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Global Switch Sydney 2 Data Centre

273 Pyrmont Street, Ultimo

Major Project Application No. 08_0222 Environmental Assessment Report

March 2010





issue register

| Date of Issue | Reason for Issue | Prepared by | Checked by | Signed |
|---------------|---------------------------------------|---------------|------------|-----------|
| 5 Feb 10 | Draft No.1 to Architects | L Ryan/M Ryan | M Ryan | <i>WR</i> |
| 10 Feb 10 | Draft No.2 to Architects | L Ryan/M Ryan | M Ryan | <i>WR</i> |
| 15 Feb 10 | Draft No.3 to Client | L Ryan | M Ryan | <i>WR</i> |
| 19 Feb 10 | Draft No.4 to Client | L Ryan | M Ryan | <i>WR</i> |
| 22 Feb 10 | Report to DoP For Test of Adequacy | L Ryan | M Ryan | <i>WR</i> |
| 19 Mar 10 | Revised Draft No.5 to client | S Jenkins | M Ryan | <i>WR</i> |
| 26 Mar 10 | Final EAR to DOP | L Ryan | M Ryan | <i>WR</i> |



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Statement of Validity

Submission of Environmental Assessment Report prepared under Part 3A of the Environmental Planning and Assessment Act 1979.

Environmental Assessment prepared by:

| | |
|----------------|---|
| Name | Michael Ryan |
| Qualifications | BA (Urban & Regional Studies) Curtin University WA Graduate Certificate Public Sector Management, Griffith University QLD Certified Practising Planner, MPIA |
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Project Application:

| | |
|--------------------------|---|
| Applicant name | Global Switch (Property) Australia Pty Ltd |
| Applicant's Address | 400 Harris Street, Ultimo NSW |
| Land to be Developed | 273 Pyrmont Street, Ultimo NSW |
| Proposed Development | Construction of Data Centre Facility |
| Environmental Assessment | An environmental assessment is attached that addresses all matters in accordance with Part 3A of the Environmental Planning and Assessment Act 1979 |
| Certificate | I certify that I have prepared the content of this Environmental Assessment in accordance with the Environmental Planning and Assessment Act and Regulations and that, to the best of my knowledge, the information contained in the Environmental Assessment is not false or misleading. |

Signature

| | |
|------|---------------|
| Name | Michael Ryan |
| Date | 26 March 2010 |



Executive Summary

Global Switch Property (Australia) Pty Ltd is an international company that has provided a world class service in secure co-location data storage and IT infrastructure management for customers in the Sydney CBD for the past eight years, and in so doing, has helped attract leading national and international financial and major corporate institutions to the City of Sydney. Global Switch is a world leader in providing co-location data storage services and has facilities in major financial hubs in Europe and the Asia-Pacific region. Global Switch facilities store the data of some of the world's leading corporate, IT, communications and financial companies.

As a result of Sydney's increasing strategic importance in the Asia Pacific region, there is a growing need to increase the provision of secure data storage capacity and IT infrastructure management facilities within close proximity to the Sydney CBD. Addressing this need is essential in attracting and retaining major investment in Sydney.

To meet this demand, Global Switch is proposing to extend its current Ultimo facility known as Global Switch Sydney 1 to create the Southern Hemisphere's largest secure co-location data storage facility. The new data centre, to be located on the vacant site adjoining, will be known as Global Switch Sydney 2.

This Major Project Application proposes to construct a purpose built six storey building above three basement levels, accommodating a total Gross Floor Area (GFA) of 22,285 m² with a back up plant area of 15,227 m². Large areas of plant and machinery are required as a direct result of accommodating technical equipment for specialist data storage.

Global Switch Sydney 2 will incorporate a range of sophisticated, environmentally sustainable design initiatives within its new building. These initiatives will be closely integrated into the building layout, external appearance and design and will by necessity govern overall building height and form.

This innovative project will adopt a leading edge trigeneration system to generate electricity on-site and utilise the waste heat by-product of the electricity generation to provide cooling to the building through the use of absorption chillers. For Global Switch Sydney 2 it is proposed that the primary energy source be natural gas.

The total project cost to extend the existing Global Switch facility will be in the order of \$198,533,000 excluding GST.

The upgraded and expanded facilities are anticipated to attract hundreds of millions of dollars worth of business investment into NSW and the Sydney CBD. In doing so, this development will both directly and indirectly assist in creating and maintaining employment.

It is anticipated that the project will provide significant benefits to the State, including the following:

- Hundreds of millions of dollars worth of investment to Sydney.
- Addressing a critical shortage in Sydney's IT infrastructure capability, helping to reinforce Sydney and NSW as a global financial hub
- The creation of approximately 400-500 jobs during the construction and fitout of the facility over a 2 – 3 year period.
- The creation of additional long term jobs and indirect employment opportunities within the Sydney region, doubling that already created by Global Switch Sydney 1.
- The creation of one of the world's first benchmarked, environmentally responsible Data Centre facilities. These "green" credentials are now demanded by most multinational organisations today.



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- The establishment of a purpose built facility capable of generating sufficient power to run fully independent from the grid.

The proposal is generally consistent with relevant State and Regional Environmental Planning Policies that apply to the site and other relevant legislation. The design scheme satisfactorily addresses matters of concern regarding the built form highlighted in the current Director General's requirements. In addition, detailed arguments are provided throughout the report justifying the departure from certain provisions contained within the original Master Plan Strategy that was adopted by the Minister for the site over 10 years ago.

This ambitious project has been the subject of an extensive and consultative design process and investigations over time. Relevant technical reports have been submitted demonstrating that the proposal does not give rise to any significant adverse impacts on the surrounding locality. Where potential impacts are identified, these matters will be dealt with through ameliorative measures as recommended by the team of consultants.



1 Overview

1.1 Introduction

This Environmental Assessment Report (EAR) has been prepared on behalf of Global Switch Property (Australia) Pty Ltd in support of a Major Project Application to the Minister under Part 3A of the Environmental Planning and Assessment (EP&A) Act 1979.

Global Switch Property (Australia) Pty Ltd forms part of a 265,000 m² international portfolio of 'technical real estate', designed to house and protect mission-critical IT equipment and data services. In Australia, Global Switch has been providing highly resilient data centre space to leading national and international organisations and institutions for the past eight years, based in a data centre facility at 400 Harris Street, Ultimo, on the edge of the CBD.

The existing Harris Street facility occupies the former Government Printing Office (GPO) site and is commonly known as Global Switch Sydney 1 (GSS1).

As a result of Sydney's increasing strategic importance in the Asia Pacific Region there is a growing need to increase the provision of secure data storage capacity and IT infrastructure management facilities within the City of Sydney. Global Switch has decided to create a data centre incorporating a range of world leading environmentally sustainable design initiatives. In response, this Major Project application seeks approval to extend the capacity of GSS1 by developing the adjoining site known as 273 Pyrmont Road for a second data centre, creating a highly sophisticated facility, to be known as Global Switch Sydney 2 (GSS2).

The proposed development will involve the erection of a six (6) storey building above three (3) basement levels, comprising 22,285 m² gross floor area with a plant area of 15,227 m². The building will be designed to maximise the efficiency across the two sites in terms of power and energy consumption.

DEM (Aust) Pty Ltd has been appointed as architects, urban planners and landscape architects for the design of the new GSS2 Data Centre.

This Environmental Assessment Report has been prepared following extensive site analyses, planning and expert consultant investigations which have established the opportunities, constraints and urban design principles for this unique development.

This Report describes the site, its setting, the design concept and addresses the statutory requirements, planning and environmental issues associated with the major project application. Due regard has been given to:

- the Director General's environmental assessment requirements as advised in writing to the proponent on 10th February 2009
- relevant matters for consideration under the Environmental Planning and Assessment Act 1979;
- relevant State and Regional Environmental Planning Policies; and
- the extent to which the development satisfies the aims and objectives and any relevant provisions of other environmental planning instruments, in particular the master plan for the site adopted in November 1999.

Throughout the design process, Global Switch and the design team have liaised with City of Sydney Council, Department of Planning and various other authorities and expert consultants to ensure that all relevant environmental issues are identified, addressed and incorporated into the final design to the fullest extent possible. An integral part of the design process has also been to examine alternative built form solutions prior to determining the preferred option.



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Prior to lodgement of the environmental assessment report, the applicant and design team also undertook a consultation programme to inform the community of the proposal seeking public opinion on the selected design option.

GSS2 is a significant project with an estimated capital investment value of \$198,533,000 excluding GST.

The iconic design reflects the aspirations of Global Switch to create a landmark, environmentally sustainable facility which respects both its Darling Harbour setting and the statutory planning framework that governs the site layout and built form.

1.2 The Proponent

Global Switch Property (Australia) Pty Ltd design, build and operate data centre facilities to world-class standards. Its operations provide a central, infra-structural back-bone (power, cooling, security) with multiple layers of redundancy, that ensure 24 x 7 availability for their clients, which are mainly large multi-national corporations, government agencies, IT companies and major financial institutions. The Global Switch Group is a top three business of its kind in the world and the largest outside the United States, with large-scale facilities in London, Paris, Frankfurt, Amsterdam, Madrid and Singapore.

As a result of its highly successful integration into the Australian market and the growing demand for world class data centre facilities, Global Switch has decided to rapidly expand its operations within Australia. Locations within both Sydney and Melbourne have been targeted for future development. The take up of regional facilities will be dependent on the timeframe for procurement of new facilities within each region but at this stage Sydney has been selected by Global Switch as its priority.

The chosen site for GSS2 strategically adjoins GSS1 enabling both facilities to operate in unison.

1.3 Planning History

Global Switch currently stands on a site formerly known as the Government Printing Office (GPO). Due to its strategic importance, the site along with the neighbouring Australian Mortgage Land and Finance Company (AML&F) site were earmarked for special planning consideration through a site specific Master Plan Strategy (MPS) adopted by the Minister of Urban Affairs and Planning on 12 November 1999 and implemented in March 2000. The Master Plan, whilst adopted over a decade ago, is still applicable and has been duly considered as part of preparing this Part 3A project.

The specific aims of the Master Plan were:

- *To provide guidance to developers and authorities on the type, scale, form, uses and phasing of development which will be acceptable for the subject sites, within a publicly accountable process;*
- *To enable development to proceed efficiently by clarifying issues and identifying requirements for co-ordination and consultation;*
- *To assist the public in understanding the future character of the area/sites and to assist them to comment on development applications; and*
- *To assist consent authorities when they are assessing development applications.*

The design parameters set down in the MPS are referenced throughout this report as a means of comparison with the design scheme now proposed. Particular focus is placed on elements of the proposed design that vary from the MPS such as height, building footprint and floor space. These matters are addressed in depth in Sections 4.5, 4.8 and 5.2.7. Where relevant, figures extracted from the MPS are included in this report for reference purposes.



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On 21st August 2006, the Sydney Harbour Foreshore Authority (SHFA), under delegated authority issued Director General Requirements (DGR's) for a new nine (9) storey commercial office building on the subject site with a total floor area of approximately 22,875 m², with two basement levels of parking accommodating 180 vehicles and vehicular access directly off Pyrmont Street. The DGR's were issued for a 2 year period with an expiry date of 21st August 2008. The subject scheme was never built.

In mid June 2008, Global Switch representatives and their design team met with SHFA to discuss alternative options for redeveloping the site. Subsequently, on 6th August 2008, SHFA issued a 12 month extension to the previously issued commercial office building DGR's which expired in August 2009 and afforded Global Switch sufficient time to undertake a feasibility analysis of the comparative benefits of developing the site as a commercial facility or as an extension to the existing Global Switch building. SHFA also advised that should it be proposed to change the use of the site to a data centre and amend the design, it would be necessary to request a new Clause 6 Opinion from the Minister for Planning and lodge a new Major Project Application to seek DGRs for the proposal as amended.

On 12th November 2008, the Director General of the NSW Department of Planning as delegate of the Minister for Planning formed the opinion that the Data Centre proposal was a Part 3A project and subsequently was requested by Global Switch to issue new DGRs for the project assessment.

On 10th February 2009, the Director General of the NSW Department of Planning issued updated DGR's for the construction of a new 6 storey specialist data centre with 3 basement levels. This Environmental Assessment Report has been prepared in support of this concept.

The nine (9) storey commercial building proposal prepared pursuant to the 2006 DGRs, sought key variances from the Master Plan in a number of areas, namely total floor space, building height and building configuration.

Whilst GSS2 is similar in bulk and scale to the previously issued DGR's for a 9 storey office building, it also seeks variance to the Master Plan in relation to a number of built form requirements. As explained in the body of this report, the design solution has been driven by the unique spatial requirements of Global Switch's complex technical functions and ambitious environmentally sustainable design features.

1.4 Summary of Proposed Development

Global Switch Sydney 1 located at 400 Harris Street, Ultimo, has been providing highly resilient data centre space to leading national and international organisations and institutions for the past eight years. To meet the increasing demands of a fast-growing IT industry, Global Switch is proposing to extend the Ultimo site by building a new wing, GSS2, on the vacant parcel of land which lies directly east of the existing building. The site is bounded to the north by the Western Distributor, to the east by Pyrmont Street and to the south by Quarry Street.

The extension will comprise a purpose built, six storey data centre building above three sub-ground levels and will contain approximately 22,285 m² of technical area plus 15,227 m² of plant area. A total of 12 car spaces will be provided at the Pyrmont Street grade level on the northern boundary of the site, with vehicular access being directly off Pyrmont Street. As contained within the existing Global Switch facility, the new building will house specialized plant and equipment which require very little interaction with the outside world.

The new facility has been designed to accommodate the requirements of the latest IT technologies whilst incorporating a range of world-leading, environmentally-sustainable design initiatives, which when completed, will make it one of the most environmentally-friendly data centres ever built.



1.5 Consultation with Authorities

The Global Switch Sydney 2 concept as submitted has evolved from extensive and detailed environmental and technical investigations.

As part of the process of issuing the current DGRs for the proposal, relevant authorities were consulted by the Department of Planning as to their views on key issues to be addressed. The Department received responses from the RTA, City of Sydney Council, NSW Ministry of Transport and Sydney Water. Their responses are attached at Appendix 9.20.

The design scheme and technical advice have since been refined to address various recommendations of relevant authorities. In particular Aurecon's report at Appendix 9.10 addresses matters raised by the RTA in their letter at Appendix 9.20.

In addition to the Departmental consultation, the proponent also liaised with other relevant authorities including EnergyAustralia, Sydney Water and gas suppliers. The outcome of this consultation and matters raised by the other authorities are addressed in the various consultant reports appended to this report.

1.6 Community Consultation

In order to inform and consult with the local community, the proponent engaged Id Planning to undertake a Community Consultation Plan (CCP) as required by the Director General's Requirements issued 10/02/09. The Plan has been prepared in accordance with the Department of Planning's "Major Project Community Consultation Guidelines" dated October 2007.

The objective of the CCP is to interact with the community and other stakeholders in a way that is accessible, transparent and responsive so that the reputation of the organisations involved is enhanced, and community issues are identified and resolved wherever possible.

Details of the CCP, consultation programme and community responses are outlined in more detail in Section 6.9 of this report.

1.7 Project Team & Supporting Documentation

Global Switch is committed to creating a World's Best Practice benchmark facility for its major new Asia Pacific hub at Ultimo. In order to emulate the highly successful delivery of the GSS1 project, Global Switch has retained the original design team of DEM's Urban Planners and Architects and specialist services engineers, Aurecon. The selected design team were the authors of the original GSS1 building which has won high recognition for its positive contribution to the City's urban infrastructure.

The selected team also has the benefit of intimate knowledge of the site and Global Switch's unique technical and operational requirements. The team is uniquely qualified to meet the complex technical challenges presented by this ground breaking project.

This Environmental Assessment Report is to be read in conjunction with expert technical reports and other relevant documentation and correspondence, appended to this report, as follows.



| Appendix | Documentation | Prepared by |
|----------|---|---|
| 9.1 | Site Survey Information | Hard & Forrester |
| 9.2 | Architectural plans | DEM (Aust) Pty Ltd |
| 9.3 | Landscape Plans | DEM (Aust) Pty Ltd |
| 9.4 | Landscape Maintenance Strategy | DEM (Aust) Pty Ltd |
| 9.5 | Shadow Diagrams | DEM (Aust) Pty Ltd |
| 9.6 | External Finishes | DEM (Aust) Pty Ltd |
| 9.7 | Proposed Signage | DEM (Aust) Pty Ltd |
| 9.8 | Stakeholder and Community Consultation Plan and Responses | Id Planning |
| 9.9 | Acoustic Report | Aurecon |
| 9.10 | Engineering Response to DGRs | Aurecon |
| 9.11 | Air Quality & Greenhouse Gas Impact Assessment | Parsons Brinckerhoff Aust. Pty Ltd |
| 9.12 | Traffic & Parking | Transport & Traffic Planning Associates |
| 9.13 | Geotechnical Investigation Report | Jeffery & Katauskas P/L |
| 9.14 | Archaeological Assessment | Austral Archaeology Pty Ltd |
| 9.15 | Statement of Heritage Impact | Graham Brooks & Associates |
| 9.16 | BCA Report | AE & D |
| 9.17 | Construction Management Plan | Global Switch Property (Australia) Pty Ltd |
| 9.18 | Access Report | Accessibility Solutions Pty Ltd |
| 9.19 | Quantity Surveyor Certification of Cost | Turner & Townsend Pty Ltd |
| 9.20 | DGR Requirements issued 10/2/09 Responses from Authorities to NSW Department of Planning | DOP RTA, Ministry of Transport, Sydney Water, Sydney Council |



2 Site Analysis

2.1 Site Location and Context

The site for the GSS2 facility is a vacant parcel of land which lies directly to the east of the existing Global Switch Sydney 1 facility, located at 400 Harris Street, Ultimo. The site abuts the existing Global Switch Sydney 1 building and is bounded to the north by the Western Distributor, to the east by Pyrmont Street and to the south by Quarry Street.

The site is located in a mixed residential / commercial area and in close proximity to Darling Harbour and the Sydney Convention Centre which are located to the east of the site. The Goldsbrough Mort building adjoins the northern edge of the Western Distributor and the Bullecourt residential development is located south of Quarry Street. The Light Rail line and Monorail are directly opposite the site on the eastern side of Pyrmont Street.

The site is comprised of three (3) allotments legally identified as Lot 12 in DP 632526, Lot 3 in DP 632526 and Lot 10 in DP 840467. The total site area is 5065.9 m². (Refer Survey Plan and Title Search included in Appendix 9.1). The development will also be constructed partly over the common boundary with Global Switch Sydney 1, known as Lot 1, DP 109652.

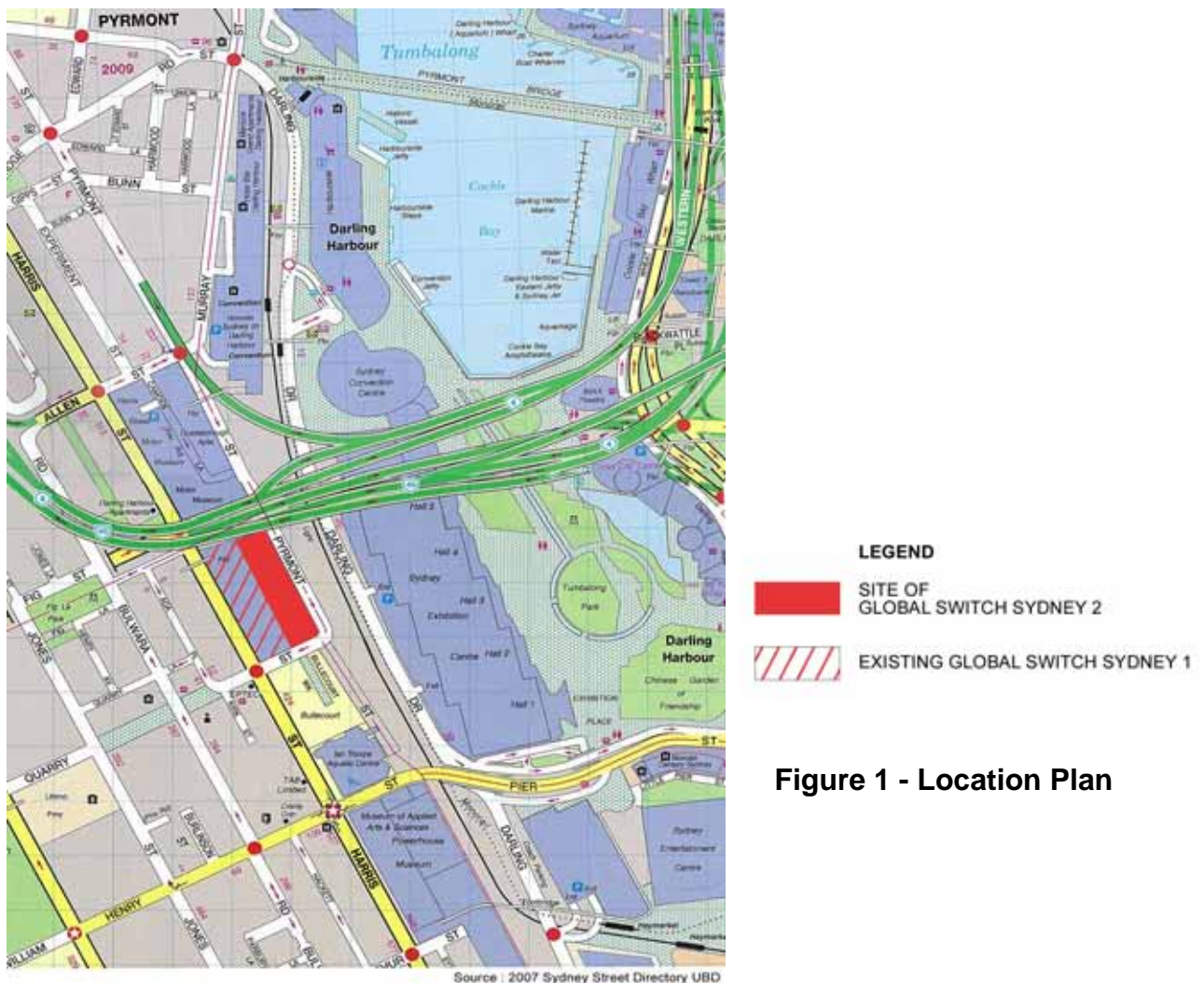


Figure 1 - Location Plan



Source : Google Earth

LEGEND


-  SITE OF GLOBAL SWITCH SYDNEY 2
-  EXISTING GLOBAL SWITCH SYDNEY 1

Figure 2 - Aerial View of the Site



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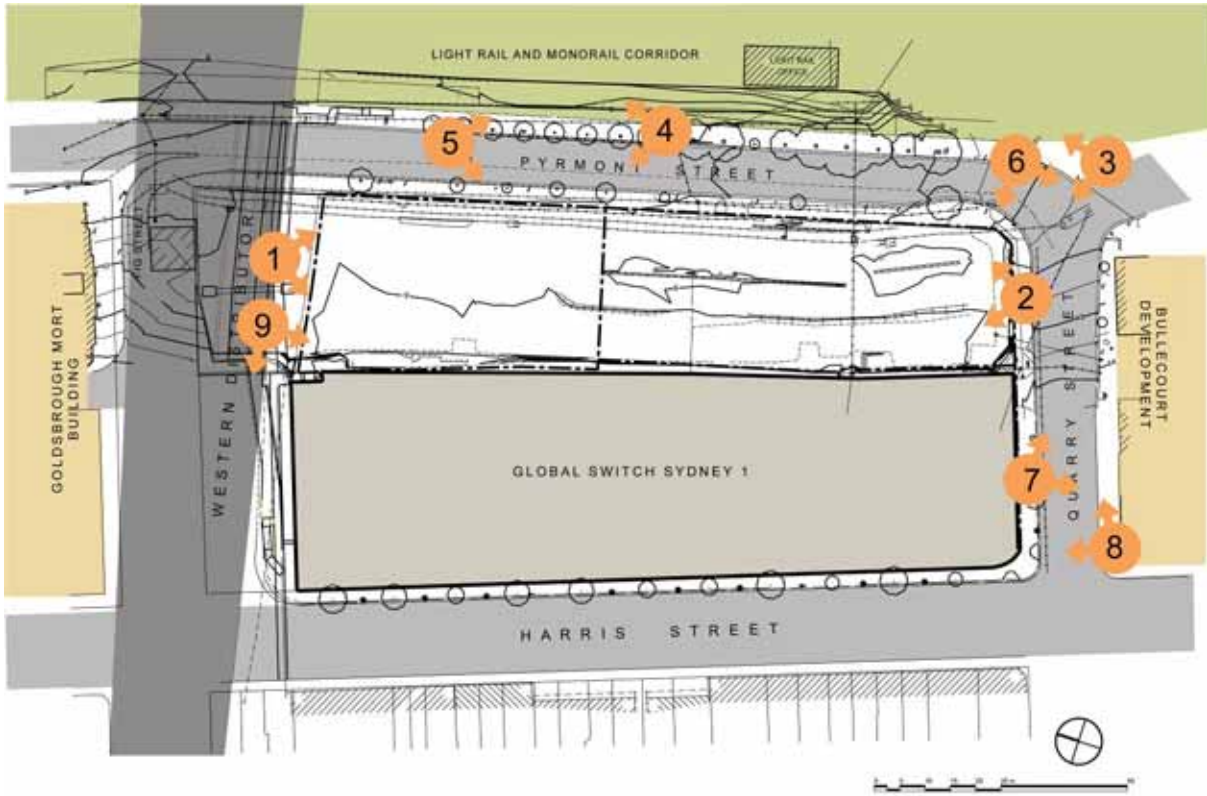


Figure 3 - Surrounding Land Uses



Photograph 1

Subject site looking south from the Western Distributor towards the Bulleccourt Development.

