Lighting design considers avoidance of glare particularly of any external lighting that may be problematic for the neighboring residential properties.
- Photo voltaic system included on the roof of the new Administration Building.
- Provision of power and data in line with EFSG requirements including the use of the DALI system.
- LED lights
- Motion sensors
- New Substation & Main Switchboard & Main Communications Rooms provided at the Public School.

Mechanical

- The heating/cooling strategy for the two schools will be mixed mode / air conditioning. Rooms will be naturally ventilated via operable vents whenever external conditions are favorable. This strategy allows natural ventilation to flow even when blinds are closed.
- Ceiling fans will be provided as per the EFSG
- Noise and vibrations caused by mechanical systems will be considered and appropriate acoustic treatment applied in consultation with the project Acoustic Engineer.
- Air conditioning units will be located within the landscape and be fenced or caged to avoid students accessing this equipment. Design of any cages around this equipment will ensure these items are not climbable and consider their aesthetic impact on surrounding site and neighboring residences.

Hydraulic

- The existing Hydrant booster will be relocation on Namona Street to service the Public School.
- On site storm water detention tanks are not required as the site is within a flood plane.
- Fire Hydrants are being included within the site based on BCA advice.
- Existing gas and water will be retained for the Public School.



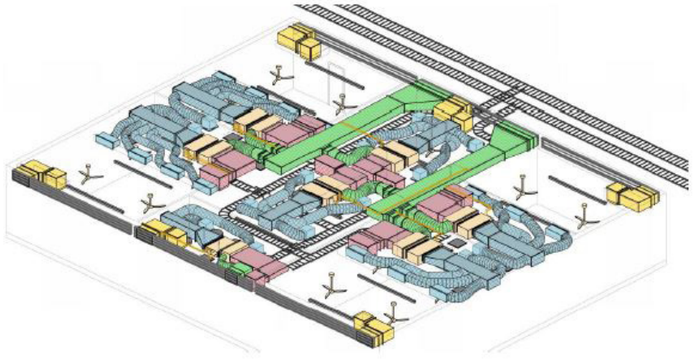


Figure 93: Typical GLS Mechanical layout design strategy, Steensen Varming

Figure 94: External Lighting strategy, Steensen Varming

7.0 Building Construction and Operation

7.07 Acoustics

Good acoustics are essential for learning environments. Accurate transmission of spoken information and sounds is imperative to optimise student achievement.

Studies have found that younger children have a less developed auditory system, coupled with reduced understanding of language and vocabulary when compared to adults.

Children require a better acoustic environment to decipher speech than adult counterparts, and have been found to perform worse in noisy environments.

Source: Bess, F. H., & Hornsby, B. Y. (2014). Commentary: Listening can be exhausting—Fatigue in children and adults with hearing loss. Ear & Hearing, 35, 592–599.

Poor acoustics and adverse noise can cause teachers to speak at higher vocal levels resulting in stress. Increased noise within classrooms can result in the Lombard effect: Speaking within a loud environment causes changes in speech production such as an increase in intensity, pitch structure, and formant characteristics, to enhance audibility. Ultimately this phenomenon can cause a breakdown of speech.

Acoustic requirements for the school will be guided by the EFSG, which will be interpreted in conjunction with the Acoustic Consultant.

In particular the design of learning spaces will be assessed acoustically to check the adequacy of acoustic treatment within both open plan and traditional arrangements of the spaces.

Site wide acoustic considerations will be applied to noise generated by the school site to consider impact on neighboring properties. In particular, noise generated by facilities associated with the New Building will be considered due to the close proximity to neighboring properties.

7.08 Fire Separation

Fire separation requirements will be considered with input from the BCA Consultant as the design progresses.

As the project involves two storey buildings it is assumed that most buildings will be type B construction. This will impact numerous aspects of the design and materiality.

FRLs and non-combustible materials will be required to numerous building elements, particularly load bearing walls/columns/ structural elements and external walls.

