Structural Environmental Civil Hydraulic Mechanical Electrical

NORTHROP
Level 11, 345 George Street, Sydney NSW 2000
T (02) 9241 4188 F (02) 9241 4324
E sydney@northrop.com.au ABN 81 094 433 100

PROPOSED INNER SYDNEY HIGH SCHOOL
244 CLEVELAND ST, SURRY HILLS NSW 2010

SSD 16_7610

STRUCTURAL REPORT

PREPARED BY
Northrop Consulting Engineers
Level 11
345 George Street
SYDNEY NSW 2000

Tel: 02 9241 4188
Fax: 02 9241 4324

PREPARED FOR
DEPARTMENT OF EDUCATION
35 Bridge Street
Sydney NSW 2000

REVISION SCHEDULE

Date	Revision	Issue	Prepared By	Approved By
03/05/2017	A	SSDA Submission	LS	IMcD
08/06/2017	B	Final SSDA Submission	LS	IMcD

Prepared By: Lachlan Sykes		**Revision:** B
Approved By: Ian McDaid		**Revision:** B

PROJECT NAME: Inner Sydney High School

TABLE OF CONTENTS

INTRODUCTION

The NSW Department of Education (DoE) are preparing a State Significant Development Application (SSD 16_7610) for the development of inner Sydney high school located at the corner of Cleveland and Chalmers Streets, Surry Hills (the 'site').

The inner Sydney high school is proposed to accommodate up to 1200 students to take enrolment pressure off surrounding high schools exceeding student capacity, and accommodate future population growth within City of Sydney Local Government Area (LGA). The high school will contain high quality classrooms, collaborative learning spaces and associated facilities.

Specifically, this proposal seeks development consent for the following works at the site:

- Internal reconfiguration and refurbishment of the existing heritage listed buildings on the site to create:
  - Classrooms, learning and study spaces;
  - Amenities; and
  - Offices and lounge spaces for teachers and administrative staff.
- Construction of a thirteen (13) storey plus roof level and basement (approximately 56.5m from park level), multi-purpose school building, containing:
  - Collaborative learning hubs with a combination of enclosed and open spaces;
  - Library;
  - Staff workplaces;
  - Student canteen;
  - Indoor gymnasium and other indoor recreation and performance spaces;
  - Ancillary outdoor learning and recreational areas.
- Associated site landscaping and public domain improvements; and
- Augmentation and construction of ancillary infrastructure and utilities as required.

Background

The population of Sydney is forecast to grow by over one million people in the next 10 years and a significant number will reside in or close to the Sydney CBD in new residential developments in areas such as Green Square, Central to Eveleigh precinct, Barangaroo, Central Square, the Bays Precinct and Ultimo. This growth in inner Sydney suburbs is occurring rapidly, putting significant pressure on public infrastructure, including transport, health services and education.

The DoE has a legislative responsibility to provide teaching spaces to meet demand in all areas across NSW. A new inner city high schoolihs is to be built on Cleveland Street, Surry Hills to meet this demand. Cleveland Street Intensive English High School currently occupies the site. A new facility is being constructed for Cleveland Street Intensive English High School on a site already owned by the DoE at Alexandria.

The Cleveland Street school site will be redeveloped to create a new future focused high-rise school with a mix of new and refurbished buildings. The heritage of the site is a major consideration for the

design of the new school. A design excellence competition has been completed with the winning architects, Francis Jones Morehen Thorp (FJMT) continuing to progress the design for the school. The new inner Sydney high schoolihis is expected to open in 2020. The new inner Sydney High School will offer:

- Facilities that are readily accessible and flexible to meet the demands of an evolving curriculum in line with future-focused learning principles.
- Flexible and well connected teaching and learning spaces that enable a variety of teaching and learning practices.
- Spaces that are engaging and supportive for students and teachers.
- Technology-rich settings with an emphasis on mobility and flexibility.
- A healthy and environmentally sustainable environment.
- Innovative, connected outdoor spaces that enable play and collaborative learning.

Connected open space, creating a welcoming and accessible school with indoor and outdoor teaching and learning opportunities. No buildings of heritage significance are proposed to be demolished as part of the redevelopment.

- The new teaching spaces will incorporate principles of energy efficiency and ecologically sustainable development (ESD). This includes:
- Passive design principles
- Thermal performance and comfort.
- Natural lighting.
- Water recycling management.

Works are as illustrated in detail in the Architectural Design Statement as prepared by FJMT.

Site Description

The inner Sydney high school site is located within Surry Hills, on the southern edge of the Sydney CBD. It is bound by Chalmers Street to the east, Cleveland Street to the south and Prince Alfred Park to the North and West. Refer to Figure 1.

The site itself is currently occupied by Cleveland Street Intensive English High School, who occupy a number of existing buildings on the site. These existing buildings are of mixed construction with sandstone, brick, timber, concrete and steel materials used throughout the site.

Figure 1 - ISHS Site Map

STRUCTURE

Structural Description

The proposed new development consists of a main building used for both teaching and staff spaces as well sporting activities. The structure has a common basement which accommodates the basketball court facilities. This floor plate extends up to L5 in a mostly rectangular shape directly over the court. Above L5 the floor plates located over the southern end of the building rise up to L12 to form the tower structure.

The tower floor plates above level 5 consist of banded post-tensioned slabs. These plates form two types of shapes of similar, but mirrored geometry. The tower floor plates have long spans to allow flexibility of space and improve the amenity when spaces are left open. We have employed a banded floor system which provides an efficient structure and reduces vibration from footfall and activity when compared to a flat plate.

Below L5 the floor structure changes to a steel composite floor design in order to reduce the structural weight over basketball court. The mostly rectangular shape of the floor plate allows fairly regular spacing of both primary and secondary beams with a bondek slab on top.

Reinforced concrete columns are used to support the tower side of the building, whereas a mix of steel and reinforcement concrete columns have been used over the basketball court as required.

The lift and stair cores are used within the tower structure to act as lateral load (wind and earthquake) resisting elements, whereas a combination steel framed bracing and a reinforcement concrete core is used on the basketball court side of the development for the same reason.

In order to achieve a clear span over the basketball court a steel truss design has been used to suspend the floor from the upper levels. The truss consists of the composite floor slabs as top and bottom chords with Macalloy tension bars acting as struts to suspend the lowest floor level. The perimeter columns around the truss are of concrete construction to complete the vertically supporting elements of the truss.

The building is typically founded on pad footings on shale within the basement footprint. A small number of footings outside of this area will be supported on bored piers down to weak shale. A geotechnical investigation report of the site has been undertaken by Alliance Geotechnical (2187-GR-1-1, 26 February 2016).