Global Switch Sydney 1 abuts the site to the west.



Photograph 2

Subject site looking north from Quarry Street towards the Goldsbrough Mort building.



Photograph 3

View north-west towards the site from the corner of Pymont and Quarry Streets.



Photograph 4

View of Pymont Street and the Light Rail and Monorail corridor to the east of the site.

The Western Distributor is visible in the middle distance.



Photograph 5

View south-east along Pymont Street.



Photograph 6

View south-west from the corner of Pymont Street and Quarry Street toward the Bullecourt residential / retail development to the south of the site.



Photograph 7

View south-east across Quarry Street to the Bullecourt residential / retail development.



Photograph 8

View north-east along Quarry Street to the southern end of the site.

Darling Harbour and the City skyline are visible in the distance.



Photograph 9

View of the Western Distributor to the north of the site.



2.2 Road Access and Pedestrian Network

The site is bounded to the south by Quarry Street and to the east by Pyrmont Street. Both roads are one-way, Pyrmont Street from north to south and Quarry Street from east to west. Current vehicular site access is from Pyrmont Street. The Western Distributor, to the north of the site, is elevated above ground level and Pyrmont Street extends beneath the elevated road structure.

Pedestrian circulation is located within the surrounding streetscapes providing legible and safe pedestrian paths between destinations. Darling Harbour Exhibition Centre, Darling Drive and the Light Rail / Monorail corridor present a physical barrier between the site and Darling Harbour and the City. Currently safe, legible and direct pedestrian linkages are provided via walkways located adjacent to the Western Distributor and the William Henry Street / Pier Street Bridge. Refer to Figures 4 and 5.

Destinations such as the Light Rail station and the Ian Thorpe Aquatic Centre generate the majority of pedestrian movement between Harris Street and Pyrmont Street. The most used pedestrian path is the cross site link located adjacent to the Ian Thorpe Aquatic Centre entrance, linking the Light Rail station to Harris Street and a bus stop. There is little pedestrian circulation along Pyrmont Street and Quarry Street and the Bullecourt Development only provides limited private entries off these streets.

Camden Lane, within the Goldsbrough Mort building, is a one way service lane both providing poor public pedestrian amenity and connectivity. A subway, currently closed, is located to the north of the site and provides a potential link between the site and the Goldsbrough Mort Building, however sight lines through the subway are obstructed and there is poor surveillance of the subway entry. The central space within the Bullecourt development is a secured private space.

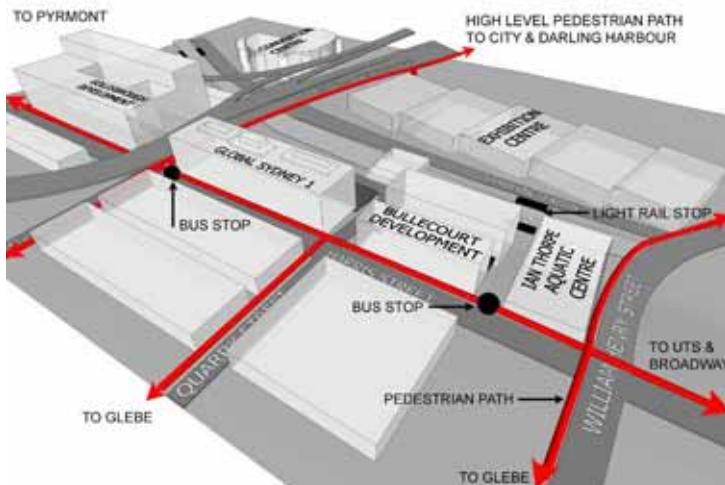


Figure 4

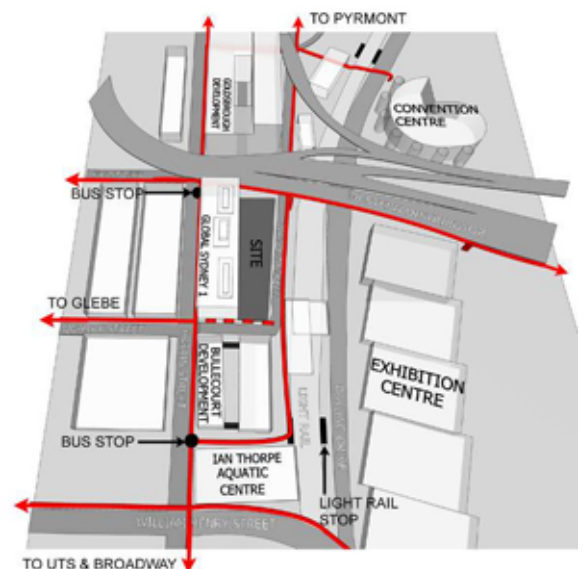


Figure 5



2.3 Site Conditions and Topography

The vacant site is essentially a level parcel of land with worn bitumen surfacing and a general RL of 9.0. The streets adjoining the site fall from an approximate height of RL 13.7 in Quarry Street to RL 8.4 in Pymont Street near the Western Distributor. Retaining walls and sandstone rock faces, created by past excavation of the site, are located along the site boundary, as shown in Figure 6, and accommodate the changes of level. Current vehicular access to the site is from Pymont Street where the road level is RL 9.0. Excavated sandstone and a sandstone block and brick retaining wall form the western boundary of the site where there are level changes of between approximately 3.0 metres and 4.6 metres. Isolated low banks to a height of approximately 350mm cross the site in a north to south direction. Two dish drains are located within the site; one in the centre and one in the south-east corner of the site.

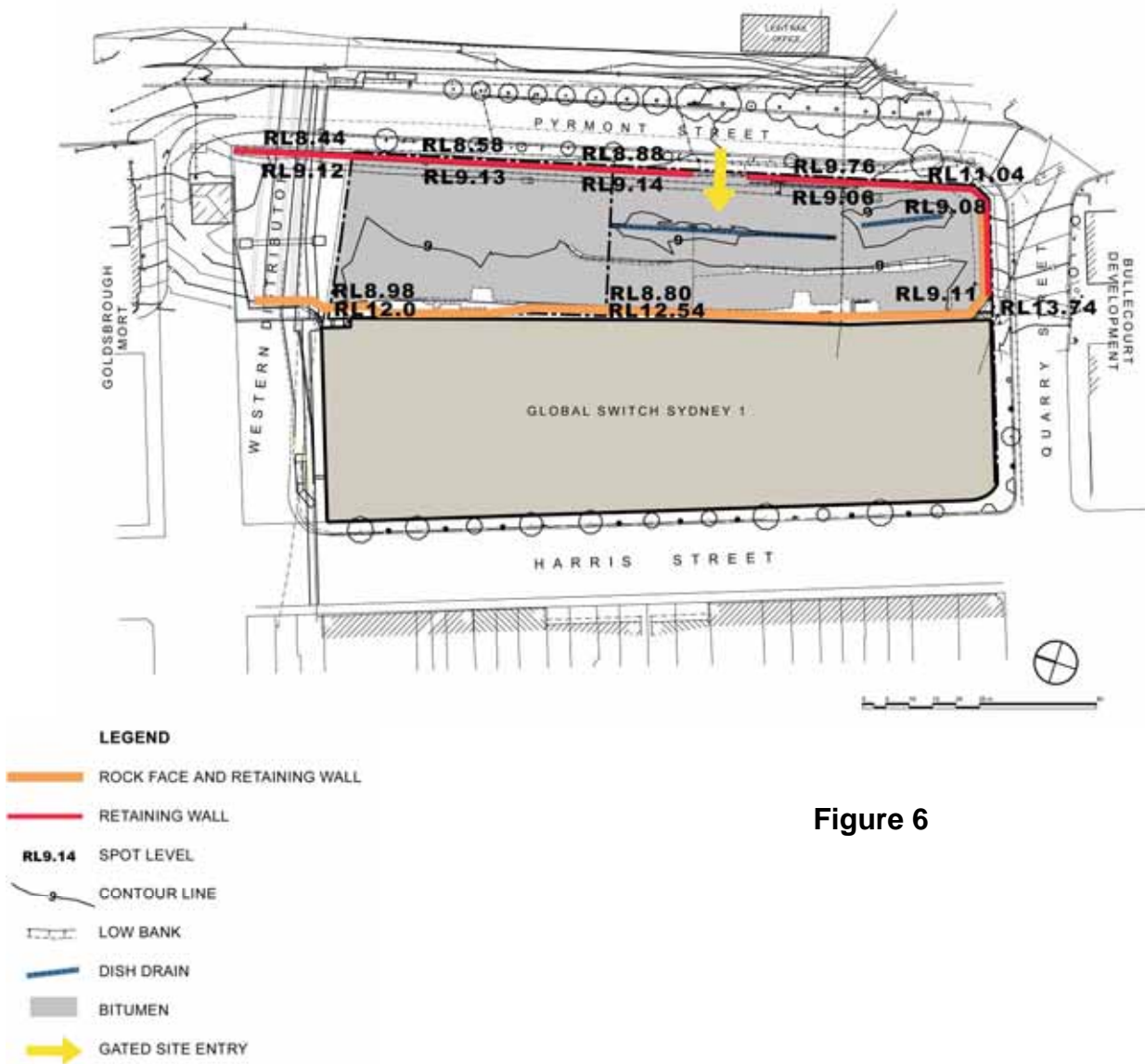


Figure 6



2.4 Vegetation

Vegetation within the site is predominantly grasses and scattered groundcover plants located along the base and tops of the sandstone rock faces and along the low banks within the site.

Existing street trees on the western side of Pymont Street (*Sapium sebiferum* and one *Platanus* sp.) vary in height from 2.5 metres to 6 metres and spread from 2 metres to 7 metres. The trees have an inconsistent form and vary in spacing. Street trees to the eastern side of Pymont Street are predominantly Paperbarks of consistent height and spacing. The City of Sydney Street Tree Masterplan identifies *Ficus microcarpa* var "hillii" (Hills Fig) or *Melaleuca quinquenervia* (Paperbark) as the recommended species for Pymont Street. Hills Fig street trees are located on the western side of Pymont Street adjacent to the Goldsbrough Mort building.

Two *Lophostemon confertus* (Brush Box) street trees are located on the northern side of Quarry Street adjacent to Global Switch Sydney 1. Brush Box is the recommended street tree for Quarry Street in the City of Sydney Street Tree Masterplan.

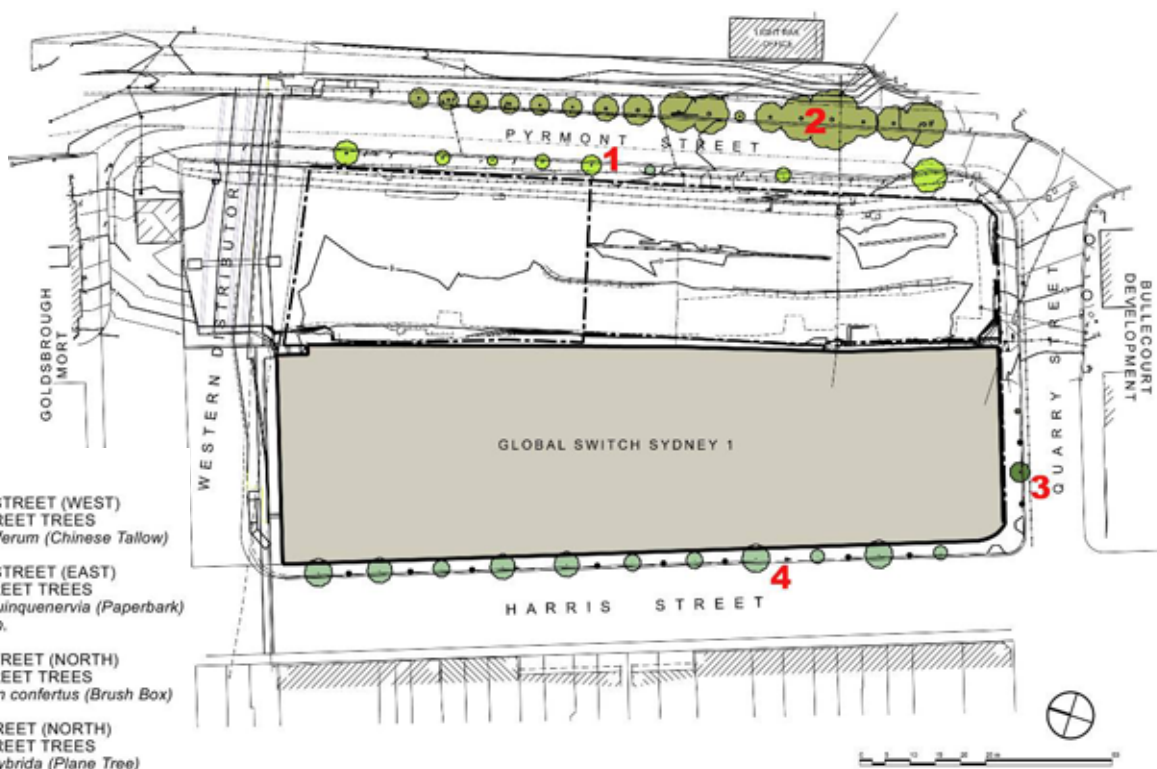


Street trees along Pymont Street adjoining the site.



Street trees along Pymont Street adjacent to the Goldsbrough Mort building.

Figure 7





2.5 Encumbrances

There are various internal easements and restrictions as to user affecting the property including for drainage, water and electricity. Easement locations and details are shown on the site survey drawing and the property title plans and searches attached at Appendix 9.1.

Negotiations between Global Switch and relevant supply authorities for the relocation of services on the site are well advanced. Stamped approved plans for the proposed relocation of the sewer and all underground electrical cables on the site are attached in Appendix 9.1.

The property search records also confirm that all Section 88B restrictions on use of Lots 3 and 12 are in favour of Lot 1 which is also owned by Global Switch Property (Australia) Pty Ltd, who will extinguish these restrictions.

3 The Design Process

3.1 Background

In recognition of the building's importance to the western Darling Harbour fringe and the importance of creating a major new extension which is sympathetic and in keeping with the successful GSS1 building, Global Switch have specifically selected the original architectural and engineering authors of the existing facility to sensitively design this major extension.

DEM Urban Planners and Architects, together with specialist Engineers, Aurecon were engaged by Global Switch in February 2008 to commence a series of in depth and detailed design and engineering studies to firm up the proposed ambitious ESD engineering measures and challenging technical requirements for the new GSS2 data centre.

These requirements have been carefully coordinated and integrated into an overall building framework which works with the existing building's technical operations and overall building fabric, the local context and the requirement to create a functional and positive contribution to the locality. The selected design team has now built up an intimate knowledge of Global Switch's operational and commercial parameters, which have also been applied to establish the proposed new building's design framework.

The project also involves a range of world leading ESD initiatives within the building including a major Tri-generation plant facility, heat recovery, green roof systems, stormwater/grey water/black water capture and recycling and general recycling systems all of which have involved extensive research and architectural / engineering analysis. The proposed initiatives will allow the building to significantly reduce reliance on the existing power grid and reduce greenhouse emissions. This will require ongoing in-depth development of identified building and engineering solutions and close integration of engineering solutions with external building elements to deliver a successful Urban Design outcome for the proposed development.

The Director General's requirements specify that a design review must be incorporated into the final design process. Section 3.2 below describes alternative concept designs along with an assessment of the merits or otherwise of each scheme as well as the rationale for the chosen option.



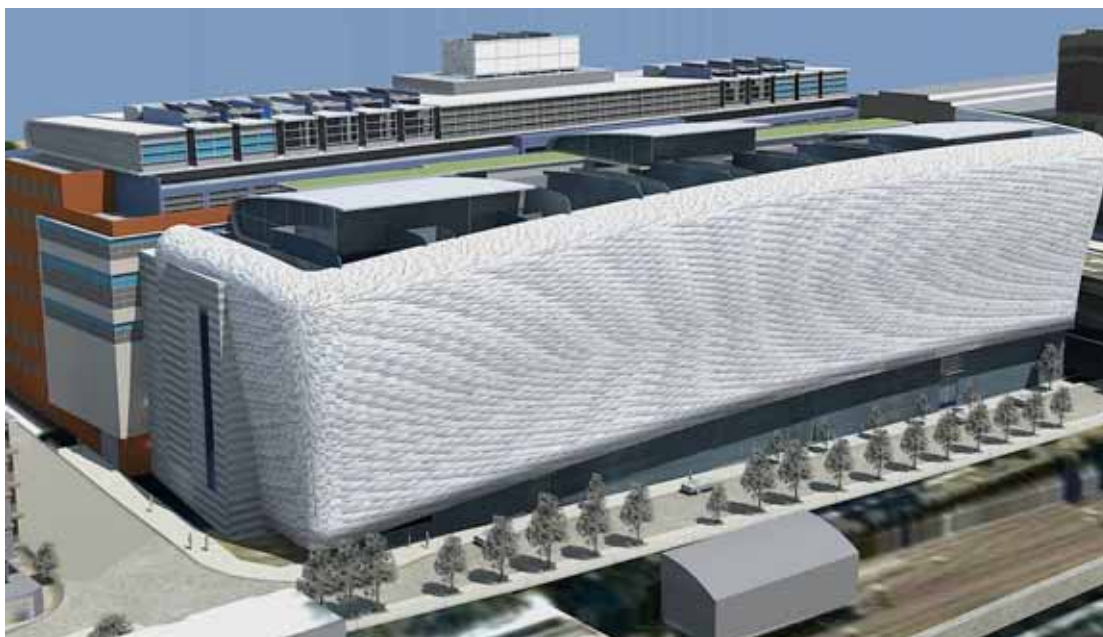
3.2 Design Review Process

The proposed new extension to the existing GSS1 facility constitutes a major infrastructure building which is of a highly specialised and sophisticated engineering nature. Hence, due to its highly technical and services intensive nature, GSS2 does not lend itself to a traditional competitive design process. The final building form and design requires close integration with the building's highly technical functions and the complex operational needs to the building's specialised back-up plant and trigeneration systems.

In collaboration with their selected professional team, Global Switch undertook a detailed analysis of building options and alternatives, which were tested and analysed through a review process. Once the concept design was further developed, it was presented informally to the Department of Planning (DoP) along with the alternative options for design review and feedback. Comments received from DoP representatives have been taken on board in finalising the design for the proposed development.

Four (4) options were subject to design review. The machine aesthetic concept shown in Section 3.2.4 was the preferred approach selected from a well considered design process which addressed and evaluated in detail the following alternative options.

3.2.1 Sculptural Art Form Concept



This option involved the provision of an iconic building and visual attraction for Sydney and Darling Harbour using contemporary technologies such as spun aluminium discs and biomes to create an organic building form. Although this was perceived to be an exciting design option, there was concern that the initial interest in the building may weaken as Sydney gets used to its presence and that there may be a conflict between the private use of the building and its potential high profile public presence. It was concluded that this design approach lent itself more to a public building typology rather than a highly secure data centre facility. It was also concluded that the integration of the building's complex plant and ventilation requirements with the organic building forms generated from this approach may not be as successful aesthetically as some of the other design options explored.



3.2.2 Interactive Display Screen Concept



This option aimed to conceal the building functions and operations behind an interactive building facade, which could be used to display information, signage and entertainment. This option was disregarded as it was felt that the building maybe perceived as an advertising structure and consequently be subject to additional planning approval issues and ongoing concerns about the content published on the screens as well as driver distraction.

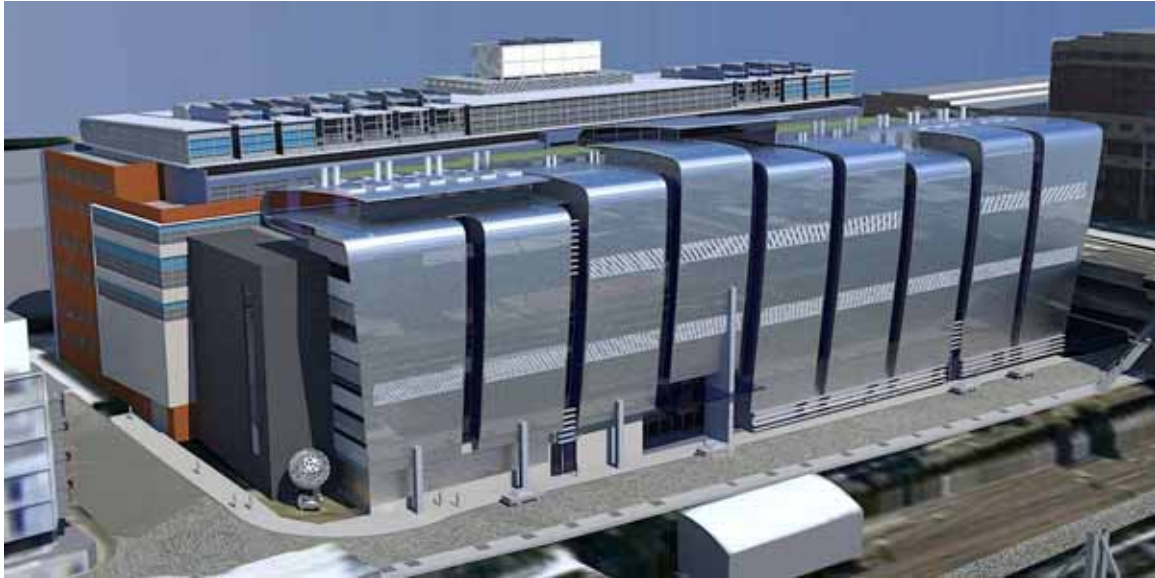
3.2.3 Extension of Global Switch 1 Concept



This option provided a design which complemented the Global Switch Sydney 1 building, by reflecting the original Bauhaus design principles inherent in the former Government Printing Office. To create an identity for Global Switch 2 it was proposed that a contemporary palette of materials would be used that would contrast with the materials used in Global Switch 1. There was a concern that this design approach might be perceived as an imitation of the rear façade of the Global Switch 1 building and it would not provide the desired iconic address to Pyrmont Street, Darling Harbour and the City.