Fire compartment sizes and escape distances will also be considered in conjunction with the BCA consultant.

7.09 CPTED

The principles of CPTED have been considered during the design process of the masterplan strategy for Narrabeen Education Precinct.

As per the Educational Facilities School Guidelines criteria for the development of NSW public schools the site boundary will be enclosed with fencing.

This fencing also serves as territorial reinforcement and assists the ability to control site access. Visitor access to the site will be via Namona Street, with access restricted by controlled gates, allowing staff to monitor the flow of individuals into and out of the campus.

Selection of fencing and boundary treatments that provide the security required for the school, but are also aesthetically pleasing to those within the school and to the community outside. Fencing strategies are covered in further detail within the landscape section of this document.

External lighting has been provided for night-time illumination of walkways, entrances,exits and related areas to promote a safe environment.

One of the key tenets of the design is maximisation of passive surveillance throughout the site, where possible within the context of an existing school site.

Although the playground will be staffed during break times, lines of sight have been considered, particularly from areas occupied by staff, or from main circulation routes.

Toilets face towards the playground to increase passive surveillance, minimising areas where bullying could occur by providing views into washroom circulation areas.

7.0 Design Objectives - Architecture

7.10 Site Maintenance

Through the consultation process with the School, SINSW, and other Department of Education Technical Stakeholders the design has considered the long term maintenance strategy of all proposed work.

Key strategies adopted in the design of the new building include:

- EFSG compliance (excepting approved departures).
- Selection of external materials which have low maintenance and provide longevity.
- Avoidance of paint finishes which require ongoing maintenance.
- Roof drainage strategy utilising eave gutters and maintaining appropriate pitches. Considering ease of access to gutters for regular maintenance.
- Selection of internal materials with resilient finishes to allow cleaning and provide durability.
- Ease of maintaining lighting, which includes consideration of where lighting is located and specification of LED fixtures.
- Reduced extent of glazing below 900mm to reduce breakages.
- Safety In Design, which will be reviewed regularly through the design process.
- Maintenance considerations have been reviewed through the design process.

7.11 Vehicular Access

Site access for vehicles at Narrabeen Education Precinct remains as existing. However, the drop off process has been considered as part of the design.

The following strategy has been determined for the school:

- Delivery vehicles will park within existing car parks and enter the reception on foot, from which point they will be escorted to the appropriate area on site by admin staff.
- Parking provision on site to remain as existing.
- Fire Brigade access will be determined as the design develops considering inputs from the relevant consultants.
- Waste collection processes to remain unchanged.

7.12 Waste Collection

A waste management plan for Narrabeen Education Precinct has been developed by the Waste Consultant MRA Consulting Group to address the operational management of waste generated by the school.

Key objectives of the waste strategy for the school are outlined as follows:

i. Promote responsible source separation to reduce the amount of waste that goes to landfill by implementing convenient and efficient waste management systems.

ii. Ensure adequate waste provisions and robust procedures that will cater for potential changes during the operational phase of the development.

iii. Comply with all relevant council codes, policies, and guidelines.

Waste Management Procedures

A waste bin will be located in each room throughout the campus. After hours cleaners will circulate through the campus to collect and transport the waste to the bulk bins that are located within the existing Bin Enclosures.

The location of the Bin Enclosure allows for ease of collection out of school hours by Garbage truck, which will pick up bins from the side of the street without accessing the site.

EFSG Requirements

Provision of play space on the school is inadequate. Whilst the proposed development improves the playground area provision, the allowance is still below the EFSG requirement of 10sqm per student. Consequently utilisation of site area to maximise functional playground space is a key consideration for the project.

EFSG requirements state that trucks must not reverse on site and must enter and leave site in a forward direction only for safety purposes. Inclusion of fenced hardstand for the purposes of garbage truck access with a forward only motion would result in a significant loss of playground space.

Consequently, the proposed design of waste storage for the school is based around garbage being collected from xxxx with the trucks remaining outside the site boundary.

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