3.2.4 Machine Aesthetic Concept



For reasons outlined in Section 4 below, the preferred built form option for GSS2 is that of the iconic “Machine” form to signify and integrate the multitude of plant and equipment within the building. The illustrative narrative created by the machine aesthetic will provide the Global Switch 2 building with an honest and appropriate representation of the building functions, and deliver an iconic building for Darling Harbour and Ultimo which will not visually be interpreted as a public destination.

The justification for this chosen scheme is discussed in detail in Section 4.1 below.



4 Project Description

4.1 Architectural Design Statement

The design approach for the Global Switch 2 building is to provide a high quality and sustainable facility for Darling Harbour and the greater Ultimo precinct. Global Switch is aiming to deliver an iconic building as a flagship project to represent their international operations in Australia whilst delivering an iconic high quality building for the City of Sydney.

The proposed design adopts a machine-like aesthetic to provide an illustrative narrative of the highly technical functions of the building and its world leading ESD initiatives. This high tech approach represents with honesty the various engineering equipment and environmental building design requirements that are proposed for Global Switch 2. Technical real estate buildings unlike commercial offices do not require glazing for penetration of natural light or views, as these buildings are of a high security nature, rarely inhabited by people and are mainly used for the storage of technical equipment and back up plant. The Global Switch 2 design provides an innovative and appropriate solution for the architecture typology of a technical real estate building whilst physically and functionally accommodating the building's complex and challenging technical requirements.

The proposed building façade is comprised of 9 metallic veils that wrap over the roof and down the eastern façade, creating a building encasement to screen the extensive plant and technical equipment to be housed within the upper levels of the building.

This innovative building encasement form will screen visually undesirable plant areas from elevated vantage points such as the Goldsbrough Mort and Bullecourt residential developments and the high rise buildings which line the surrounding western CBD fringe as well as from surrounding streets. Ventilation for the engineering equipment is provided, where required, through perforated portions of the veils. Variation in the height of the veils responds to the specific engineering requirements at various locations across the building as well as adding interest and rhythm to the building's roofline.

Greater building articulation is achieved by setting back the roof elements from the face of the veils at the southern end of the building and centrally around the meeting room and breakout space. Further articulation and rhythm is achieved via the introduction vertical recessed slots which will be differentiated from the metallic veils through the use of fixed and spandrel glazing, glazed PV panels and metallic louvre systems.

Curved roof forms are introduced to the north and south ends of the building providing a form that creates a high presentation address to Darling Harbour and the City of Sydney. The machine aesthetic provides an architectural style, form and materiality for Global Switch 2 which provides a contrasting yet complimentary counter play to the existing Global Switch 1 building. The adopted architectural style visually articulates the new and existing buildings as two separate structures although they are proposed to be physically attached at Levels 1 - 3. The new building roof forms take various cues from the existing building roof form so that there is a common architectural language between the two buildings.

Global Switch 2 will have its formal address off Pyrmont Street whilst provides a high quality façade fronting Darling Harbour and the city. A new reception and entry lobby for staff and visitors and the access to the carpark and service yard will be located along Pyrmont Street providing activation and increased security of the surrounding public realm.

The Global Switch 2 building has been designed to target a LEED Platinum Environmental Sustainable Design rating which is the highest international environmental rating achievable for a data centre. To achieve this world class Environmental Sustainable Design (ESD) rating the building will adopt a tri-generation system which creates the buildings own power supply using natural gas as the primary energy source instead of grid supplied electricity.



A green roof adjacent to the roof level breakout area is proposed which will not only provide a soft landscape for visual amenity but will contribute to improving thermal and acoustic insulation of the Level 5 plant, reduce stormwater run-off and the urban heat island effect. Other ESD measures to be incorporated include the use of photovoltaic (PV) panels to power external LED building lighting, stormwater and black water harvesting and re-use on site, use of low VOC finishes and recycling of building waste during construction along with a range of energy efficient services inclusions into the building design.

4.2 Detailed Description

GSS2 will comprise a purpose built six (6) storey data centre building above three (3) basement levels, comprising a total Gross Floor Area (GFA) as defined in the site specific Master Plan of approximately 22,285 m² in addition to 15,227 m² plant area. A total of 12 car spaces will be provided at grade on the northern boundary of the site. All vehicular access will be directly off Pyrmont Street.

In line with the rapid global trend towards climate change awareness and action, Global Switch is committed to creating the world's premium ultra energy efficient data centre, the aim being to substantially minimise power consumption and reliance on grid generated power supply. The resultant building will significantly reduce greenhouse emissions and will have an extremely low carbon footprint compared to similar facilities around the world.

The project application seeks approval for the following works:-

- all associated site works and in-ground infrastructure works,
- excavation and shoring of basement areas,
- installation of all necessary foundation and retaining structures,
- construction of a proposed new 9 level data storage facility which includes 3 levels below ground,
- installation of all ancillary plant and equipment required to make the building operational,
- direct internal linkages to Global Switch Sydney 1 building
- secure, covered onsite parking for 12 vehicles and loading area,
- implementation of new landscaping works, streetscape upgrades and street tree planting works,
- erection of corporate building signage as indicated on the submitted drawings.

The proposed development is depicted in architectural and landscape plans prepared by DEM, reduced copies of which are attached at Appendix 9.2 and 9.3.

4.3 Floor Areas

A direct consequence of accommodating technical equipment for specialist data storage is the need to also provide expansive areas of plant and machinery. Consequently, 15,227 m² of area will be dedicated within the GSS2 facility to back-up machinery and plant. This area is excluded from the definition of Gross Floor Area (GFA) as defined in the site specific Master Plan.

It should be noted that a large portion of the GFA of the building will be designated as technical data equipment storage, which will be supported by a very small area of office and administration facilities.

The floor area breakdown is detailed below in Table 1.



Table 1

| Floor | Functions on each Level | Gross floor area m² | Plant Area m² | Total Area m² |
|--------------------|--|---------------------------------------|---------------------------------|---------------------------------|
| Basement 3 | Technical & Plant (<i>diesel tanks, storage, water storage & treatment, pump rooms & urea storage</i>) | 1480 | 2687 | 4167 |
| Basement 2 | Technical & Plant (<i>electrical switch rooms</i>) | 3515 | 664 | 4179 |
| Basement 1 | Technical & Plant (<i>switchrooms, equipment and connection rooms, pump room, riser ducts, amenities.</i>) | 3260 | 1020 | 4280 |
| Ground | Technical & Plant (<i>switchrooms, electrical transformers</i>) Lobby & reception areas Car Parking & Dock | 3390 | 423 | 3813 |
| First | Technical & Plant (<i>switchrooms</i>) Access link to GSS1 building | 3285 | 620 | 3905 |
| Second | Technical & Plant Access link to GSS1 building | 3450 | 633 | 4083 |
| Third | Technical Access link to GSS1 building | 3665 | 787 | 4452 |
| Fourth | Plant (<i>Gas Engine (producing electricity) & diesel generators</i>) | – | 4460 | 4460 |
| Fifth | Plant (<i>Diesel generators -remainder of the area is for reticulation of pipework for Cooling towers positioned on the L5 mezzanine.</i>) | – | 3920 | 3920 |
| Roof | Green roof area Break out / meeting area Amenities Lift overruns | 240 | 13 | 253 |
| Total Areas | | 22,285 | 15,227 | 37,512 |

4.4 Proposed Operations, Hours & Staffing

The project will be a state-of-the-art Data Centre, serving as an extension to the existing Global Switch Sydney 1 facility adjoining.

The recognised quality of the building and the credentials of Global Switch as an operator of such facilities has helped attract a number of blue-chip organisations to Sydney as well as to foster the development of a fast-growing IT industry who run their operations out of the Global Switch facility. With its extensive technical area, Global Switch is by far the largest facility of its kind in Australia and generally recognised as the gold standard for the industry.

Beyond its existing base of local and international customers, Global Switch is witnessing growing interest in the Australian market from new IT Service Integrators and from large blue-chip clients currently using Global Switch facilities elsewhere in the Group. For many of these the CBD location is a “must” due to the higher levels of connectivity and the easy access to their own client-base.



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GSS2 is not designed to interact with the outside world due to the sensitivity of its operations. This will necessitate the incorporation of a sophisticated security system including measures to enforce access control, physical security, as well as alarm and surveillance mechanisms. The security features are detailed in Aurecon's report at Appendix 9.10.

Consistent with the fact that the majority of the floor area will be dedicated to technical equipment and plant, the onsite support staff will be negligible relative to the size of the building. Once fully operational, GSS2 will employ only approximately 3–4 permanent Global Switch staff and 6-8 permanent contractors.

The building will be fully operational 24 hours a day, 7 days a week.

4.5 Built Form & Key Master Plan Controls

The following subcategories provide an overview of the main built form characteristics of the proposal and where relevant, reference is made to specific requirements and diagrams that form part of Master Plan Strategy (MPS).

Figure 4 of the MPS depicts the various land parcels to which the Plan applies. This diagram is included for reference purposes in this section of the report.

The MPS area is bounded by Pymont, William Henry, Harris and Fig Streets, covering two large sites over two street blocks, separately known as the GPO Site and the AML&F site.

The Global Switch project relates only to the GPO site, referred to in the MPS as comprising:-

- The existing GPO building (now occupied by Global Switch Sydney 1)
- Parcel 1 (northern area of vacant GSS2 site)
- Parcel 2 (southern area of vacant GSS2 site)

GSS2 is to be erected over both vacant Parcels 1 and 2 with a physical link to the GPO building (GSS1).

Further discussion regarding compliance with the MPS controls is discussed in Section 5.2.7.



EXTRACT FROM MASTER PLAN

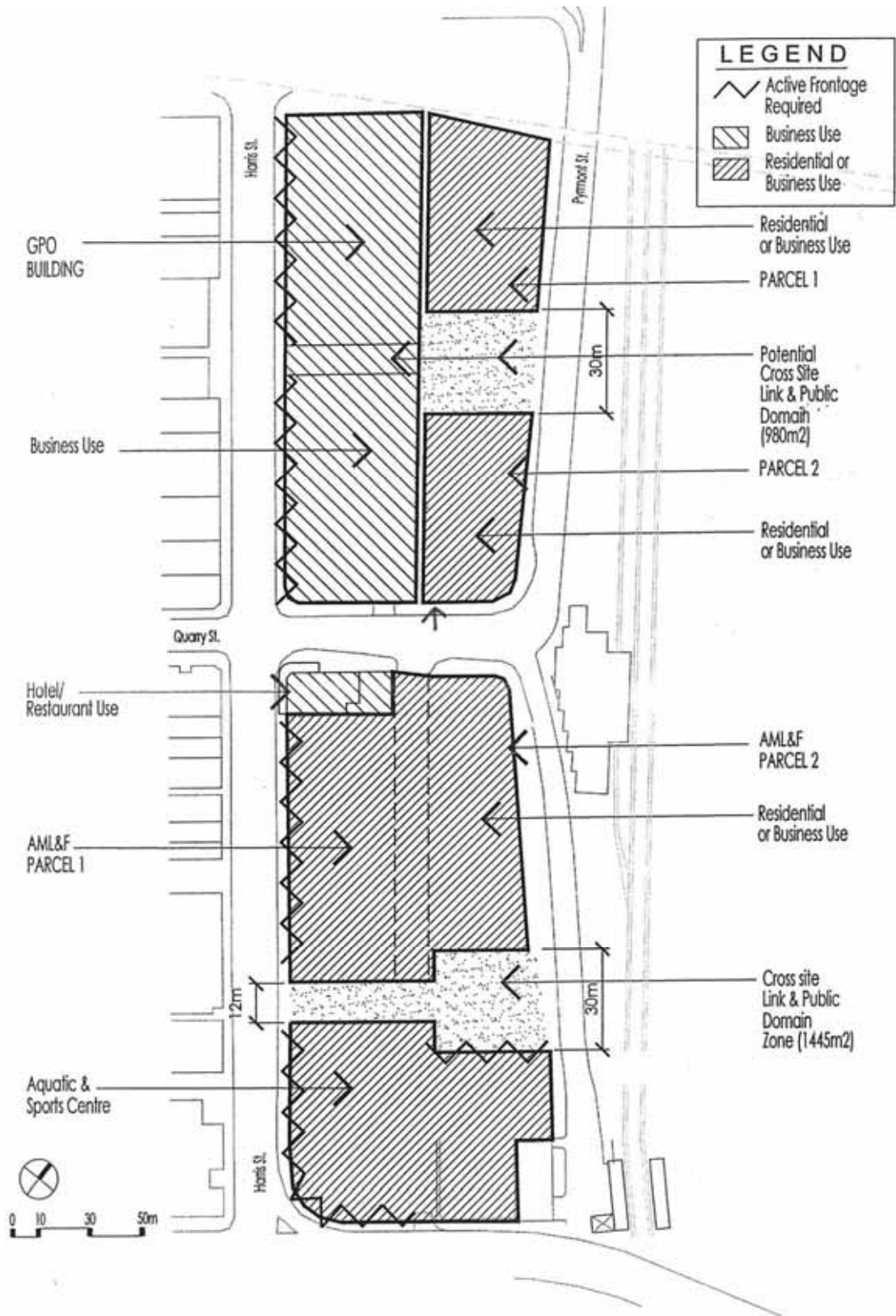


FIGURE 4 – PREFERRED LAND USE



4.5.1 Floor Space

The MPS identified a maximum business floor space total of 79,300 m² for both the Global Switch (former GPO site) and the AML&F site, with 32,000 m² being apportioned to the AML&F site and 47,300 m² apportioned to the GPO site. Refer to Table 2 below which includes information extracted from the MPS.

Table 2

| Site | Land Parcels | Max Business Floor Space |
|----------------------------|--|-----------------------------|
| Global Switch (former GPO) | Existing Global Switch Sydney 1 facility (former renovated GPO Building) | 35,800 m ² |
| GSS2 | 1 (northern parcel) | 6,000 m ² |
| GSS2 | 2 (southern parcel) | 5,500 m ² |
| Total: | | 47,300 m² |
| AML&F | 1* (west) | 11,000 m ² |
| | 2 (east) | 12,000 m ² |
| | Aquatic & Sports Centre | 9,000 m ² |
| Total: | | 32,000 m² |

* Includes Bristol Arms Hotel

The Master Plan also established the maximum gross floor area for residential uses across both sites as 28,600 m² as detailed in the Table 3.

Table 3

| Site | Land Parcels | Max Residential Floor Space |
|----------------------------|--|-----------------------------|
| Global Switch (former GPO) | Existing Global Switch Sydney 1 facility (former renovated GPO Building) | N/A |
| GSS2 | 1 (north) | 3,600 m ² |
| GSS2 | 2 (south) | 5,000 m ² |
| AML&F | 1** (west) | 9,000 m ² |
| | 2 (east) | 11,000 m ² |
| | Aquatic & Sports Centre | N/A |

** Includes Bristol Arms Hotel and ground floor level to Harris Street. Land parcels of the sites are indicated in Figure 4.



The Master Plan defines **gross floor area** as:

“the sum of the areas of each floor of a building where the area of each floor is taken to be the area within the outer face of the external enclosing walls as measured at a height of 1,400 millimetres above each floor level, excluding:

- Columns, fin walls, sun control devices, awnings and any other elements, projections or works outside the general lines of the outer face of the external walls;
- Lift towers, cooling towers, machinery and plant rooms, and air conditioning and ventilation ducts; and
- Ancillary car parking and any associated internal designated vehicular and pedestrian access thereto; and
- Space for the loading and unloading of goods; and
- Internal public areas such as arcades, atria and thoroughfares, and terraces and balconies with outer walls less than 1,400 millimetres high”.

Whilst Table 2 identified 35,800 m² as the maximum business floor space for GSS1 (former GPO), in actual fact only 27,975 m² was initially built. This was increased by 793 m² to 28,768 m² in 2008 with the approval by SHFA of alterations and additions to Level 7 of GSS1.

As shown in Table 1, the new GSS2 building proposes a total ‘business’ (technical) gross floor area (as defined in the Master Plan) of 22,285 m² with an additional 15,227 m² of dedicated plant and machinery which is critical to the operations of the data centre.

Consequently, the combined business gross floor space as defined by the Master Plan across GSS1 and GSS2 is 51,053 m² (existing GSS1 -28,768 m² + proposed GSS2 - 22,285 m²) which represents an additional 3,753 m² (8%) over and above the 47,300 m² of maximum business floor space identified in the Master Plan.

As a comparison, the previously issued 2006 DGRs for the 9 storey commercial building proposed a gross floor area 22,875 m² exclusive of plant, carparking and ancillary storage areas, which if constructed would have resulted in a greater gross business floor area of 51,643 m² (22,875 m² + 28,768 m²). This represents an additional 4,343 m² (9%) over and above the 47,300 m² of maximum business floor space identified in the Master Plan.

It is our understanding that the Bullecourt development which is predominantly residential did not construct the majority of the allowable maximum business floor space and therefore it is submitted that the additional business floor space attributable to GSS2 is still within the maximum identified in the Master Plan.

4.5.2 Height

Figures 6 and 7 of the MPS have been extracted and included in this section to depict the indicative building heights for business and residential development under the Plan (measured in RLs and metres). These diagrams are included at the end of this section for reference purposes. In this section also, Figure 11 of the MPS has been modified to superimpose the proposed height of GSS2 over the heights proposed by the MPS.

Height is defined under the Master Plan as:

‘the vertical distance measured in metres between ground level which existed at the date of adoption of the Master Plan at any point on which the building is sited, and the ceiling of the topmost habitable floor of the building above that point’.



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At the time the Master Plan was conceived it was envisaged that the subject site would be developed as residential and /or business uses. Figure 7 of the Master Plan stipulated maximum heights across the site of between R.L 124.5 at the northern end of the site and 131.56 at the southern end along Quarry Street. These height limits are problematic because a data centre requires a significantly greater floor to ceiling clearance to accommodate the extensive amount of plant and machinery needed to generate the required power. It is apparent from these figures, therefore, that the design scheme will challenge the previously set height parameters. However a taller building concept on vacant parcels 1 and 2 will not unduly compromise the amenity of the GPO building because it is largely uninhabited being an established data centre.

As described in Table 1 of Section 4.3 above, the proposed building contains four (4) levels above ground of technical floor space with a floor to ceiling height of 5.475 metres. Above this are two (2) levels of plant, one of which has a 9.0 metre floor to ceiling height and the other at 7.5 metres. Contained within both these levels are 9 gas engines, 27 diesel engines and 48 cooling towers which constitute the key plant elements of the building's tri-generation and back-up power supply systems.

Whilst it is normal practice that plant and machinery are located on the roof of the building, GSS2 has purposely been designed to encapsulate all plant equipment within the building's roof line to assist in minimising the intrusive nature that is often associated with plant and machinery. This also has the benefit of improving the overall visual appearance of the building when viewed from surrounding key locations within the Sydney CBD.

In the Department of Planning's covering letter to the 2009 DGR's issued for GSS2 it is noted that ...*"In accepting that a height greater than that of the current Master Plan may be justified, it was previously determined that any new height should not exceed the original parapet height of the GPO (Global Switch 1) building"*. This comment was made in the context of the former design for a 9 storey commercial building.

The existing parapet height of GSS1 is:-

- on the western façade - RL 147.13;
- on the eastern façade - RL 142.86; and
- the overall height of GSS1 to top of plant is RL 157.970.

The only reference in the Master Plan to existing parapet heights is in Figure 6 – Indicative Building Heights which refers to the existing parapet height on the western Harris Street façade of GSS1 as RL 147.13.

The proposed height of GSS2 ranges between RL 144.065 to RL 150.165, of which only a small portion of the building has a roof height of RL 150.165. The majority of the building's height mostly varies between RL 144.065 to RL 146.065. Therefore, numerically, the proposed height for the new GSS2 Facility falls below the existing Global Switch western parapet height contained in the Master Plan. The majority of the building is between 1.205 and 3.205 metres above the existing GPO's eastern parapet height (i.e. RL 144.065 – RL 142.86 and RL 146.065 – RL 142.86). The previously issued DGR's for the 9 storey commercial building proposed an approximate height of RL 142 and an overall height to top of plant of RL 151.

Plan No ar-2501 at Appendix 9.2 illustrates the differences in height between the Master Plan, that proposed when the current 2009 DGRs were sought , and the current proposal.

In contextual terms, the proposed height of GGS2 is considered acceptable for the following reasons:

- a) As demonstrated in Figure 8 below the proposed new GSS2 extensions will reinforce the strong built form on the western edge to the visual catchment of Darling Harbour. This will be achieved through the bulk, scale and form of the building.



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- b) The existing gradual stepping up in height of buildings between the Powerhouse Museum to the south and the Goldsbrough development to the north will be maintained. The south eastern corner of GSS2 has been stepped down in height to be comparable to the Bullecourt development.
- c) The bulk and scale of the proposed building envelope is comparable to the buildings in the surrounding Darling Harbour precinct.
- d) The visual analysis in Section 6.2 demonstrates that whilst the proposed building will be highly visible from the upper levels of high rise buildings on the eastern side of Darling Harbour, the bulk and scale of the proposed building envelope is comparable to surrounding buildings. The Global Switch Sydney 1 roof will also remain visible from these locations.

Figure 8 below illustrates the built form relationship of GSS2 with neighbouring buildings.

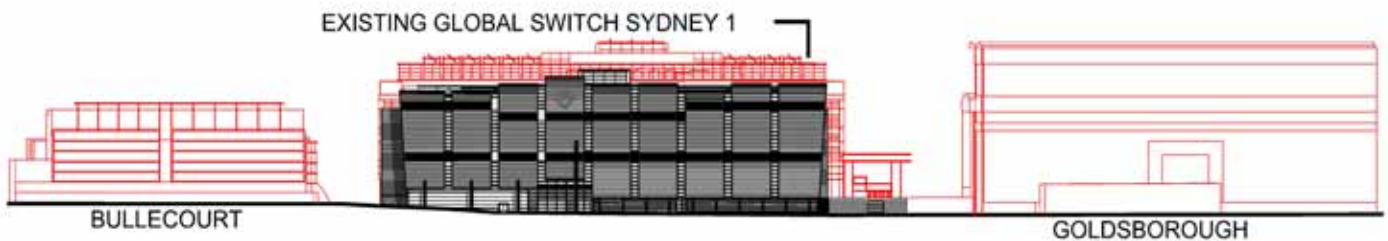


Figure 8



EXTRACT FROM MASTER PLAN

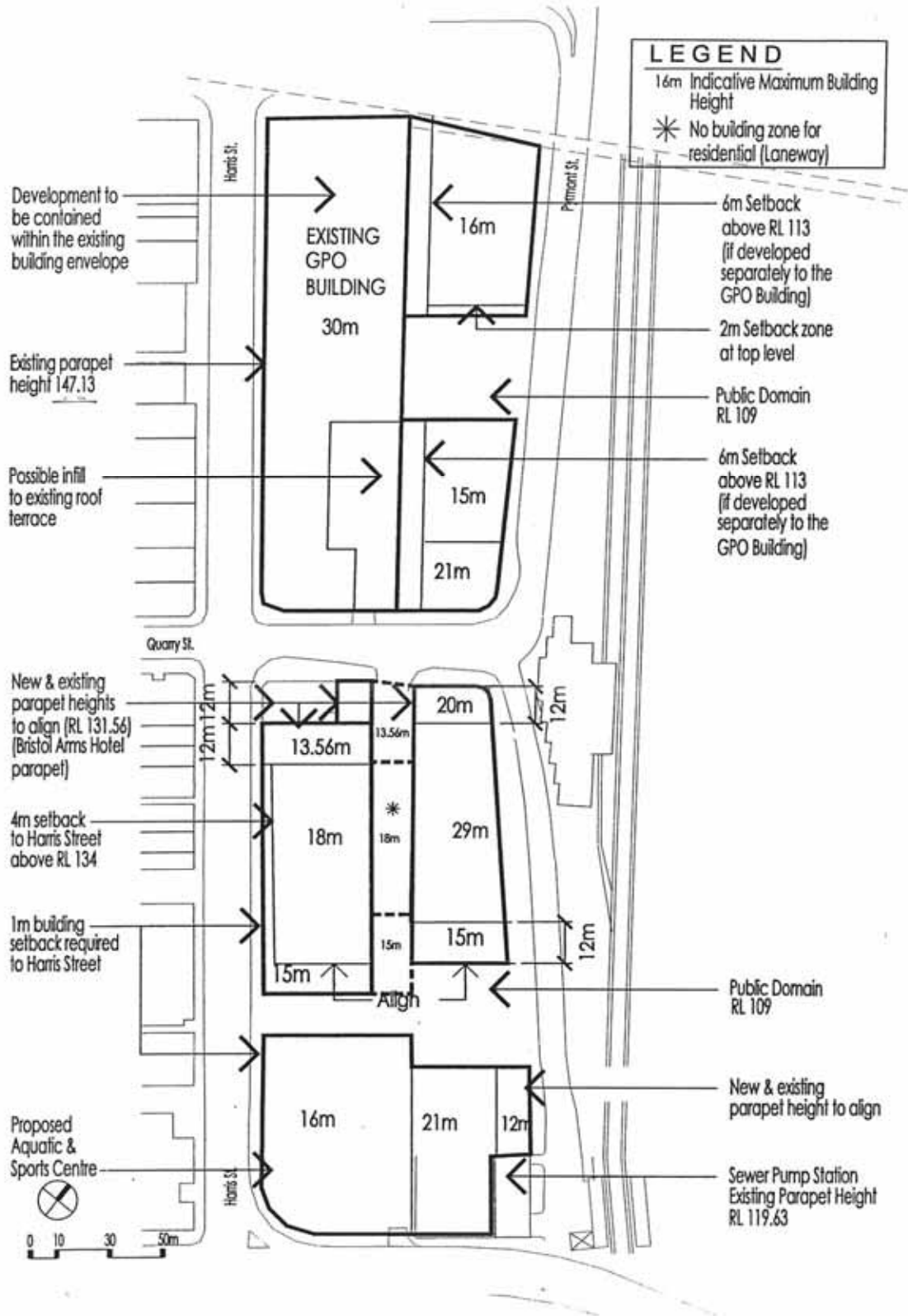


FIGURE 6- INDICATIVE BUILDING HEIGHTS



EXTRACT FROM MASTER PLAN

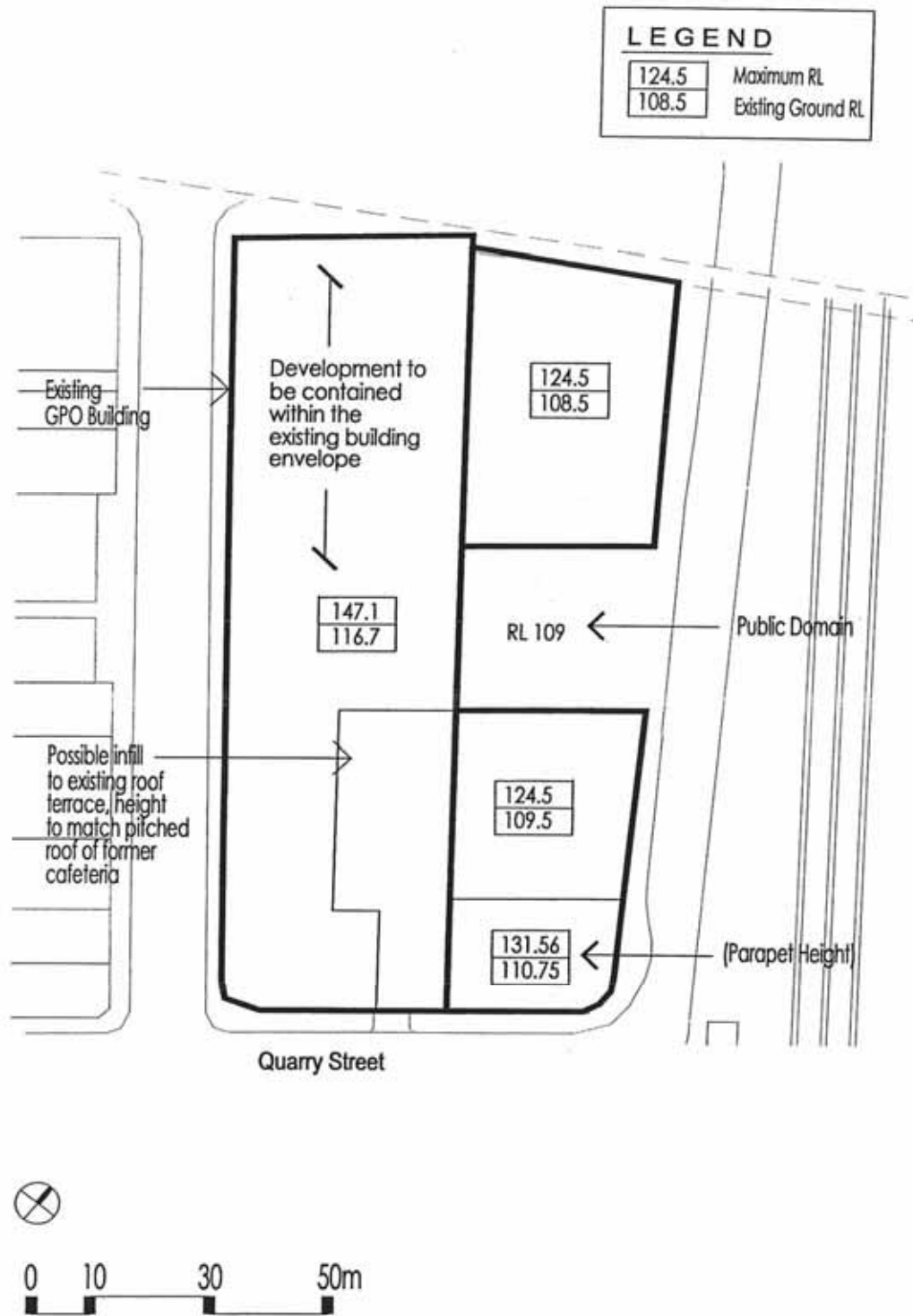
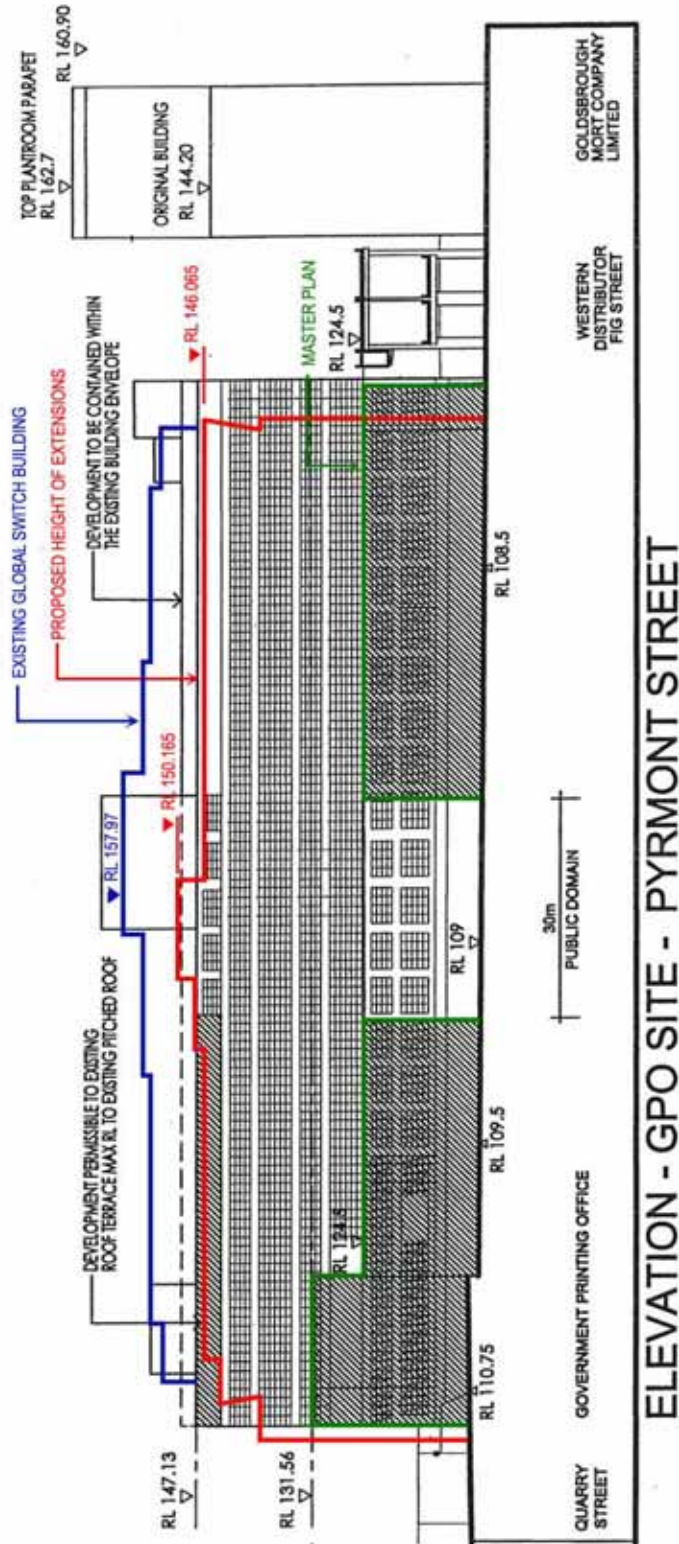


FIGURE 7- MAXIMUM BUILDING HEIGHTS - GPO SITE



EXTRACT FROM MASTER PLAN



BASED ON MASTER PLAN FIGURE 11 – BUILDING HEIGHTS, PYRMONT STREET ELEVATION



4.5.3 Setbacks

The Master Plan requires buildings to be constructed to the street alignment on the corner of Pyrmont and Quarry Streets with the encouragement to provide a setback midway along Pyrmont Street.

Varying somewhat from this, the new GSS2 building will be set back 3 metres at both ground and Level 1 at the southern end of the site to Pyrmont Street, and 3 metres at ground level at the northern end. However, as detailed in the architectural drawings, the steel framed veils north of the lobby entrance extend down to the floor level of Level 1 thereby reducing the 3 metre setback at this location.

The proposed building alignment, however, will reinforce the strong line of built form, which characterises the western fringe of the Darling Harbour basin. It also continues and completes the Pyrmont Street 'wall' edge character as defined by the existing Goldsbrough Mort and 'Bullecourt' buildings.

The south eastern corner of the building has been stepped back to create an open space area, where public art can be introduced. This will signify an area of civic interest, inviting pedestrian use and activity.

4.5.4 Connectivity

The Master Plan identified a potential cross-site link through the original GPO building into a proposed public square through the middle of the site emerging onto Pyrmont Street. Figure 12 of the MPS depicts the proposed access and movement pattern across the combined sites and is included below for reference purposes. With the subsequent approval of the occupation of the former GPO building by GSS1 in 2002, this effectively removed the opportunity to provide a future cross site link from Harris Street to Pyrmont Street. It should also be noted that the MPS also reinforces pedestrian access via the surrounding street system.

Whilst the 2006 commercial DGR's sought a variation to this provision by proposing an atrium space extending north - south through the site, the proposed GSS2 scheme does not propose a cross-site link nor atrium space. This cross site link was primarily imposed based on an assumption that previous designs for the site were for commercial buildings, which would naturally increase pedestrian traffic to and from the site.

A public or semi public atrium or a cross-site link would not be an appropriate attribute for a purpose built data centre, bearing in mind that GSS2 is not designed to interact with the outside world. As it will be integrally connected to GSS1, and will be of a highly secure nature with a negligible worker population, pedestrian access through the site is not sufficient to provide passive surveillance and pedestrian security and is not warranted from a pedestrian desire line or flow perspective.

Currently adequate pedestrian circulation is located within the surrounding streetscapes providing legible and safe pedestrian paths between destinations as explained in Section 2.2 of this report. Whilst the proposed GSS2 extension does not provide a cross-site link, it does however reinforce and upgrade the current pedestrian circulation along Pyrmont and Quarry Streets. At present this street block is predominantly a dead frontage due to its vacant disuse. Redevelopment however will activate a part of Ultimo that is currently uninviting and unsafe for pedestrians.



EXTRACT FROM MASTER PLAN

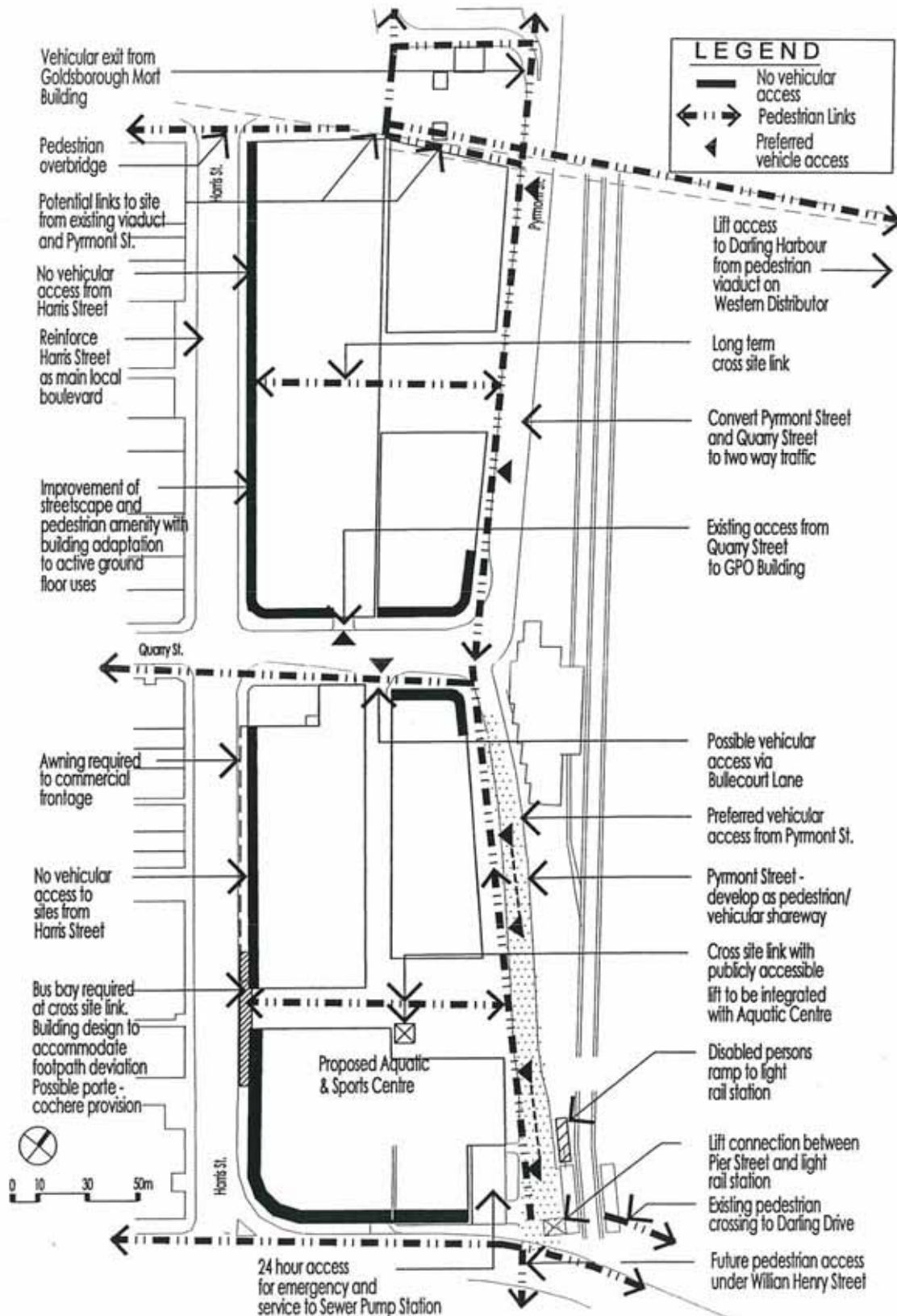


FIGURE 12 - ACCESS & MOVEMENT



4.6 External Finishes

The building has been custom designed to meet the functional requirements and expectations of its end users. This extends to the treatment of the building's façade that must respond to both the outside environment and the specialist requirements of activities within.

Facade materials have been chosen to reinforce the design concept of the building as a machine and to express some ESD elements of the buildings which are targeting world leading Environmentally Sustainable Design initiatives. A large part of the facade is clad in satin finish silver metallic 'veils' which wrap up and over the rooftop plant. The northern and southern ends of the building terminate in rectilinear forms which are to be clad in contrasting charcoal coloured metallic cladding with expressed joints. These forms sit upon a honed black masonry base. Whilst the technical areas of the building require no natural light or views, large areas of translucent coloured back glass have been used at the northern and southern end of the building, and recessed vertical slots provide a contrast between the 'veils' on the eastern façade and add articulation and rhythm to the facade.

On the Pyrmont Road frontage a colonnade is formed towards the southern end of the building and the building base in this area is to be clad in a large format buff coloured sandstone tile in a honed finish. The exposed columns will have a metallic finish to match the facade 'veils'. Satin finish silver metallic horizontal louvres screen the building base at the northern end of Pyrmont Road. The building entry is centrally located in this facade and is expressed by a large area of glass together with a glazed entry canopy.

The building's facades will be designed to minimise uncomfortable or hazardous glare that may affect nearby roadways, pedestrians and residences. In line with recommendations of the RTA (refer Appendix 9.20), during the design development phase all external glass will be designed to a level of reflectivity that ensures that motorists on the viaduct will not be adversely affected. Refer to Section 10 of Appendix 9.10 for further comment on reflectivity issues.

Details of external finishes and materials are listed at Appendix 9.6.

A sample board displaying external finishes is also submitted with the project application.

4.7 Access, Parking & Loading

Section 2.4.2 of the Master Plan states that the provision of car parking should reasonably satisfy the needs of occupants, whilst acknowledging the area's high accessibility by foot, cycle, public transport and access via connecting walkways and cycle ways.

The high-tech operational nature of a data storage facility requires minimal staff numbers, hence, the existing GSS1 facility accommodates a total of only 12 car spaces. Similarly, GSS2 which has significantly less technical floor space and also minimal staff numbers, proposes 12 spaces at ground level. These car spaces are located directly off Pyrmont Street at the northern end of the site beneath the Western Distributor flyover. The secured designated parking area will include one disabled space and a separate loading dock area.

Manoeuvring for loading and unloading on site will be via a turntable arrangement adjacent to the dock within the service yard. This will permit service vehicles to enter and leave the site in a forward direction. Direct pedestrian access into the building from the dock is provided.

An assessment of traffic and parking issues associated with the proposal has been undertaken and discussed in Section 6.4 and Appendix 9.12.



4.8 Pedestrian Access and Public Domain

There will be a single building entry and reception area located in a central and visible position along the Pyrmont Street frontage, with level access provided for the disabled.

The walking patterns in this area of Ultimo have been described in Section 2.2 of this report. Currently there are safe, direct and convenient paths in close proximity to the site via footpaths and pedestrian bridge links. It is proposed that this pattern be reinforced by upgrading the visual appeal of this somewhat abandoned frontage of Pyrmont Street. This will be achieved through widened footpath area with modernised paving surfaces and some degree of weather protection for pedestrians provided by the building's colonnade. These improvements in addition to the main entry lobby fronting Pyrmont Street, will enliven the public domain and offer life and interest to the streetscape as well as improving pedestrian safety.

Additional street planting is proposed with an emphasis on tree species that are in accordance with City of Sydney Council tree planting programme. In particular, fig trees already established along Pyrmont Street will be repeated along the building's frontage to reinforce a consistent planting theme along the roadway.

The stepped building façade at the corner of Quarry Street will create a public domain suitable for the future placement of public artwork.

Figure 4 of the MPS (referenced in Section 4.5.1) only specifies that an active street frontage is required to Harris Street, with no specific activation plans for Pyrmont Street.

4.9 Landscaping

The site will be landscaped in accordance with the landscape plan attached at Appendix 9.3.

A Landscape Maintenance Strategy is also provided at Appendix 9.4.

The main landscape elements and objectives for various areas of the site are outlined below.

4.9.1 Streetscapes

The new footpath zones to Pyrmont Street and Quarry Street will be provided in accordance with City of Sydney Council's requirements. Tree planting to the footpath verge area will be undertaken in accordance with City of Sydney's requirements.

STREETSCAPE PLANT SCHEDULE

| Code | Botanic Name | Common Name | Height | Spread | Pot Size | Qty |
|--------------|-------------------------------|-------------|-----------------|--------|----------|-----|
| TREES | | | | | | |
| Fm'H' | Ficus microcarpa vsr 'Hillii' | Hills Fig | 12-15m | 9m | 200L | 8 |
| Lc | Lophostemon confertus | Brushbox | Variable to 15m | 9m | 200L | 2 |

4.9.2 Green Roof and Rooftop Garden

A break-out space is located on the roof level. The recreation area incorporates a paved area and extensive planting enhances this space and provides a 'green roof' insulating the building below. Hardy, native species with low water requirements are to be utilised in this area. Future potential photovoltaic (PV) cells may be located on the rooftop garden that will improve power harvest.



ROOF TOP GARDEN PLANT SCHEDULE

| Botanic Name | Common Name | Mature Height | Planting Rate | Pot Size |
|---------------------------------|---------------------|---------------|---------------|----------|
| GROUNDCOVERS | | | | |
| Dianella spp | Flax Lily | 600mm | 8/m2 | Tube |
| Dianella caerulea | | 400mm | 8/m2 | Tube |
| Dianella caerulea 'Little Jess' | Little Jess | 400mm | 8/m2 | Tube |
| Dianella 'Little Rev' | | 200mm | 8/m2 | Tube |
| Festuca glauca | Blue Fescue | 300mm | 8/m2 | Tube |
| Isolepis nodosa | Nobby Club Rush | 1000mm | 8/m2 | Tube |
| Liriope 'Evergreen Giant' | Evergreen Giant | 600mm | 8/m2 | Tube |
| Lomandra longifolia "Breeze" | Matt Rush | 500-600mm | 8/m2 | Tube |
| Pennisetum alopecuroides | Swamp Foxtail | 800-1000mm | 8/m2 | Tube |
| Poa labillardieri | Large Tussock Grass | 600-800mm | 8/m2 | Tube |

4.10 Signage

Corporate identification signage is to be installed on two elevations, to clearly identify the premises upon approach and as a landmark from distant locations. The signage will be complementary to the architectural appearance of the building, the style and colour reflecting the corporate logo of Global Switch.

Four (4) identification signs are proposed as follows:-

- Pyrmont Street frontage – one (1) non-illuminated, embossed logo sign mounted at the height of RL 141 facing east towards the CBD. The diameter is approximately 6.0 metres.
- Pyrmont Street frontage – two (2) illuminated, wall signs mounted on the blade wall at the ground level lobby entry facing north and south along Pyrmont Street.
- Northern elevation - north facing, illuminated logo mounted at the height of RL 138 facing north towards the Western Distributor. The diameter is 6.0 metres.

The appearance of the signs and their positioning is illustrated in photomontage diagrams at Appendix 9.7.

An assessment of the proposed signage in terms of the requirement of State Environmental Planning Policy No. 64 has been undertaken in Section 5.2.4.

4.11 BCA Requirements

AE & D have prepared a report that provides a Building Code of Australia 2009 (BCA) compliance assessment of the design documentation for the proposed Global Sydney Switch 2 Extension, against the significant requirements of the BCA 2009. A copy of their report is attached at Appendix 9.16.

In summary, their findings are summarised as follows:-



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“This report has assessed the preliminary design documentation for the proposed Global Sydney Switch 2 Extension Project, Ultimo NSW. This assessment has been carried out in accordance with the provisions of the Building Code of Australia 2009 (BCA) to determine if the submitted design can comply with the requirements of the BCA. The primary purpose of this report is to identify any significant non-compliance matters (or constraints) in comparison to the current Deemed-to-Satisfy (DTS) provisions of the BCA and identify if Alternative Solution may be applicable in relation to those identified BCA DTS non-compliance matters.

The outcome of the report has noted that the proposed design contains several non-compliances with the deemed-to-satisfy provisions of the BCA that must be addressed via either re-design (by the design team) or supported by Alternative Solution. There are also certain matters for which full BCA compliance can not be fully determined due to the current level of design containing an insufficient level of detail, such matters will be addressed as the design continues to progress.

Subject to the recommendations contained in Section 3.0 of this report, the current design can readily comply with the performance requirements of the BCA.”

4.12 ESD Initiatives

GSS2 has been designed to become a leading example of an environmentally sustainable facility incorporating design initiatives aimed at achieving long-term energy efficiency. These initiatives have been closely integrated into the building layout and external appearance, fully influencing the overall built form.

This innovative project will use a leading edge trigeneration system to generate power on site via a natural gas fired energy plant. Waste heat from this plant will also be used to power absorption chillers, producing chilled water to provide cooling capacity to the site further reducing energy requirements.

4.12.1 Trigeneration

The trigeneration system will generate all power for the new building and at times will have capacity to supply some electricity to Global Switch 1. The new building is to provide a technical facility with real delivery of power to IT space of 1500W/m² plus power for cooling and ancillary systems, compared to 30 or 40W/m² for standard commercial office space. This produces a total building load for Global Switch 2 of 30MW.

The reasons why providing trigeneration plant is better for the environment include:

- Much lower carbon dioxide emissions than using electricity sourced from the NSW grid. This is because the majority of the grid sourced electricity is produced by burning coal. The electricity generated on site is from burning natural gas which has lower emissions than coal. This results in carbon dioxide emissions 45% lower than those produced if grid electricity were used. Details are provided in Appendix 9.11, Air Quality and Green House Gas Impact Assessment.
- Higher usage of energy contained in the gas than using grid electricity because the heat from the electricity generation is used within the building in the absorption chillers. This saves approximately 5MW of grid electricity.
- No energy is lost in the electrical transmission associated with transporting electricity across the grid because the electricity is generated on site.
- The high energy consumption of this building amplifies the advantages of trigeneration compared with a more typical commercial development. A large facility allows greater utilisation of plant whilst maintaining redundancy, and the larger plant is more efficient. Global Switch Sydney 2 would be 3 – 4 times more efficient than multiple computer rooms built within other facilities. This equates to energy savings of upwards of 40MW.



4.12.2 Water Recycling / Re-use

The facility intends to capture and reuse water from the following sources:

- Stormwater capture and treatment from Global Switch Sydney 1 & 2
- Sewer water capture and treatment from Global Switch Sydney 1 & 2
- Potential sewer mining from the street sewer mains.
- Potential water treatment and recycling of water for use in building services cooling systems

Rainwater to be harvested from the roof structure will be fed into the existing building services for site irrigation and toilet flushing.

Overall these initiatives could save 220,000 megalitres of water per annum.

4.12.3 LEED Rating

The development is targeting a LEED rating of Gold under the LEED for New Construction v2.2 tool as a minimum, with an aspiration for a Platinum rating.

The development is proposing the implementation of the following LEED initiatives:

- Redevelopment of an existing 'Brownfield' site
- Bicycle parking with support facilities
- Landscaping to the roof to reduce heat island effects
- Parking facilities for fuel efficient vehicles
- Light pollution reduction for external lighting
- Water efficient landscaping & rainwater harvesting
- Water use reduction through the use of water efficient fixtures
- Commissioning & implementation plan including enhanced commissioning process
- Energy efficiency reductions minimum 10% improvement on similar facilities
- Enhanced refrigerant management
- Divisions of minimum 75% of waste from landfill
- Use of certified wood products on the development
- Construction Indoor Air Quality plans and implementation procedures in operation
- Thermal comfort assessments and monitoring in operation for the ancillary offices
- Daylighting and external views for staff
- Increased ventilation rates to ancillary offices
- Outdoor air delivery monitoring systems
- Low VOC paints, adhesive & sealants, carpet systems and composite wood products
- Lighting controls and systems

For a full description of the ESD strategies refer to Section 6.3 and Appendix 9.10 of this report.

4.13 Estimated Development Cost

The estimated capital investment value of the GSS2 project is \$198,533,000 excluding GST.

The value of the development has been calculated to include all costs necessary to establish and operate the development, including the design and construction of buildings, structures, associated infrastructure and fixed or mobile plant and equipment (excluding GST). This figure is confirmed by written advice from Quantity Surveyors, Turner & Townsend, copy attached at Appendix 9.19.



5 Statutory Planning Framework

5.1 Director General's Requirements

The Global Switch Sydney 2 project is submitted as a Major Project application under Part 3A of the EP&A Act. The initial process involved the lodgement of a Project Application (No 08_0222) seeking the Director General's environmental assessment requirements.

On 10th February 2009, the Department of Planning issued the up-to-date Director General's Requirements for the GSS2 project, for the construction of a new 6 storey specialist data centre with 3 basement levels. A copy of the DGR requirements is attached at Appendix 9.20.

The following Table 4 summarises the key issues, assessment requirements and documents required by the Department with cross references to the relevant sections of this Environmental Assessment Report where these matters are addressed.

Table 4

| Director General's Requirements | Report Reference |
|--|---|
| Key Issues | |
| <p>The EA must address the following key issues:</p> <p>1. Relevant Environmental Planning Instruments (EPIs) policies and guidelines to be addressed:</p> <ul style="list-style-type: none"> ▪ State Environmental Planning Policy (Major Projects) 2005 ▪ State Environmental Planning Policy (Infrastructure) 2007 ▪ State Environmental Planning Policy No. 55 – Remediation of Contaminated Sites ▪ Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 ▪ Sydney Harbour Foreshores & Waterways Area DCP ▪ Darling Harbour Development Plan No.1 ▪ Ultimo Pyrmont Section 94 Contributions Plan, and ▪ The Former GPO and Australian Mortgage Land and Finance Company Site Master Plan, March 2000 (the Master Plan). <p>You must clearly detail the nature and extent of any non-compliance with relevant environmental planning instruments, plans and guidelines, and provide a justification for any non-compliance/s.</p> | <p>Refer Section 5.2.1</p> <p>Refer Section 5.2.2</p> <p>Refer Section 5.2.3</p> <p>Refer Section 5.2.5</p> <p>Refer Section 5.2.6</p> <p>Refer Section 5.2.8</p> <p>Refer Section 5.2.9</p> <p>Refer Section 4.5, 5.2.7 & 6.1</p> <p>Refer Sections 4.0,4.1,4.5, 5.2.7 & 6.1</p> |
| <p>2. Built Form, Architectural and Urban Design</p> <p>The EA must include an assessment of the impact of the bulk, scale and form of the proposed building, and its relationship with the existing adjoining development, the streetscape, the public domain and the wider context of the western edge of Darling Harbour. You should also clearly detail building height, setbacks, gross floor space, business floor space and 'other' floor space (such as car parking and plant) and compliance with the Master Plan.</p> | <p>Refer Sections 4.1, 4.3, 4.5, 4.7 & 4.8</p> |



| Director General's Requirements | Report Reference |
|--|--|
| Key Issues | |
| <p>Particular reference must be made to the following principles:</p> <ul style="list-style-type: none"> ▪ Enhancement of the visual and urban design qualities of the site. ▪ Completion of the strong line of built form that defines the visual catchment of this western edge of Darling Harbour. ▪ The northern corner of Quarry/Pyrmont Streets should be provided with a built edge to a scale comparable to the southern corner. ▪ Urban design improvements to adjacent areas of the public domain and the activation of ground level spaces, and ▪ Physical and/or visual connectivity within the precinct. <p>The preliminary project design will be subject to independent design review. Advice from this review process must be incorporated into the final design submitted in the EA. A design statement prepared by the architect(s) completing the project design must be included as part of the EA.</p> | <p>Refer Sections 4.1, 4.5, 4.8, 4.9, 5.2.7, 6.1, 6.2</p> <p>Refer Section 3.2</p> |
| <p>3. Visual Impact</p> <p>The EA must include an assessment of the visual impact of the proposal on the surrounding area, and must include a photomontage of the proposal when viewed generally from each elevation. The analysis should include the visual impacts of alternative building heights, bulks and forms when viewed from within Darling Harbour and from any public viewing locations across Darling Harbour.</p> | <p>Refer Section 6.2</p> |
| <p>4. Ecologically Sustainable Development (ESD)</p> <p>The EA must detail how the development will incorporate ESD principles in the design, construction and ongoing operation of the development, including energy use, water, waste minimisation and recycling strategies.</p> <p>Particular details must be provided of the proposed 'trigeneration' system and associated infrastructure including the natural gas fired energy plant.</p> | <p>Refer Section 6.3 & Appendix 9.10 (<i>Section 8</i>)</p> |
| <p>5. Transport and accessibility (Construction and Operational)</p> <p>The EA must provide a Traffic Impact Study prepared in accordance with the RTA's Guide to Traffic Generating Developments, considering traffic generation, access and any required road works.</p> | <p>Refer Section 6.4 & Appendix 9.12</p> |
| <p>6. Car Parking</p> <p>The EA must demonstrate the provision of sufficient on-site car parking and loading facilities for the proposal having regard to local planning controls, RTA guidelines and the Master Plan. (Note: The Department supports reduced car parking rates in areas well served by public transport).</p> | <p>Refer Section 6.4 & Appendix 9.12</p> |
| <p>7. Excavation and Construction</p> <p>The EA shall assess the excavation and construction related impacts from the proposed development, including noise, air, erosion and sedimentation. Management measures must also be described to minimise these impacts.</p> | <p>Refer Section 6.5, 6.7.3 & 6.7.6 & Appendix 9.11 & 9.17</p> |
| <p>8. Heritage and Archaeology Impacts</p> <p>The EA must include a Heritage Impact Statement in accordance with the NSW Heritage Office publication "Statements of Heritage Impact".</p> | <p>Refer Section 6.6 & Appendix 9.14 & 9.15</p> |



| Director General's Requirements | Report Reference |
|--|---|
| Key Issues | |
| <p>9. General Environmental Risk Analysis</p> <p>The EA must include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation) and proposed mitigation measures including but not be limited to:</p> <ul style="list-style-type: none"> • contamination and remediation • geotechnical considerations • relocation and/or protection of existing infrastructure • noise, vibration and dust emissions during construction • transmission and storage of potentially hazardous materials on site, such as natural gas and diesel, and • drainage/flooding issues. <p>Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of these additional key environmental impacts must be included in the EA.</p> | <p>Refer Sections 5.2.3, 6.7, 6.8, 6.12 & Appendix 9.9, 9.10, 9.11, 9.13 & 9.17</p> |
| <p>10. Utilities and Services</p> <p>In consultation with relevant agencies, the EA shall address the requirements of the development for utilities and services, including water, waste water, energy and natural gas. The EA must identify any augmentation requirements and/or any alternative servicing options.</p> <p>An integrated Water Management Plan is to be prepared, including any proposed alternative water supplies, proposed end uses of potable and non-potable water, water sensitive urban design and any water conservation measures.</p> <p>The EA must also clearly identify any existing utilities, services and assets that could be potentially impacted by the development, including consultation with RailCorp and Sydney Water and other relevant service providers. The EA must describe how any such impacts will be managed, to the satisfaction of the relevant service provider or asset owner.</p> | <p>Refer to Appendix 9.10 (<i>Sections 7.3, 7.9 & 8.2.2 & Appendix B</i>)</p> |
| <p>11. Consultation</p> <p>Undertake an appropriate and justified level of consultation in accordance with the Department's Major Project Community Consultation Guidelines October 2007.</p> | <p>Refer Section 6.9 & Appendix 9.8</p> |
| Plans and Documents to accompany the Application | Comments/Reference |
| <p>General</p> <p>The Environmental Assessment (EA) must include:</p> | |
| <p>1. An executive summary;</p> | <p>Included in report, Page (v)</p> |
| <p>2. A thorough site analysis including site plans, aerial photographs and a description of the existing and surrounding environment;</p> | <p>Refer Section 2.0</p> |
| <p>3. A thorough description of the proposed development;</p> | <p>Refer Section 4.0 & Appendix 9.10 (<i>Section 1</i>)</p> |
| <p>4. An assessment of the key issues specified above and a table outlining how these key issues have been addressed;</p> | <p>Refer Section 5.1 & Appendix 9.10 (<i>Section 1</i>)</p> |
| <p>5. An assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any</p> | <p>Refer Section 5.0, 6.0, 7.0 & Appendices 9.9 to 9.18</p> |



| Director General's Requirements | Report Reference |
|---|---|
| Key Issues | |
| potential impacts of the project; | |
| 6. The plans and documents outlined below; | |
| 7. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading; | Included in report, Page iv |
| 8. A Quantify Surveyor's Certificate of Cost to verify the capital investment value of the project (in accordance with the definition contained in the Major Projects SEPP; and | Refer Section 4.13 & Appendix 9.19 |
| 9. A conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest. | Refer Section 6.16 |
| <p>Plans and Documents</p> <p>The following plans, architectural drawings, diagrams and relevant documentation shall be submitted:</p> <p>1. An existing site survey plan drawn at an appropriate scale illustrating:</p> <ul style="list-style-type: none"> • the location of the land, boundary measurements, area (sqm) and north point; • the existing levels of the land in relation to buildings and roads; • location and height of existing structures on the site; and • location and height of adjacent buildings and private open space. • all levels to be to Australian Height Datum. | Refer Appendix 9.1 |
| 2. A Site Analysis Plan must be provided which identifies existing natural elements of the site (including all hazards and constraints), existing vegetation, footpath crossing levels and alignments, existing pedestrian and vehicular access points and other facilities, slope and topography, utility services, boundaries, orientation, view corridors and all structures on neighbouring properties where relevant to the application (including windows, driveways, private open space, etc.) | Refer Section 2.0 |
| 3. A locality/context plan drawn at an appropriate scale should be submitted indicating: <ul style="list-style-type: none"> • significant local features such as parks, community facilities and open space and heritage items; • the location and uses of existing buildings, shopping and employment areas; • traffic and road patterns, pedestrian routes and public transport nodes. | <p>Refer Figures 1 to 7 in Section 2.0 and Appendix 9.15 re: heritage items</p> <p>Refer Figures 1 to 7 in Section 2.0 and Appendix 9.15 re: heritage items</p> |
| 4. Architectural drawings at an appropriate scale illustrating: <ul style="list-style-type: none"> • the location of any existing building envelopes or structures on the land in relation to the boundaries of the land and any development on adjoining land; • detailed floor plans, sections and elevations of the proposed buildings; • elevation plans providing details of external building materials and colours proposed; | Refer to Section 4.0 & Appendix 9.2, 9.6, 9.18 |



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| Director General's Requirements | Report Reference |
|--|--|
| Key Issues | |
| Consider height and massing of building and its relationship to Goldsbrough Mort, Bullecourt and the existing Global switch developments. The proposed height of the building exceeds the prescribed height under the master plan. The former design had greater articulation and an overall lower profile | Refer Sections 4.5.2, 5.2.7, 6.1.2 & 6.2 |

5.2 Relevant Environmental Planning Instruments

The relevant planning controls governing development of the site as advised by the Director General are:

- State Environmental Planning Policy (Major Projects) 2005;
- State Environmental Planning Policy (Infrastructure) 2007;
- State Environmental Planning Policy No. 55 – Remediation of Contaminated Sites;
- State Environmental Planning Policy No 64 – Advertising and Signage;
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005;
- Sydney Harbour Foreshores & Waterways Area DCP;
- The Master Plan for the former GPO site, March 2000;
- Darling Harbour Development Plan No 1; and
- Ultimo Pyrmont Section 94 Contributions Plan.

Compliance with these environmental planning instruments is addressed below.

5.2.1 State Environmental Planning Policy (Major Development) 2005

This project application is lodged under the provisions of SEPP (Major Development) 2005.

Pursuant to Clause 6(1) (a) of the SEPP, a project is declared to be a project to which Part 3A of the Act applies, where, in the opinion of the Minister, the development is of a kind:

- (a) that is described in Schedule 1 or 2, or
- (b) that is described in Schedule 3 as a project to which Part 3A of the Act applies, or
- (c) to the extent that it is not otherwise described in Schedules 1–3, that is described in Schedule 5,

Under the SEPP, the land is described in Clause 10 of Schedule 2 as being within the boundaries of the Sydney Harbour Foreshore Site (Map 9), with a capital investment value greater than \$5 million. It is noted that Global Switch site falls outside the jurisdiction of City of Sydney local government area.

In accordance with the provisions of Part 3A of the Environmental Planning & Assessment (EP&A) Act, due process has been followed in terms of this major project application.

Following receipt of the Director General's requirements of 10th February 2009, this report constitutes the next step in the approval process, being the environmental assessment as required by Section 75H of the Act for major projects.



5.2.2 State Environmental Planning Policy (Infrastructure) 2007

SEPP Infrastructure is relevant to the Global Switch project in terms of Clause 104 – Traffic Generating Development and Clauses 85 & 86 relating to development in proximity to a rail corridor. These provisions require consultation with both the RTA (Clause 104) and Rail Authority (Clauses 85 & 86) for specified development.

In this regard, the project may require the following referrals by the Department of Planning:-

- **RTA**

Consultation required under Clause 104(1), as the proposal is of a development type listed under Schedule 3, being best categorised as 'commercial premises' in excess of 10,000 sq m in area.

It is noted that the RTA as part of the application process has already been consulted by the Director General and their preliminary response is included at Appendix 9.20.

- **Rail Authority**

The site is located opposite the light rail line parallel to Pymont Street which may be defined as a rail corridor. Consultation may be required under Clause 85(1) (b) and 86(1)(b), as the project will involve:-

- the placement of a metal finish on a structure on land that is immediately adjacent to a rail corridor ; and
- excavation to a depth greater than 2 metres below ground on a site that lies within 25 metres (measured horizontally) of a rail corridor.

5.2.3 State Environmental Planning Policy No.55

SEPP No. 55 – Remediation of Land requires the consent authority to consider whether the land is contaminated, whether remediation has occurred or is recommended and, if so, is the site suitable for the development proposed.

As part of the application process, a geotechnical investigation of the site was undertaken by Jeffery & Katauskas P/L. Their report is attached at Appendix 9.13.

The consultant's advice confirms that borehole logs from the geotechnical investigation indicate only minimal areas of soil, with the site being predominantly sandstone bedrock exposed by previous excavation work. Whilst no analysis has been undertaken to date, the geotechnical report recommends that any soil that requires disposal off-site be classified and tested for contamination as part of the construction programme, prior to commencement of excavation on site.

5.2.4 State Environmental Planning Policy No 64

As development consent is sought for the erection of business identification signage, the application is subject to assessment under the provisions of SEPP No 64.

The proposed signage is described in Section 4.10 and depicted in diagrams at Appendix 9.7.

The aim of SEPP 64 is to ensure that advertising and signage is compatible with the desired amenity and visual character of an area, provides effective communication in suitable locations and is of a high quality design and finish. The SEPP does not regulate the content of a sign. The consent authority must not issue consent unless the signage is consistent with the objectives of Clause 3(1)(a) of the Policy and satisfies the assessment criteria of Schedule 1 of the SEPP.



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The proposed Global Switch logo is of a high quality design consistent with Global Switch's international branding and which respects and reinforces its corporate setting. It is considered to satisfy the assessment criteria of Schedule 1 of the SEPP particularly in terms of visual compatibility with the character of the area and streetscape, and is of an appropriate scale and proportion to the GSS2 building.

5.2.5 Sydney REP – Sydney Harbour Catchment 2005

This SREP is now deemed to be a State Environmental Planning Policy pursuant to amendments enacted by SEPP (Repeal of REP Provisions) 2009, gazetted on 26th June 2009.

The site lies within the boundaries of Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 and is specifically located within the designated Foreshores and Waterways Area. The primary objective of this Policy is to ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are protected, enhanced and maintained.

The site is unzoned under the REP and has no land/water interface. However, in accordance with Clause 20 of the SREP, it is necessary for the approval body to take into account various principles and considerations where sites lie within the Foreshores and Waterways Area.

The proposal does not require referral to the Foreshores and Waterways Planning and Development Advisory Committee because it is not development of a type listed in Schedule 2 of the SREP.

The relevant matters for consideration are addressed in Table 5 below.



Table 5
Compliance with Sydney REP 2005

| Relevant Clause | Compliance |
|---|--|
| Clause 21 - Biodiversity, ecology and environment protection | The proposal is not considered to have adverse impacts on biodiversity or ecology of the area as there is no land/water interface. Appropriate environmental protection measures will be employed during construction to prevent any adverse impacts beyond the site, as detailed in the CMP at Appendix 9.17. |
| Clause 22 - Public access to, and use of, foreshores and waterways | Currently, safe, legible and direct pedestrian linkages are provided around the Darling Harbour foreshore. Pedestrian circulation along Pyrmont Street & Quarry Street is relatively low, due to the uninviting nature of the vacant frontage. However, as detailed in Section 4.5.4 & 4.8, GSS2 will improve street activation along Pyrmont Street through landscaping, paving and weather protection thereby improving the pedestrian appeal around the site. |
| Clause 23 - Maintenance of a working harbour | Not directly applicable to proposal |
| Clause 24 - Interrelationship of waterway and foreshore uses | No foreseeable impact on waterway and foreshore uses |
| Clause 25 - Foreshore and waterways scenic quality | For reasons stated in Sections 4.1, 4.5, 6.1 & 6.2, GSS2 will be an iconic building of an appropriate scale, form and design to enhance the scenic and visual quality of the Darling Harbour precinct. |
| Clause 26 - Maintenance, protection and enhancement of views | A detailed visual analysis was undertaken & the visual impacts assessed in Section 6.2. For the reasons outlined, the proposal will not adversely affect views to and from Sydney Harbour and other landmarks around the foreshore. |
| Clause 27 - Boat storage facilities | Not directly applicable to proposal |

5.2.6 Sydney Harbour Foreshores & Waterways Area DCP 2005

DCP 2005 is a supplementary document to SREP 2005 incorporating detailed design guidelines relating to foreshore access, visual and natural environments, recreation and maritime industrial uses. The DCP pertains mainly to land/water interface developments and therefore has limited application to the GSS2 project because the site does not directly adjoin the harbour waterfront, nor does it lie within any area nominated as Ecological Communities and Landscape Characters.

However, design guidelines specified in Sections 5.2 to 5.6 of the DCP do apply to all land based development within the boundaries of SREP 2005. Section 5.0 matters relevant to GSS2 are addressed in Table 6 below.



Table 6
Compliance with Sydney Harbour DCP 2005

| Relevant Section | Comment |
|---|--|
| Section 5.2 – Foreshore Access | Not directly applicable as GSS2 site is not positioned where direct public access to the foreshore can be facilitated. |
| Section 5.3 – Siting of Buildings & Structures | The only relevant provision is that buildings should not obstruct views and vistas from public places to the waterway or landmarks. There are no landmarks in the vicinity of GSS2 and the site is positioned such that it is not in direct sight line to the waterways. Refer to visual analysis diagrams and justification in Section 6.2. |
| Section 5.4 – Built Form | The impacts of the built form have been adequately assessed in Sections 4.5, 6.1 & 6.2. |
| Section 5.5 - Signage | The proposed signage is for business identification only. The signs as detailed in Section 4.10 are discretely positioned on the façade, appropriate in sizing and do not intrude on the skyline. An assessment has been undertaken under SEPP 64 in Section 5.2.4. |
| Section 5.6 – Planting | The site is almost devoid of vegetation. A landscape strategy is proposed, details of which are included at Section 4.9 of this report. Appropriate species in the surrounding landscape will be used including repetition of existing street trees along Pyrmont Street. |

5.2.7 Master Plan – Former GPO and AML&F Sites

As explained in Section 1.3, a Master Plan Strategy (MPS) was implemented in March 2000 to assist in guiding future development on both the former GPO site and the adjoining AML&F site.

The original intent of the MPS was to give guidance to developers as to the prospective land uses deemed suitable for a strategic site on the western fringe of Darling Harbour. Since its inception, the MPS has generally achieved its objectives through the construction of Bullecourt residential complex and the preservation and adaptive reuse of the GPO building for specialised data centre operations which fit in with the MPS's desired commercial style uses.

It is noted that at the time of the drafting of the original MPS control document that neither the Global Switch (former GPO) nor the Bullecourt sites had been developed. Whilst the MPS initially envisaged either a residential and/or commercial use for the site, this all changed when Global Switch converted the former GPO building into a data centre. Subsequently, with the proposal now to develop the site as an extension to GSS1, many of the planning guidelines identified in the MPS are no longer directly applicable.



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For example, when considering aspects such as through site linkages, public realm spaces and the interrelationship of buildings within the former GPO site, it should be recognised that emerging technology has led to this specialised built form that does not closely match the master plan strategy. Data centres require unique accommodation solutions to their challenging technical and environmental requirements. They also need to be strategically located to ensure high levels of connectivity and easy access to their corporate client base.

In 2002, Global Switch Property (Australia) Pty Ltd was granted approval to occupy the former GPO site. Now due to operational demands, they need to expand onto the adjoining site. However, a decade ago the MPS would not have envisaged this innovative style of land use. It is therefore contended that the concept now proposed, cannot achieve full compliance with various master plan guidelines. In light of this, the proponent seeks support to vary from the MPS for reasons outlined below.

The MPS nominated residential and commercial office uses for the site, and supported the use of the former GPO as a commercial usage or as an art gallery, with uninterrupted views of Darling Harbour and the City. The later conversion of the GPO as Global Switch 1 generated the potential for different controls for the adjoining site than those outlined in the MPS. Due to its specialised technical operations and the requirement for a highly secure internal environment, Global Switch 1 building does not require natural light or views to the city nor does it support a large permanent building population commensurate with a typical commercial useage.

Due to the requirement for large contiguous floor plates and the extensive engineering plant and equipment for the tri-generation system, GSS2 will exceed the nominated heights and building footprints shown in the MPS. Given these operational imperatives, the proposed increase in building height and footprint will not impact either the natural light penetration or the need for view opportunities through the eastern façade of the GSS1 building.

It is considered, however, that GSS2 generally complies with the principle intent of the MPS by:-

- Providing an appropriate built form which responds in character to the context of Darling Harbour and Ultimo;
- Providing a backdrop and clearly identifiable visual catchment of the western edge to Darling Harbour and
- Not visually impacting on the existing skyline of the western edge of Darling Harbour when viewed from the City, which steps down from the Goldsbrough Mort building to the Bullecourt development.

The following assessment examines compliance of GSS2 against all relevant provisions that apply to that particular site as contained with the Master Plan.

Summary of Relevant Master Plan Controls

As the proposed data centre was not an envisaged land use at the time the MPS was developed, many of the following controls identified are no longer directly relevant to this unique proposal. In regard to some matters, a YES/NO response is recorded under the heading of Compliance. The purpose of recording in this manner is to explain that whilst it may not technically comply with certain provisions, it is acknowledged that the proposal achieves the intent of what the MPS sets out to establish for the reasons listed.



Vision and Objectives

| Primary matters | Compliance | Reference and Comments |
|--|------------|---|
| <ul style="list-style-type: none"> ▪ To provide a flexible Masterplan which allows for variety of compatible mixed uses and provides open space | YES | <p>YES – The existing & proposed data centre reinforces the diversity of uses and is environmentally compatible with other mixed uses in Ultimo, as GSS1 has co-existed satisfactorily on the site since 2002</p> <p>NO – Large contiguous floor plates means a requirement for 100% site coverage limiting opportunities to provide open space. Also as GSS2 is not a public destination, open space is not considered integral to the development.</p> |
| <ul style="list-style-type: none"> ▪ To facilitate pedestrian links from the inner western suburbs through Darling Harbour to the city centre. | YES/NO | <p>YES - GSS2 will enliven a vacant, disused frontage, improving the quality and appeal of Pyrmont Street as a pedestrian thoroughfare.</p> <p>There is existing convenient public access to the Western Distributor by stairs & Darling Harbour at the northern end of the site.</p> <p>NO- Through site links are not feasible or desirable as the two buildings will be physically & operationally linked rather than separate premises as previously envisaged under the MPS. Approval to GSS1 effectively removed the opportunity to provide a through site link. The unusually low building population is not conducive to a public link for reasons outlined in Section 4.5.4.</p> |
| <ul style="list-style-type: none"> ▪ To accommodate heritage opportunities and constraints on and around the sites. | YES | <p>GSS1 is an adaptive reuse of the GPO which is noted in the MPS as being of 'low significance'. The visual impact of GSS2 has been minimised by maintaining visual exposure of the upper levels of GPO's eastern façade. The primary elevation for GSS1 is to Harris Street & there is no change or impact on that elevation. The Heritage Study at Appendix 9.15 concludes that the proposal will have no adverse impact on the heritage significance of the area.</p> |
| <ul style="list-style-type: none"> ▪ To improve connections to Pyrmont Street | YES/NO | <p>YES - GSS2 will improve the quality and appeal of Pyrmont Street as a pedestrian thoroughfare through landscaping, increased street lighting and public domain works. Refer to Sections 4.5.4, 4.8 & 4.9.</p> <p>NO - Additional through site links are not feasible or desirable given high security nature, large floor plates and interlinked buildings and low level of passive surveillance and pedestrian activation afforded by the lower than normal building population within the site. There is existing convenient public access to the western distributor & Darling Harbour at the northern end of the site.</p> |



Land Use and Floor Space

| Primary matters | Compliance | Reference and comments |
|--|------------|--|
| <ul style="list-style-type: none"> Provide new open space areas and active frontages associated with cross site links as indicated in Figure 4. | YES/NO | <p>YES - GSS2s iconic presence will activate frontage by improving the security and appeal of Pyrmont Street as a pedestrian thoroughfare through the building's entry points, landscaping, increased street lighting and public domain works. Refer to Sections 4.5.4, 4.8 & 4.9.</p> <p>NO - Additional open space and cross site links are not feasible or desirable given the high security nature of the use, large floor plates and interconnecting operations of GSS2 & GSS1.</p> |

Built Form and Urban Design

| Primary matters | Compliance | Reference and comments |
|---|------------|---|
| <ul style="list-style-type: none"> Buildings generally should have strong masonry forms with parapets and defined street corners and edges. Corners should be articulated. Development on corners of street blocks should be emphasised as part of an integrated design solution and should reflect the character of the locality. | YES | <p>Refer to detailed architectural design statement and built form comments in Sections 4.1, 4.6 & 6.1.</p> <p>The development where it meets the street corner relates to the buildings to the north and south by being articulated to provide a transition of massing from Bullecourt to Goldsbrough Mort as illustrated in Figure 8 in Section 4.5.2 and creating a civic space at ground level.</p> <p>The building form provides a sense of solidity which is in keeping with the adjoining strong masonry forms of the locality.</p> |
| <ul style="list-style-type: none"> Building heights must not exceed heights shown in Figures 6 to 11. | NO | <p>RL of eastern façade of GSS1 is 142.86 & western façade is 147.13. GSS2 façade ranges from RL 144.065 to RL 150.165. Refer to justification of height in Sections 4.5.2, 6.1.2, 6.2</p> |
| <ul style="list-style-type: none"> Development must comply with the siting and built form principles for the various sites as outlined in Figure 5. | NO | <p>GSS2 is a unique land use demanding an innovative built form, significantly different in design to the commercial style building envisaged by the MPS.</p> <p>The site is now being developed as an integral extension to GSS1, in contrast to the MPS which assumed development would be independent to the GPO site. The GSS1 occupation in 2002 effectively removed the opportunity to provide a mid block link.</p> <p>The general massing of the new building form is however complimentary to the adjacent Goldsbrough and Bullecourt buildings, as illustrated in the visual analysis in Section 6.2</p> <p>Refer to Sections 4.5, 6.1, 6.2</p> |
| <ul style="list-style-type: none"> Modulation of facades is required behind building lines as shown in Figure 5. | YES/NO | <p>YES - Modulation has been achieved by the use of veils, curved roof elements, recessed panels and perforations in the facade. Refer to Section 4.1 & 4.6 for more detail.</p> <p>NO - As explained elsewhere, GSS2 building lines vary significantly from the building footprint envisaged by MPS, primarily because it demands a unique design solution.</p> |



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| Primary matters | Compliance | Reference and comments |
|---|------------|--|
| <ul style="list-style-type: none"> Building setbacks in mid-building block areas are encouraged. Refer Figure 5. | NO | As justified elsewhere in this table, GSS2 built form varies significantly from the building footprint envisaged by MPS. |
| <ul style="list-style-type: none"> Public domain areas are to be provided with minimum dimensions as indicated in Figure 5. | NO | As justified elsewhere in this table, the unique GSS2 built form varies significantly from the building footprint envisaged by MPS. |
| <ul style="list-style-type: none"> Reflective glass must not be used and facades of buildings must not contain large unbroken expanses of a single material such as glass or curtain walling. | YES | Minimal amount of glass is proposed. Materials reflect the "machine" aesthetic. Whilst the façade is primarily satin metallic cladding, this is contrasted with masonry base, expressed joints louvre screens and other varied material elements as described in Section 4.6. |
| <ul style="list-style-type: none"> Services, plant rooms, lift overruns, etc., should be minimised and incorporated within the roof pitch or upper level building forms. | YES | GSS2 incorporates extensive areas of plant and machinery within the building and upper roof form. |
| <ul style="list-style-type: none"> Major existing views and vistas from Ultimo along Quarry Street and William Henry Street are to be maintained and enhanced by the form and treatment of buildings along the view corridor. | YES | No impact on east-west view corridors. |
| <ul style="list-style-type: none"> Planning and design of buildings adjoining the Western Distributor are to address the noise generated by the elevated freeways. | YES | Noise emanating from the western distributor freeway is not considered a matter of concern given that the data centre will be predominantly occupied by machines and equipment with a very low workplace population. All walls adjoining the elevated Western Distributor roadway will be suitably treated acoustically. |
| <ul style="list-style-type: none"> Planning and design of the eastern portion of the GPO site is to provide improved pedestrian links to Pymont Street from Harris Street and improved pedestrian amenity and safety, including desirable active use of the area under the freeway ramp at the northern end. | YES/NO | YES - GSS2 will improve the security and appeal of Pymont Street as a pedestrian thoroughfare through the building's entry points, landscaping, increased street lighting and public domain works. Refer to Sections 4.8, 4.9, 4.5.4 NO - Inclusion of a cross site link is not feasible or desirable given high security nature of the facility, and interconnecting operations of GSS2 & GSS1 and low workforce. |

Access, Circulation and Parking

Refer to separate Traffic Report discussed in Section 6.4 and Appendix 9.12.

Disabled Access & Facilities

Refer to separate Access Report discussed in Section 6.11 and Appendix 9.18.



Public Domain

| Primary matters | Compliance | Reference and comments |
|---|------------|---|
| <ul style="list-style-type: none"> Parcels of open space must be provided in the locations indicated on Figure 13. | NO | Not applicable to the siting of this building for reasons stated elsewhere due to the unique built form requirements. |
| <ul style="list-style-type: none"> Design of the public domain must provide for barrier free access for people with disabilities. | YES | Footpath areas are the applicable public domain related to this development. These have been designed for barrier free access. |
| <ul style="list-style-type: none"> Landscape quality and character is to reflect public domain function. | YES | Refer to landscaping objectives and public domain works in Section 4.8 & 4.9. |
| <ul style="list-style-type: none"> Streetscape improvements such as new paving and street tree planting are required to Pyrmont and Quarry Streets in conjunction with the implementation of development consents. | YES | Refer to landscape plans at Appendix 9.3. |
| <ul style="list-style-type: none"> All designs, finishes and materials are to comply with the Ultimo-Pyrmont Public Domain Technical Manual. | YES | Refer to landscape plans and details at Appendix 9.3 and 9.4. |
| <ul style="list-style-type: none"> Provide a future through site link from Harris Street to Pyrmont Street in the vicinity of the middle of the GPO Building | NO | <p>Through site links are not feasible or desirable given high security nature and the two buildings will be operationally linked rather than separate premises. Also the unusually low building population is not conducive to a public link. Approval to GSS1 effectively removed the opportunity for a through site link.</p> <p>There is existing convenient public access to the western distributor & Darling Harbour at the northern end of the site and via surrounding street footpaths.</p> |

Ecological Sustainable Development

Refer to separate Aurecon Report discussed in Section 6.3 and Appendix 9.10.

Heritage

Refer to Heritage Impact Statement discussed in Section 6.6.2 and Appendix 9.15.

Site Remediation

Refer to Section 6.7.1 and geotechnical investigation report at Appendix 9.13.

Infrastructure

Refer to Aurecon report attached at Appendix 9.10.



Development Phasing

| Primary matters | Compliance | Reference and comments |
|---|------------|--|
| <ul style="list-style-type: none"> Allow for independent development of the eastern part of the GPO site. | NO | The site is now being developed as an integral extension to GSS1, in contrast to the MPS which assumed that the site would be developed independently to the GPO site. However the built form reads as 2 distinctly, separate structures. |
| <ul style="list-style-type: none"> A future east-west through site link in the vicinity of the middle of the GPO Building is to be provided. | NO | Through site links are not feasible or desirable as the two buildings will be operationally linked. Also the low level of passive surveillance and pedestrian activation afforded by the unusually low building population within the site is not conducive to a public link for reasons stated elsewhere. There is existing convenient, alternative public access to the western distributor & Darling Harbour at the northern end of the site and via surrounding street footpaths. |

5.2.8 Darling Harbour Development Plan No 1

Darling Harbour Development Plan No.1 is the relevant environmental planning instrument that controls development of the Global Switch site within the Darling Harbour precinct.

The Plan aims to encourage the development of a variety of tourist, educational, recreational, entertainment, cultural and commercial facilities within that area. In terms of the Plan's objectives, the proposal is consistent with the general intent of the Plan as the project will:-

- contribute to the diversity of uses encouraged within the Darling Harbour area;
- remove an unsightly vacant parcel of land in a key Darling Harbour location;
- contribute to the visual vitality of the precinct.

It is submitted that the proposed data centre is best defined as "commercial premises" under the Plan and as such is permitted with consent. GSS1 was similarly defined when it was approved as a data centre in 2001.

GSS2 and GSS1 will operate as a single data storage facility spread across two buildings.

5.2.9 Ultimo Pyrmont Section 94 Contributions Plan

Sydney City Council administer the Ultimo Pyrmont Section 94 Contributions Plan which has been identified by the Director General as being applicable to the site.

The intent of the Plan, prepared in December 1994, was *"to enable the consent authority to require contributions towards the provision, extension or augmentation of public amenities and public services that will or are likely to be required as a consequence of development within Ultimo Pyrmont or that have been provided in anticipation of or to facilitate such development"*.

At the time, the predominant form of development anticipated in the Ultimo Pyrmont area was a mix of residential, commercial, recreational and tourist development. In terms of workforce population, the Plan assumed that a diversity of employment opportunities would be attracted to the area including commercial office, retail, education, leisure, recreation and tourism. Based on these assumptions, the Plan calculates the Section 94 contribution on the following employee occupancy rates as set out in Section 10.5 of the Plan, namely:-



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- *Commercial Office* – 25 sqm GFA / employee
- *Showrooms and warehouses* – 85 sqm GFA / employee
- *Industrial* – 75 sqm GFA / employee
- *High Tech Industrial* – 35 sqm GFA / employee
- *Hotel accommodation 5 star* – 1 employee / room, or less than 5 star – 0.3 employees / room, plus 1.5 visitors per room x 70% occupancy rate
- *Retail shops* – 25 sqm GFA / employee
- *Supermarkets and Department stores* – 48 sqm GFA / employee
- *Licensed Clubs* – 23 sqm of site area / total employees
- *Other Uses not listed above* – based on the estimated number of employees

It is evident that a data centre does not comfortably fit within any of the above development categories, with the exception of “*other uses not listed above*”.

The Plan then assesses the contribution rate to be paid on the basis of the total number of persons accommodated and/or employed in the proposed development after construction minus the pre-existing population on the site at the time of gazettal of Sydney REP 26. In this case, the site is vacant therefore the existing population is zero.

Bearing in mind the operational nature of the premises and the extensive plant, equipment and storage floor space, the estimated population of GSS2 will be only 3–4 permanent staff and 6-8 permanent contractors. (refer Section 4.4).

The monetary value of the contribution to be paid by the proponent is subject to complex formula calculations, as determined by the City of Sydney Council. This will be subject to further clarification during the approval process.



6 Environmental Assessment

The following is an assessment of the environmental impacts of the proposed development, structured so as to address the:-

- key issues raised in the DGR guidelines; and
- other environmental effects and outcomes as identified by expert consultant investigations as part of the design process.

6.1 Built Form, Architectural & Urban Design

6.1.1 General

The unique nature of GSS2's operations demands a signature building form that will reinforce a strong corporate image signifying Global Switch's status and integrity in the technological community. The architectural design strives to integrate new ideas, proven technologies and sustainable initiatives to provide a cutting edge data storage facility.

Its strategic position on the western fringe of the Darling Harbour precinct, demands a building that will visually engage with the CBD, being highly aesthetic as well as functional. Whilst not a building that interacts with the outside world, its unique form and fabric will stand as a visual icon on the CBD landscape.

The varying height and scale of the metallic veils along with curved roof elements, perforations in the facade and recessed panels creates an interesting architectural composition, which visually uplifts rather than dominates the Ultimo landscape.

The Global Switch 2 building will enhance the visual and urban design qualities of the site by providing:

- A high quality, sustainable and iconic building which will be appropriate for Darling Harbour and the Ultimo precinct.
- A building form and massing that will not visually impact on the existing skyline of the western edge of Darling Harbour when viewed from the City, which steps down from the Goldsbrough Mort building to the Bullecourt development.
- An eastern building façade that provides a formal address off Pyrmont Street whilst providing a high quality façade fronting Darling Harbour and the City.
- Activation and increased security of the surrounding public realm through upgrading of the streetscapes and by locating the new building's reception and entry lobby along Pyrmont Street.

6.1.2 Design Responses to the 2009 DGRs

The proposal departs from the following DGR's dated 10th February 2009 as outlined below.

The provision of a physical north south pedestrian link between the existing Global Switch 1 building and the proposed Global Switch 2 building. This link would allow pedestrians to enter the site between the two buildings via a stair from the Western Distributor pedestrian walkway. This requirement was based on the previously issued commercial DGR's dated August 2006 for the design of a commercial building with a large internal atrium space. Due to the requirement for the new and existing facilities to be operationally linked and the need for existing technical space to be able to be directly expanded into the new building, the proposed Global Switch 2 building will be a physical extension to the existing Global Switch 1 data centre and will not require any physical separation or an atrium space.



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In addition to this the new building now proposes a continuation of the existing data centre uses on the site in lieu of the previously envisaged commercial building use. This results in a significantly lower building population which is not conducive to creation of a public link and atrium space mid block in this location.

It is worth noting that the MPS did not insist on a north-south link. A six metre setback between the GPO building and new development was required only if the site was to be developed separately to the GPO building, which is not to be the case. (Refer to MPS Figure 6 included in Section 4.5.2 of this report).

An existing public stair access is located opposite the site providing a safe pedestrian connection to the Western Distributor footpath and Darling Harbour from Pyrmont Street. It is proposed that in lieu of a north south mid block cross site pedestrian link that pedestrians are encouraged to use the existing stair located on Pyrmont Street. The proposal provides for an upgrade to the footpaths, lighting and security to the surrounding streets and provides clear linkages to adjacent areas creating a safer pedestrian environment.

Provision of a visual link between the existing Global Switch 1 Building and the proposed Global Switch 2 Building, maintaining a visual link from Goldsborough Mort to the Bullecourt Development.

This requirement responds to the 2006 DGR's which supported the proposal of a visual link from Quarry Street through a large internal atrium space providing views to the upper levels of the Goldsborough Mort building. The atrium was an urban design device to integrate Global Switch 1 with a commercial office building under different uses and ownership. In order for the proposed Global Switch 2 building to function effectively as an extension to the current Global Switch 1 data centre operations the building must be physically connected and accessible at levels 2-5, without the need for an internal atrium space, as Global Switch will own and operate both buildings concurrently. The 2000 Masterplan urban design controls allow the development on the site to physically abut the Global Switch 1 building if there is common ownership of the buildings.



View from the Bullecourt Development



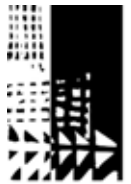
Visual Link as required by 2009 DGR's

Proposed Global Switch 2 building massing

Although the proposal does not include an internal atrium space, the building massing is expressed externally as a separate building from Global Switch 1. This is achieved through the provision of a deep recess located between the two buildings on the north and south elevations, the contrast in the materials of Global Switch 1 & 2 and the physical separation of the upper levels.

The northern corner of Quarry / Pyrmont Streets should be provided with a built edge to a scale comparable to the southern corner. The proposal provides a step in the massing along Quarry Street which is comparable to the scale of the Bullecourt Development and maintains the existing skyline of the western edge of Darling Harbour when viewed from the City, which steps down from the Goldsborough Mort building to the Bullecourt development. The massing approach adopted creates a transition of scale from the higher Goldsborough Mort building southwards towards the Bullecourt development.

The proposed height of the building should not exceed the original parapet height of the GPO (Global Switch 1) building. The western parapet of the existing Global Switch building is noted on the 2000 Masterplan as RL147.13 whilst the eastern parapet of the Global Switch 1 building sits at RL 142.86. To accommodate the size and extensive quantity of engineering plant and equipment required for the tri-generation system, the new Global Switch 2 building height will sit beneath the existing Global Switch 1 western parapet level but will sit above the existing Global Switch 1 eastern parapet height by 1.2 – 3.0 m, with two other isolated areas sitting 5.0 - 6.0 m above the eastern parapet to accommodate engineering plant and lift shaft overrun and machinery. These areas have been fully integrated into the new building's external form so as to provide an uncluttered roof line.



View from upper level of Cockle Bay Wharf

Refer to architectural drawings for clarity



Height nominated in 2009 DGR's



Proposed height of Global Switch 2

The proposed additional building height will have minimal visual impact on the existing skyline of the western edge of Darling Harbour when viewed from Cockle Bay Wharf, which steps down from the Goldsbrough Mort building to the Bullecourt development.

View from the Crowne Plaza Hotel, Day Street



Height as nominated in the 2009 DGR's



Height of proposed Global Switch 2 building

The proposed additional building height will have minimal visual impact on the existing skyline of the western edge of Darling Harbour when viewed from the City, which steps down from the Goldsbrough Mort building to the Bullecourt development.



6.1.3 Shadowing Impacts

Shadow diagrams attached in Appendix 9.5 demonstrate that in mid-summer the only significant additional shadow from the new building is cast onto Pymont Street in the afternoon.

At mid-winter there is little additional shadow cast by the new building in the morning, whilst around noon there will be increased shadow in Quarry Street which may extend onto the northern wall of the ground floor (parking level) of the Bullecourt building. By 3pm in mid winter the shadow of the new building moves away from the Bullecourt building and extends onto Pymont Street.

At the equinox there is no additional shadow in the morning, an increased shadow cast onto Quarry Street at noon, and increased shadow only falling onto Pymont Street in the afternoon.

In summary, most of the over-shadowing from the new development which occur on Quarry Street and Pymont Street, and the shadow expected to fall onto the ground floor northern facade of the Bullecourt building around noon in mid-winter, will cause no loss of amenity as this is a car parking level of that building.



6.2 Visual Impact

GSS2 will be visible from areas north, south and east of the site. Views of the site from the west are blocked by the existing Global Switch Sydney 1 building. The Western Distributor forms a visual barrier between the site and the Goldsbrough Mort building to the north of the site. The Light Rail / Monorail corridor creates visual separation of the site and the Tumbalong Park area of Darling Harbour, east of the site.

The visual impacts of the proposed building envelope have been assessed from key viewing points as marked on Figure 9 below. The existing and proposed views from each key location illustrate the visual impact of the proposed building envelope with particular regard to siting, bulk and scale relationships.

Figure 9



LEGEND

- SITE OF GLOBAL SWITCH SYDNEY 2
- EXISTING GLOBAL SWITCH SYDNEY 1



VIEW 1



VIEW NORTH ALONG PYRMONT STREET

Existing View

- The northern end of Global Switch Sydney 1 is visible between the Bullecourt development and the Goldsbrough Mort building.
- The central and eastern sections of the Goldsbrough Mort building are visible.

Visual Impact of Proposal

- The Pyrmont Bridge Road frontage of the proposed building will align with the Bullecourt Development providing a consistent building setback from Pyrmont Street.
- The Goldsbrough Mort building will not be visible from this viewing point.



VIEW 2



VIEW FROM PIER STREET BRIDGE

Elevated view north along the Light Rail / Monorail corridor and Darling Drive from the public footpath on Pier Street Bridge.

Existing View

- The northern end of Global Switch Sydney 1 is visible between the Bullecourt development and the Goldsbrough Mort building.
- The eastern section of the Goldsbrough Mort building is visible.
- The Light Rail / Monorail corridor and Darling Drive create visual separation of the site and the Tumbalong Park area of Darling Harbour.

Visual Impact of Proposal

- The proposed building will be of a comparable height to the Bullecourt Development.
- The Pyrmont Street frontage of the proposed building will align with the Bullecourt Development creating a strong line of built form which will reinforce the western edge of Darling Harbour.
- The extent of Goldsbrough Mort building, visible from this vantage point, will be reduced however the eastern end of the building will remain visible.



VIEW 3



VIEW FROM THE BULLECOURT DEVELOPMENT

View north across the Bullecourt Development central courtyard toward Global Switch Sydney 1.

Existing View

- A view corridor exists between the Bullecourt apartment buildings providing a partial view to Global Switch Sydney 1 and the Goldsbrough Mort building.

Visual Impact of Proposal

- The Goldsbrough Mort building will not be visible from this viewing point.
- The southern elevation of Global Switch Sydney 1 is to be articulated with a deep recess to visually distinguish the proposed building from the existing Global Switch Sydney 1 building.



VIEW 4



VIEW EAST ALONG QUARRY STREET

Existing View

- The south facing façade of Global Switch Sydney 1 dominates the view to the north of Quarry Street.
- The Bullecourt Development is visible on the southern side of Quarry Street.
- The City skyline and the Sydney Exhibition Centre terminate the view along the street corridor.

Visual Impact of Proposal

- The view of Darling Harbour and the City skyline along Quarry Street is maintained with the extent of the view being only partially reduced.



VIEW 5



VIEW FROM THE EASTERN END OF PYRMONT BRIDGE

Elevated view south-west across Cockle Bay and Darling Harbour.

Existing View

- The upper levels of Global Switch Sydney 1 and the Goldsbrough Mort building are visible in the distance above the Western Distributor and the buildings in Darling Harbour.

Visual Impact of Proposal

- The upper levels of the proposed building will be visible in the distance from the eastern end of Pyrmont Bridge.
- The roof of the existing Global Switch Sydney 1 building will remain visible above the proposed building.
- The bulk and scale of the proposed building envelope is comparable to the buildings in Darling Harbour.



VIEW 6



VIEW ACROSS COCKLE BAY

View south-west across Cockle Bay and Darling Harbour from promenade level.

Existing View

- The upper levels of Global Switch Sydney 1 and the Goldsbrough Mort building are visible in the distance above the Western Distributor and the buildings in Darling Harbour.

Visual Impact of Proposal

- The upper levels of the proposed building will be visible in the distance from the eastern edge of Cockle Bay.
- The roof of the existing Global Switch Sydney 1 building will remain visible above the proposed building.
- The bulk and scale of the proposed building envelope is comparable to the buildings in Darling Harbour.



VIEW 7



VIEW FROM UPPER LEVEL OF COCKLE BAY WHARF

Elevated view south-west across Cockle Bay and Darling Harbour from viewing platform.

Existing View

- The upper levels of Global Switch Sydney 1 and the Goldsbrough Mort building are visible in the distance above the Western Distributor and the buildings in Darling Harbour.

Visual Impact of Proposal

- The upper levels of the proposed building will be visible in the distance from the upper level of Cockle Bay Wharf (viewing platform).
- The roof of the existing Global Switch Sydney 1 building will remain visible above the proposed building.
- The bulk and scale of the proposed building envelope is comparable to the buildings in Darling Harbour.



VIEW 8



VIEW FROM THE WESTERN END OF PYRMONT BRIDGE

Elevated view south along Darling Drive and the Light Rail / Monorail corridor.

Existing View

- The upper levels of the southern section of Global Switch Sydney 1 are visible in the distance above the Western Distributor.
- A variety of built forms and materials are visible from this viewing point.

Visual Impact of Proposal

- The Pyrmont Street frontage of the proposed building will align with the Bullecourt Development which will reinforce the western edge of Darling Harbour.
- Global Switch Sydney 1 will not be visible from this viewing point.



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VIEW 9



VIEW FROM WESTERN DISTRIBUTOR FOOTPATH

Elevated view south-west from the Western Distributor (connecting to Pyrmont Road).

Existing View

- The upper levels of Global Switch Sydney 1 are visible above the Western Distributor in the middle distance.

Visual Impact of Proposal

- The extent of Global Switch Sydney 1, visible from this vantage point, will be reduced.
- The bulk and scale of GSS2 is comparable to Global Switch Sydney 1 and will not visually impact the Goldsbrough Mort building.



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VIEW 10



VIEW FROM WESTERN DISTRIBUTOR FOOTPATH

Elevated view south-west from the Western Distributor footpath located to the north of the subject site.

Existing View

- Global Switch Sydney 1 is highly visible from this viewing point although partially obscured by the road structure.

Visual Impact of Proposal

- GSS2 will be highly visible from this viewing point.
- Global Switch Sydney 1 will not be visible.
- The Bullecourt Development will remain largely visible in the distance.



VIEW 11



VIEW FROM THE CROWNE PLAZA HOTEL, DAY STREET

Existing View

- Elevated, panoramic views exist across Darling Harbour and the Western Distributor to Global Switch Sydney 1.
- The existing building is highly visible from this vantage point.

Visual Impact of Proposal

- The proposed building will be highly visible from this vantage point.
- The roof of the existing Global Switch Sydney 1 building will remain visible above the proposed building and will not alter the stepping up in height of buildings between the Bullecourt Development to the south and the Goldsbrough Mort building to the north.
- The bulk and scale of the proposed building envelope is comparable to surrounding buildings.



VIEWS 12 AND 13



VIEWS TO THE SITE ACROSS TUMBALONG PARK, DARLING HARBOUR

Existing View

- Mature trees and the Sydney Exhibition Centre limit visibility of the Global Switch Sydney 1 building from within the central parkland area of Darling Harbour at ground level.

Visual Impact of Proposal

- GSS2 will have minimal impact on the views from this area of Darling Harbour.



VIEWS 14 AND 15



VIEWS WEST TO THE SITE FROM BATHURST STREET AND THE BATHURST STREET PEDESTRIAN BRIDGE LINK

Existing View

- The Darling Walk Redevelopment complex, currently under construction, will block views to Global Switch Sydney 1 from Bathurst Street.

Visual Impact of Proposal

- GSS2 will not impact the views from Bathurst Street.



The aforementioned assessment of the visual impacts of the proposed building envelope from key locations shows that:-

- The Pymont Bridge Road frontage of the proposed building will align with the Bullecourt Development providing a consistent building setback from Pymont Street and a strong line of built form which will reinforce the western edge of Darling Harbour.
- The bulk and scale of GSS2 is comparable to Global Switch Sydney 1 and does not alter the stepping up in height of buildings between the Bullecourt Development to the south and the Goldsbrough Mort building to the north.
- The bulk and scale of the proposed building envelope is comparable to the buildings in the surrounding Darling Harbour precinct.
- From Cockle Bay, the upper levels GSS2 will be visible in the distance above the Western Distributor and the buildings in Darling Harbour; however the proposed building will not exceed the height of the Global Switch Sydney 1 building and the roof of the existing building will remain visible above the proposed building.
- The existing partial views to the Goldsbrough Mort building will be reduced from Pymont Street looking north and from within the Bullecourt development.
- The proposed building will be highly visible from the upper levels of high rise buildings on the eastern side of Darling Harbour however the bulk and scale of the proposed building envelope is comparable to surrounding buildings. The Global Switch Sydney 1 roof will also remain visible from these locations.
- GSS2 will have minimal impact on the views from the Tumbalong Park area of Darling Harbour as views to the site are screened by mature trees and the Sydney Exhibition Centre.
- GSS2 will not impact the views from Bathurst Street and Bathurst Street pedestrian bridge link as the Darling Walk Redevelopment complex, currently under construction, will block views to the proposed building.

6.3 ESD Initiatives

One of the key initiatives being implemented by Global Switch is Trigeneration, which consists of generating electricity on-site and utilising the heat by-product of the electricity generation to power absorption chillers and some heating. For GSS2 to function efficiently, the primary energy source for the site will be natural gas that will be supplied via an augmentation of the existing pipework infrastructure surrounding the site. In addition to the use of natural gas as the primary fuel source, the building will house an on-site energy storage capability which will consist of underground diesel fuel storage tanks which service the buildings back up diesel generators which provide emergency backup in case of gas network and electricity grid connection failure.

There are a number of advantages in using Trigeneration, namely:

- The fuel source is natural gas so the CO₂ emissions are much lower compared with coal typically used in NSW to generate grid electricity. This would save approximately 45% of the CO₂ emissions. This would equate to a saving of 123,000 tonnes of CO₂ per year equivalent to the CO₂ produced by 42,000 cars.
- Excess power generated from the new extension's operations is proposed to be delivered to the existing Global Switch Sydney 1 facility, thus providing further reductions to the load on the power grid and subsequently reducing greenhouse gas emissions even further.



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- The heat produced by the gas plant is used to drive absorption chillers saving the relatively large electricity use associated with electric chillers. For Global Switch this amounts to several Megawatts in power savings of grid electricity.
- As the electricity is generated on-site there are no transmission losses with Zero impact on the already stretched EA power grid and a significant reduction in peak local power demand requirements.

All wastewater will be collected on site, treated and reused to reduce water usage. The proposal includes on-site rainwater / plant water harvesting and recycling and on-site sewage/black water storage, treatment and re-use.

The design and installation of this facility will be in accordance with Department of Environment, Climate Change and Water (DECCW) guidelines and requirements. In particular this facility will comply with the NO_x (oxides of nitrogen) emissions limit. Refer to Appendix 9.11 for Air Quality and Green House Gas Assessment.

In addition to the above world leading ESD initiatives, Global Switch's proposed large consolidated and centralised facility provides economy of scale benefits such as greater operational efficiency and reliability. The alternative of providing multiple, smaller data centre facilities that are commonly found within standard commercial office developments would use up to twice the energy of the same sized area provided in a large centralised data centre. This is primarily due to the ability to use larger, more efficient systems to meet the power and cooling requirements. The overall number of redundant systems is also significantly reduced. Overall, Global Switch's large consolidated facility is 2 to 3 times more efficient than multiple small data centres.

Currently the City of Sydney is a participating in the 'C40' group, which is a group of cities committed to significant progress in stemming emissions and tackling climate change. This project is wholly in line with the aims and objectives of this group and would provide an outstanding testimonial to this initiative.

The proposed development would significantly assist the City of Sydney with their Sustainable Sydney 2030 Strategic Plan which targets a 70% reduction in greenhouse gas emissions by 2030 from current emissions. (30% reduction by 2020 from 1990 levels; 70% reduction by 2050 from 1990 levels). The project is also in line with the City of Sydney's vision to develop Green Transformers comprising of co-generation, water recycling and waste-to-energy, to be located in new urban renewal projects and in existing parts of the City.

The building design will be specifically tailored to cater for the range of specialist equipment and plant required to operate the proposed trigeneration system and other sustainable design initiatives. Floor to floor heights required to house trigeneration plant are required to be in the order of 9 metres as are roof plant areas. This requirement coupled with the data centre's higher than normal 5.5 metre floor to floor height requirements will necessitate some flexibility in overall building envelope height.

A variation to the original Master Plan overall building heights is sought to facilitate the above environmentally sustainable project initiatives as well as the building's specialised data centre functions and usage. Overall building form will be in keeping with the Existing Global Switch Sydney 1 facility and will provide a suitable transition of scale from the existing Goldsbrough Mort building to the existing Bullecourt building.

The ESD measures have been extensively investigated by the consultant team who have the benefit of intimate knowledge of the site and Global Switch's unique technical and operational requirements and are uniquely qualified to meet the complex technical challenges presented by the ground breaking innovative project.

The technical detail of the ESD measures is outlined in Aurecon's report at Appendix 9.10.



6.4 Transport, Accessibility & Car Parking

In accordance with the Director-General's Requirements, the impact of traffic generation, access, adequacy of car parking and servicing arrangements has been assessed by Transport and Traffic Planning Associates for this project. Their detailed report findings are attached at Appendix 9.12.

The Traffic Study notes that the principal focus of these requirements is to ensure that travel by private motor vehicle is minimised and that travel by public transport, walking and cycling is facilitated. In this regard, it is noted that:

- only 12 parking spaces are provided for a total gross floor area of 22,258 m²;
- the site is ideally located with convenient access to bus, light rail, monorail and ferry services;
- the metropolitan rail system is easily accessed by walking or use of one of the other transport services;
- the site is within easy walking distance of the CBD and high density residential areas; and
- walking and cycling is made easy by the existing facilities on the site frontage and nearby.

As such, the proposed development will only generate very minor traffic movements (ie less than 10 vtp/h in the peak periods) and therefore the impact on the road system serving the site will be quite imperceptible.

The proposed parking and servicing provisions will be quite adequate and appropriate and will reflect the ease of access and use of the public transport services.

The design of the vehicle access, internal circulation and servicing arrangements will comply with the relevant design standards.

Their findings and response to the DGRs are summarised as follows, namely that the development will:

- not present any unsatisfactory traffic capacity, safety or environmental related implications
- incorporate a suitable and appropriate parking provision for the nature of use
- incorporate suitable vehicle access, internal circulation and servicing arrangements
- make appropriate provision for cyclists, pedestrians and disabled drivers.

6.5 Excavation & Construction

Adequate measures will be employed to ensure that construction work is undertaken in a manner which minimises noise, disturbance or other environmental effects on surrounding Ultimo properties and businesses.

A Construction Site Management Plan (CMP) has been prepared by Global Switch to ensure that work undertaken during the construction phase implements appropriate measures for public safety, site security, noise and dust management as well as matters relating to waste disposal and traffic management. Refer to the plan is attached at Appendix 9.17 for more details.

6.6 Heritage & Archaeological Impacts

In accordance with the Director General's Requirements, Heritage and Archaeological Impacts have been given due consideration as key issues. The respective findings of the consultants are discussed below.



6.6.1 Archaeological Impacts

A Baseline Archaeological Assessment has been prepared by Austral Archaeology Pty Ltd as a means of defining the level of archaeological potential of the site. The Report analysed the site's history, geotechnical information as well as previous investigations of sites in the vicinity. The potential cultural, aboriginal and archaeological significance of the site was then assessed on the basis of historical information and data available.

For details of the consultant's investigations, refer to their report attached at Appendix 9.14. In summary, their conclusions and recommendations are as follows:-

Conclusion:

- *The site is not identified in archaeological zoning plan and is not a State or locally listed item;*
- *Historical and physical evidence indicates that the site has been substantially modified and is unlikely to retain archaeological potential for pre 1915 occupation of the site;*
- *The site is unlikely to reveal further information that would contribute to the significance of the site or the area;*

Recommendations:

1. Historical archaeology

In the event that archaeological resources not predicted in this assessment are unearthed during any stage of the development, work in the immediate vicinity is to cease and an archaeologist contacted to make an assessment of the find. Consultation with the Heritage Branch and further assessment may be required prior to works progressing on site. Further research may be required. It should be noted by the Client that further research and an application for an excavation permit would delay construction schedules.

2. Aboriginal archaeological values

In the event that objects pertaining the Aboriginal cultural values are unearthed during any stage of the development, works must cease and an archaeologist contacted to make an assessment of the find. Consultation with the Department of Environment, Climate Change and Water may be required prior to works progressing on the site. Aboriginal objects and/or sites are protected by the National Parks & Wildlife Act 1974 and cannot be destroyed without a permit. It should be noted by the Client that further research and an application for an excavation permit or permit to destroy would delay construction schedules.

6.6.2 Heritage Impacts

A Statement of Heritage Impact (HIS) prepared by Graham Brooks and Associates, is submitted with this project application, the objective of which is to analyse the overall heritage impact of the proposal in relation to the provisions of the Environmental Planning Instruments specified in the DGRs and the guidelines of the NSW Department of Planning.

The significant conclusions of the heritage study are as follows:-

- *The subject site is not listed as an item of heritage on any statutory list.*
- *It is in the vicinity of the listed heritage items below, however it is concluded that the proposal will have no adverse impact on the heritage significance of the established significance of the following items:*
 - *Darling Harbour Rail Corridor*



- Elder Smith Goldsborough Mort No 1 Woolstore
- Ultimo Heritage Conservation Area

There is no statutory requirement, in any of the EPIs applying to the subject site, for the assessment of heritage impact on items in the vicinity of the development to be addressed.

On this basis, the HIS recommends that the consent authority should have no hesitation, from a heritage perspective, in approving the project application.

For detailed findings of the HIS, refer to the accompanying report attached at Appendix 9.15.

6.7 General Environmental Risk Analysis

6.7.1 Geotechnical Issues & Contamination

A geotechnical investigation has been undertaken on the site by Jeffery & Katauskas P/L which included borehole testing. Their report summarises the investigation and makes recommendations regarding geotechnical issues to be further considered in the design, planning and construction of the development including matters such as vibration and groundwater.

Details of the findings and recommendations are attached at Appendix 9.13.

As previously stated in Section 5.2.3, advice from Jeffery & Katauskas P/L confirms that borehole logs from the geotechnical investigation indicate only minimal areas of soil, with the site being predominantly sandstone bedrock exposed by previous excavation work. It is therefore reasonable to assume that whilst no analysis has been undertaken to date, the geotechnical report recommends that any soil that requires disposal off-site be classified and tested for contamination as part of the construction programme, prior to commencement of excavation on site.

6.7.2 Relocation and Protection of Existing Infrastructure

Matters relating to infrastructure services are discussed in Aurecon's report at Appendix 9.10.

6.7.3 Noise, Vibration & Dust Emissions

Matters relating to operational noise resulting from GSS2 have been addressed by Aurecon in their report at Appendix 9.9 and Section 6.12.

In terms of noise, vibration, and dust emissions during construction, this has been broadly addressed by Global Switch in their Construction Management Plan attached at Appendix 9.17.

Parsons Brinckerhoff have assessed in detail the main impacts on air quality during the construction phase. In their report attached at Appendix 9.11 they have stated that *"the main impacts during this phase of the Project would arise from dust and combustion emissions during the construction of the Project. These potential impacts have been assessed qualitatively. This Technical Paper proposes comprehensive mitigation measures to minimise impact on the receiving environment. Implementation and adherence to these measures would ensure that potential impacts would not be significant"*.

The report at Appendix 9.11 includes more detail on emission impacts during the construction and operational phases along with recommended mitigation measures.



6.7.4 Hazardous Materials

The potential storage of hazardous materials on site was a matter for investigation by Aurecon. These relate to environmental risks associated with diesel contamination, gas and diesel engine emissions as well as natural gas. This issue has been addressed in Section 8.3 of Appendix 9.10.

6.7.5 Drainage & Flooding

Matters relating to hydraulic services are discussed in Section 7 of Aurecon's report at Appendix 9.10.

6.7.6 Air Quality & Greenhouse Gas Impact Assessment

Parsons Brinckerhoff have assessed the potential impacts of emissions arising from the construction and operational phases of the data centre. An executive summary of their investigations is as follows:-

This Technical Paper assesses the potential emissions from construction and operation of a proposed data centre at 273 Pyrmont Street, Ultimo, Sydney comprising of 9 gas turbines (trigeneration units) and 27 diesel fired engines (the 'Project').

The assessment has been undertaken in accordance with the guidelines presented in the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, DEC 2005.

Construction phase

The main impacts during this phase of the Project would arise from dust and combustion emissions during the construction of the Project. These potential impacts have been assessed qualitatively. This Technical Paper proposes comprehensive mitigation measures to minimise impact on the receiving environment. Implementation and adherence to these measures would ensure that potential impacts would not be significant.

Operational phase

Site-specific background data was not recorded at the project site. Hourly ambient air quality data (NO₂, O₃, CO and PM₁₀) for 2006 at the air monitoring station in Rozelle was provided by DECCW. With the exception of one 24 hour PM₁₀ and one 4-hour maximum O₃ exceedance, all parameters were below the relevant air quality goals. Ambient air quality data recorded at Tumbalong Park at Mary Ann Street in Darling Harbour were also presented for comparison purposes.

A dispersion modelling assessment was undertaken to predict the impact of emissions from the Project on the receiving environment. Maximum predicted levels were modelled for NO_x (as NO₂) from the Project during continuous operation. Using the OLM approach, the results indicated that the estimated NO₂ concentrations will comply with the adopted 1-hour average DECCW goal of 246 µg/m³ and annual average NEPM goal of 62 µg/m³ respectively at all sensitive receptors assessed.

Sensitive receptors were assessed at ground level and at varying heights above ground level (agl) to a maximum height of 40 metres agl at the Goldsbrough apartments. The highest predicted hourly NO_x concentration of 189.6 µg/m³ occurs at Receptor 7 (Goldsbrough Apartments) at a receptor height of 40 metres. The apartments are located approximately 50 metres north of the Project.

Emissions from the diesel engines were not assessed quantitatively in this Technical Paper. They will only be in operation for 1 hour per month for testing purposes and in the unlikely event of gas and electrical network failure.

A quantitative assessment of the likely greenhouse gas emissions during operation of the Project was undertaken to determine the carbon intensity of gas and diesel fuel usage at the proposed site.



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Mitigation measures for the operational phase have been proposed to ensure air quality impacts are minimised.

In summary, predicted emissions from the project are not expected to result in adverse impacts on the receiving environment during continuous operation of the gas reciprocating engines, including all considered sensitive receptors within the receiving environment.”

For details of Parsons Brinckerhoff findings and their recommended mitigation measures for the construction and operation of the data centre, refer to Appendix 9.11.

6.8 Utilities and Services

In accordance with the Director-General's Requirements, the supply and demand of utilities has been adequately investigated as part of the design process.

Aurecon's report at Appendix 9.10 addresses the requirements of the development in terms of utilities and services needs, and outcomes of the various services investigations.

6.8.1 Integrated Water Management Plan

This matter has been addressed in Section 7 and 8 of Aurecon's report at Appendix 9.10.

6.9 Consultation

In order to inform the local community of the data centre project, a consultation programme was initiated by Global Switch. The community consultation plan provides for:-

- The identification of individuals and organisations likely to have an interest in the project;
- Identified individuals and organisations to be consulted appropriately and across a variety of methods;
- Feedback received from the consultation process to be recorded and analysed; and
- Collation of feedback into a report for consideration in the final decision making processes

The stakeholder and community consultation plan and programme as well as distribution material and brochure are attached at Appendix 9.8.

At the time of lodgement of this Environmental Assessment Report, the initial consultation programme has been completed which has included:-

- Letter box drop to local area advising of upcoming community consultation process.
- Letters to special interest groups such as local resident action groups.
- Display panels erected at public locations to inform the general community
- Briefing discussion between community group representatives and the proponent and its consultants

The community feedback has been considered and the issues raised by the public are documented at Appendix 9.8 along with the proponent's responses to the matters identified.



6.10 Waste Management

The project will provide for the storage, collection and recycling of waste. The issue of waste management of materials during construction and operational phases has been assessed by both Aurecon and Global Switch in their respective reports at Appendices 9.10 and 9.17.

6.11 Accessibility

Accessibility Solutions (NSW) Pty Ltd has reviewed the subject development to ascertain whether the proposed facility is consistent with accessibility provisions of BCA and other regulatory controls.

Details of the consultant's accessibility review and recommendations are contained in Appendix 9.18. In summary, the access consultant concludes the following:-

The Global Sydney Switch complex and the proposed extension shall contain computer network and internet equipment and services for a wide range of clients.

The proposed extension illustrates the majority of floor space to be occupied by technical computer and communications equipment and air-conditioning plant, with small areas allocated to:

- *Ground floor reception and meeting rooms.*
- *Central lifts (2 passenger & 1 goods lift) and sanitary facilities on each primary level (excluding mezzanine equipment levels).*
- *Second floor corridor link to the existing Global Switch offices at the Harris Street entry level.*
- *Third floor ramp link to the existing Global Switch level 1 offices.*
- *Ground level (Pyrmont Street) loading dock and parking.*

With respect to access for people with disabilities the development proposes the following:

- *The Pyrmont Street entry to the reception/waiting area shall provide appropriate access in accordance with the BCA and Council's Access DCP.*
- *The building proposes three (3) central lifts that will travel to all levels including the roof-top breakout area.*
- *The first and second floors shall provide ramp access to the existing offices within the adjoining Harris Street building.*
- *The on-site parking shall include a 3800mm width bay accessible space in accordance with Council's Access DCP, AS2890.1 and Part D3.5 of the BCA.*
- *With respect to sanitary facilities the development shall detail at least one (1) unisex accessible toilet designed to comply with AS1428.2 at construction certificate stage to satisfy Part F2.4 of the BCA and Council's Access DCP.*

In summary, the proposed principal entrance, lift access to all levels and inclusion of ramps to the existing offices in the adjoining building shall provide appropriate access into the premises and thereby comply with AS1428, AS1735.12, Council's Access DCP and Parts D3.2 and D3.3 of the BCA.

Other aspects of the development application regarding the accessible toilets, entry doors, tactile and Braille signage, ramp construction details and the like will be confirmed at CC stage to ensure compliance with AS1428.1, AS1428.2 (relevant aspects), AS1428.4, AS1735.12, AS2890.1 to satisfy Parts D3.2, D3.3, D3.6, D3.8, E3.6, F2.4 of the Building Code of Australia (BCA) and Council's Access DCP.



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Overall, the abovementioned extension shall enable appropriate access to and within the development in a manner that will comply with Council's Access DCP and Part D3, E3.6, F2.4 of the BCA.

6.12 Acoustic Impacts

Aurecon Australia Pty Ltd have been engaged to conduct an environmental noise assessment for the proposal. Their findings are summarised as follows:-

"An environmental noise assessment has been carried out as part of the Part 3A submission for the proposed Global Switch 2 development at 273 Pyrmont Street, Ultimo NSW. The noise survey carried out on site showed very high traffic noise levels from the Western Distributor which dominated the existing noise environment during all periods of the day. The driving assessment criterion of Leq 49 dBA during night time applicable to residential receivers at street level and below the Western Distributor height was developed as per the NSW Industrial noise policy.

The development will contain numerous major noise sources such as:

- *Roof mounted cooling towers*
- *4 MW Gas engines*
- *1,500 kW Diesel engines*
- *UPS systems*
- *Transformers*

All of these noise sources have the capacity to be operating 24 hours a day 7 days a week with the total noise emissions from the site needing to satisfy the aforementioned criteria. Noise attenuation measures are outlined in more detail in Section 7 and include:

- *Equipment specification*
- *Equipment arrangement, discharge and intake locations*
- *Incorporation of inlet and outlet attenuators to roof mounted cooling towers*
- *Engine and plant room acoustic wall and façade specifications controlling noise breakout*
- *Air intake and exhaust duct specification, plenums and in-duct sound attenuators for gas and diesel engines*
- *Acoustic barriers to transformers*

Through the implementation of these attenuation measures, overall noise levels emitted from the site will satisfy the applicable criteria. A further more detailed review including a SoundPLAN environmental noise model of the specified attenuation measures should be carried out by an Acoustic Engineer in conjunction with the Building Services Engineers during the design development stage of the project when more accurate specification of the required equipment will be known, along with the specific sound power emission data and physical size of all of the proposed equipment.

No specific noise insulation requirements are required outside of standard external construction to attenuate traffic noise from the viaduct due to noise sensitive internal spaces being located along the perimeter of the development"

Aurecon's detailed findings are attached at Appendix 9.9.



6.13 Construction Site Management Plan

A Construction Management Plan (CMP) has been prepared by Global Switch, a copy of which is enclosed at Appendix 9.17. Essentially the CMP addresses construction procedures and measures relating to public safety, amenity, site security, hours, noise, vibration, air and dust management, sediment control, traffic management and material handling.

Parsons Brinkerhoff in their Air Quality & Greenhouse Gas Impact Assessment suggested various safeguards to be incorporated into a construction environmental management plan, which would minimise impacts on air quality. Their recommended conditions are detailed in Section 10.1 of their report at Appendix 9.11.

6.14 Social & Economic Impacts

In line with the global trend toward climate change awareness and specifically, in response to our client's corporate sustainability goals, Global Switch is committed to incorporating a range of world leading environmentally sustainable design initiatives within the new facility. Global Switch Sydney 2 will meet the highest environmental rating for any data centre anywhere in the world.

The total project cost to extend the existing Global Switch facility is anticipated to be in the order of \$198 million. This will increase to several hundred million dollars as the specialist data and technical fitout of the building occur by our tenants. From an economic viewpoint, the upgraded and expanded facilities are anticipated to attract hundreds of millions of dollars worth of business investment into NSW and the Sydney CBD. In doing so, this development will have both direct and indirect impacts on employment opportunities.

It is anticipated that the project will provide significant benefits to the State, including the following:

- Hundreds of millions of dollars worth of new investment to Sydney.
- Addressing a critical shortage in Sydney's IT infrastructure capability, helping to reinforce Sydney and NSW as a global financial and IT hub.
- The creation of several hundred jobs during the construction and fitout phases of the facility, over a 2-3 year period, plus on-going employment opportunities in our tenant areas.
- The indirect creation of additional long term jobs and employment opportunities within the Sydney region,
- The creation of one of the world's first benchmark, environmentally responsible Data Centre facility.
- A facility with the power generating capacity able to run fully independent from the grid.

From a community perspective, the project will be beneficial by virtue of the ESD initiatives as well as the revitalisation of this disused street block.

6.15 Public Interest

It is Global Switch's position that the proposed energy saving initiatives, improvements to the public domain, employment generation and critical infrastructure services offered by GSS2 will benefit Sydney's wider community. The ESD measures will minimise the energy demands placed on Sydney's infrastructure services.

Global Switch intends to promote the GSS2 as a showcase facility in its global portfolio, which will benefit the state of NSW and promote the international status of Sydney.



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The GSS2 site has stood as a disused wasteland in the Darling Harbour precinct for many years. It is considered that the general public would welcome the opportunity to replace this unsightly land parcel with an iconic building that completes the western edge of the Darling Harbour precinct.

This report in conjunction with other documentation submitted justifies that the proposal will not pose any significant adverse environmental effects on the surrounding area.

All these factors combined, will be in the broader public interest.

6.16 Justification for proposal

Global Switch Sydney 1 in Harris Street, Ultimo has provided the Sydney CBD with a world class, secure data storage facility for the past 8 years. As a global city at the forefront of the Australian economy, Sydney is a targeted location for the expansion of Global Switch's infrastructure. The creation of a new state of the art data centre facility provides an opportunity to attract Australian and internationally based companies to set up their IT business operations in NSW. The project also facilitates the retention and expansion of current business operations in the region.

The vacant, disused site in Pyrmont Street strategically adjoining GSS1 provides Global Switch with a unique opportunity to expand into a single consolidated data centre, in preference to the alternative development option of multiple smaller, more disparate centres, which is significantly less efficient in terms of energy requirements.

As explained, the building envelope is dictated by the spatial requirements of the complex technical functions and the ambitious ESD features. The architectural design strives to integrate new ideas, proven technologies and sustainable initiatives encapsulated in a cutting edge façade, which will serve as a visual inspiration to Sydneysiders.

The proposal is generally consistent with relevant State and Regional Environmental Planning Policies that apply to the site and other relevant legislation. This report has satisfactorily addressed issues of concern highlighted in the Director General's requirements. In addition, detailed arguments are provided throughout the report justifying the reasons for varying from certain provisions contained within the original Master Plan Strategy.

At the time the original Master Plan Strategy was formulated, it was envisaged that an independent commercial style building would be erected on the GSS2 site. However, only two years after the commencement of the MPS, the former GPO site was approved as suitable for occupation as a data centre. Over a decade has now passed since the original Master Plan Strategy's inception and the subject site is now the last remaining within the MPS area to be developed.

The technical built form requirements of a data centre are uniquely different to the standard commercial building envelope previously envisaged. Given the changing circumstances, flexibility is now sought in regard to a number of provisions contained in the MPS. Whilst the scheme embraces the intent of the Master Plan, a purpose built data centre requires a creative building solution that may potentially be at odds with various provisions in the MPS. Hence, the project seeks variations to height, floor space, building footprint, visual and pedestrian links, all of which are considered worthy of support on the grounds that:-

- The building envelope reflects the spatial requirements of the building's sophisticated functions, which Global Switch intend to promote as a showcase facility in its global portfolio;
- The GSS2 building will preserve views of the upper levels of GSS1, with a stepping up effect;
- The proposed new building form will not alter the skyline of the western Darling Harbour escarpment;



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- There is a transition in building height maintained between Bullecourt and Goldsbrough Mott developments;
- Whilst operating as a single facility under the one ownership, the GSS1 and GSS2 buildings will read visually as separate, complimentary yet contrasting buildings;
- The provision of a visual and pedestrian link between the two sites is not feasible as the buildings are high security premises, physically and operationally linked. Also, both premises are virtually uninhabited but for technical and plant equipment. A through-site pedestrian link is not considered justified or desirable from a pedestrian safety perspective. As an alternative, Global Switch will upgrade the public domain adjoining the Pyrmont Street frontage thereby enlivening and encouraging pedestrian movement along this currently inactive and underutilized frontage.

It has been demonstrated that the built form and height satisfactorily connects with the surrounding area and the adjoining GSS1 data centre. The visual analysis compares the desired building envelope under the MPS to that proposed, and demonstrates that the departure is satisfactory in the context of its setting and the surrounding area. The building design and site layout is functional and responsive to the specialised requirements of a technical data centre, whilst respecting the dynamic CBD environment in which it sits.

This ambitious project has been the subject of an extensive and consultative design process and investigations over time. Relevant technical reports have been submitted demonstrating that the proposal does not give rise to any significant adverse impacts on the surrounding locality. Where potential impacts are identified, these matters will be dealt with through ameliorative measures as recommended by the team of consultants, some of which will be addressed through the Draft Statement of Commitments.

This strategic location demands a building that will visually engage with the CBD. Whilst not a building that reacts with the outside world, Global Switch Sydney 2 will be recognised for its unique form and fabric and will stand as a visual icon on the CBD landscape.

It is considered therefore that the proposal is worthy of support.



7 Draft Statement of Commitments

The following Draft Statement of Commitments outline appropriate mitigation measures that Global Switch commit to undertake to safeguard against any potential environmental impacts that may result during construction and operational stages of the Data Centre project.

1. Documentation

The development will be undertaken generally in accordance with architectural and landscape drawings prepared by DEM (Aust) Pty Ltd and all documentation appended to this Environmental Assessment report dated February 2010, listed as follows:

- Architectural Drawing Nos. ar--cv00 revB01, ar—0200 revB01, ar—1200 revB01, ar--1201 revB01, ar--1202 revB01, ar--1203 revB01, ar--1204 revB01, ar--1205 revB01, ar--1206 revB01, ar--1207 revB01, ar--1208 revB01, ar—1209 revB01, ar--1210 revB01, ar--1211 revB01, ar--2100 revB01, ar--2101 revB01, ar--2102 revB01, ar--2103 revB01, ar--2500 revB01, ar—2501 revB01, ar—5000 revB01, ar—5001 revB01, ar—5002 revB01, ar—5003 revB01.
- Landscape Drawings Nos. la--cv00 revA02, la--0201 revA02, la—0501 revA02, la—0502 revA02, la—3301 revA02.
- Landscape Maintenance Strategy dated February 2010.
- Signage Plan ar-5003 prepared by DEM (Aust) Pty Ltd.
- External Finishes Schedule prepared by DEM (Aust) Pty Ltd.
- Part 3A Acoustic Report, Ref: 36148-013-01, dated 29 January 2010 Rev 01
- Engineering Response Report, Ref: 36148/3.8 dated 15 March 2010 Rev 4.
- Air Quality & Greenhouse Gas Impact Assessment dated February 2010 Rev00
- Assessment of Transport, Traffic & Parking Implications Ref 0953 dated February 2010
- Geotechnical Investigation Report Ref: 22706VTrpt dated 23 April 2009.
- BCA Assessment Report No. 1321-15 Rev 02 dated 17 February 2010.
- Construction Management Plan
- Access Report dated 19 February 2010

2. Lot Consolidation & Easements

Easements and restrictions as to user affecting Lots 3 and 12 in DP 632526 will be extinguished and relocated, where necessary.

3. Acoustics

All appropriate recommendations and commitments detailed in the Part 3A Acoustic Report prepared by Aurecon, Ref: 36148-013-01, dated 29 January 2010 Rev 01 will be implemented.

4. Utilities & Services

All appropriate recommendations and commitments detailed in the Engineering Response to Director General's Requirements Report, Ref 36148/3.8 dated 15 March 2010 Rev 4 will be implemented, in relation to the following services:-

- Electrical
- Telecommunications
- Security



- Mechanical
- Fire
- Hydraulic

5. Emissions

All mitigation and management measures recommended in Section 10.2 of Air Quality & Greenhouse Gas Impact Assessment dated February 2010 Rev00 to control emissions in the operation phase of the data centre will be implemented.

6. Traffic & Parking

Access, servicing and parking arrangements will be undertaken in accordance with the architectural drawings and Assessment of Transport, Traffic & Parking Implications Report prepared by Transport & Traffic Planning Associates, Ref 0953 dated February 2010.

7. Geotechnical

Recommendations contained within the Geotechnical Investigation Report Ref 22706VTprt dated 23 April 2009 will be implemented.

In reference to site remediation, the applicant will implement the recommendations contained within Section 6 of Geotechnical Investigation Report Ref 22706VTprt dated 23 April 2009

8. Drainage

A detailed stormwater drainage plan will be prepared to the satisfaction of the Director General to harvest rainwater for re-use, and dispose of excess rainwater to the existing street drainage system.

9. Reflectivity

A reflectivity study to assess the impact of solar reflectivity and glare from materials of the new building façade will be prepared as part of the Construction Certificate.

10. Energy Performance (ESD)

An ESD Performance Report that investigates appropriate benchmarking for data centre facilities, as the application of NABERS Office Energy & NABERS Office Water tools are considered not appropriate for use due to protocol limitations. The report will also reference international guidelines of the U.S. Green Building Council's LEED program. This will be the basis against which the design, construction and ongoing operation phases of the building will be assessed. The elements of sustainability that will be addressed will include:

- Local planning provisions where applicable to the development type
- Energy & water efficiency measures and benchmarks
- Materials & waste minimisation
- Operational monitoring & reporting.

11. Access & Mobility

An Access & Mobility Assessment of the detailed design of the building will be prepared and demonstrate how the proposed development satisfies the following statutory and regulatory guidelines to ensure effective, appropriate and safe use by all people including those with a disability:

- AS 1428.1, AS 1428.2, AS 1428.4, AS 1735.12, AS2890.1.



- Parts D3.2, D3.3, D3.6, D3.8, E3.6, and F2.4 of the Building Code of Australia (BCA)
- Disability Discrimination Act

12. Archaeological & Aboriginal Relics

In the event that archaeological resources are unearthed during any stage of the development, work in the immediate vicinity is to cease and an archaeologist contacted to make an assessment of the find. Consultation with the Heritage Branch and further assessment may be required prior to works progressing on site. Further research may be required. It should be noted by the Client that further research and an application for an excavation permit would delay construction schedules.

In the event that objects pertaining to the Aboriginal cultural values are unearthed during any stage of the development, works will cease and an archaeologist contacted to make an assessment of the find. Consultation with the Department of Environment, Climate Change and Water may be required prior to works progressing on the site.

13. BCA

All proposed building works will comply with the deemed-to-satisfy provisions of BCA, or will be supported by an alternative solution to demonstrate compliance with the performance requirements of the BCA.

14. Waste Management

A detailed waste management plan will be prepared in accordance with the recommendations of Section 8.2.3 of the Engineering Response to Director General's Requirements Report, 36148/3.8 dated 15 March 2010 Rev 4.

15. Construction & Traffic Management

All measures and recommendations contained within the construction management plan prepared by Global Switch will be implemented in relation to the following services:-

- Public safety, Amenity and Site Security;
- Operating Hours , Noise and Vibration Controls;
- Air and Dust Management;
- Stormwater and Sediment Control;
- Waste and Materials Re-Use; and
- Traffic Management and Materials handling.

Additional mitigation and management measures relating to dust and vehicle emissions as recommended in Section 10.1 of Air Quality & Greenhouse Gas Impact Assessment dated February 2010 Rev00 will be incorporated into the construction management plan.

16. Erosion & Sediment Control

An erosion and sediment control plan will be prepared as part of the Construction Certificate and will be implemented and maintained by the Contractor responsible for carrying out the works.

17. Hours of Operation

Operational –

The Data Centre will operate 24 hours, 7 days per week.



Construction –

The construction hours, including the delivery of materials to and from the site, will be restricted as follows:

- Between 7.00 am and 5.00 pm Mondays to Fridays;
- Between 8.00 am and 1.00 pm Saturdays;
- No work on Sundays and Public Holidays.

8 Conclusion

The proposed Global Switch Sydney 2 data centre is the culmination of extensive planning, architectural/engineering design and specialist investigations, reports and design options, which has resulted in a purpose built concept that will be recognised as a world class data centre with a strong visual identity in the Sydney CBD landscape. The design reflects Global Switch's aspirations to create a commercially viable facility which also embraces the latest initiatives in environmentally sustainable development.

GSS2 is an opportunity to reverse the critical shortage of data storage facilities within close proximity to the CBD. Addressing this need is essential in attracting and retaining major investment in Sydney and ensuring the city retains its strategic importance in the Asia Pacific region.

Relevant technical reports have been submitted with this project demonstrating that the proposal does not give rise to any significant adverse impacts on the surrounding locality. Any potential adverse environmental impacts such as those which may present themselves during construction are likely to be satisfactorily managed through the implementation of adequate environmental management safeguards.

The proposal is generally consistent with the requirements of the relevant planning instruments and policies and the underlying objectives of the controls. Due consideration has been given to the original Master Plan Strategy that was prepared for the site in 2000 and the Director General Requirements. Whilst variations have been sought to certain provisions of the MPS, detailed justifications for any departures from the original strategy have been provided within this report. The uniqueness of the proposed data centre building typology demands an innovative design approach that does not comfortably fit within the design parameters set down for this site over 10 years ago which envisaged a standard commercial redevelopment of the site.

It is considered that Global Switch 2 will be a positive contribution to the City landscape and is worthy of support.