MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Ministry of Education

DESIGNING SCHOOLS IN NEW ZEALAND

Requirements and Guidelines

Version 1.0, October 2015

Document History

The table below is a record of the changes that have been made to this document:

Version	Revision Date	Summary of Changes
Version 1.0	14 October 2015	First version for general issue

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Foreword

Designing Schools in New Zealand – Requirements and Guidelines is the principal document in the Ministry of Education's (the Ministry's) national guidelines for school property design. This document has been prepared by the Ministry with input from external architects, engineers, quantity surveyors, and educationalists who work closely with schools on projects nationwide. This document seeks to give design teams a clear and consistent understanding of Ministry's requirements, guidelines and high level processes.

The requirements set out in this document are mandatory from 1 January 2016. It is important that those who lead and co-ordinate design work, including architects, project managers and Ministry staff involved with school design, are familiar with the scope and purpose of this document. The latest version of this document will always be available from the Ministry's Property web pages.

Background

The Ministry owns one of the largest property portfolios in New Zealand, with more than 30,000 buildings across approximately 2,100 school sites with a replacement value exceeding $23 billion.

The school property portfolio must support the needs of teachers and students into the future. These requirements and guidelines are designed to ensure that our schools are fit for purpose and flexible enough to be adapted to meet future needs. Designers must take a whole of life approach to cost and durability, and demonstrate that taxpayers are receiving value for money from the investment decisions made.

Requirements and guidelines

This document sets out the Ministry's requirements and guidelines for designing infrastructure on school sites. It responds directly to the many design issues and the lessons that have emerged from project reviews undertaken by the Ministry's Design Review Panel, and provides a good indication of what the Ministry's Design Review Panel is expecting to see at the various milestone reviews.

Feedback and updates

We are seeking to constantly improve the content and usability of our documentation. If anything in this document appears to be ambiguous, inaccurate or in conflict with other Ministry documents please contact the Ministry through Property.Help@education.govt.nz. Your feedback will help us to ensure that this document is maintained as a valuable resource for all of those involved in the design of our schools as effective learning environments.

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INTRODUCTION

Designing Schools in New Zealand - Requirements and Guidelines sets out the Ministry of Education's expectations for developing school property projects.

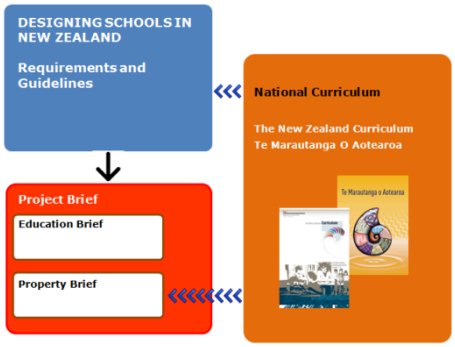
MINISTRY PROPERTY OBJECTIVES

The Ministry's investment objectives for property are set out in The New Zealand School Property Strategy 2011-2021

Designs for education buildings must be:

- **Efficient** in form and operation. They should be of consistently high quality, regular shape, and efficient to construct and maintain.
- **Durable**, resistant to wear and tear, and must not require extensive maintenance.
- **Cost effective** over the whole life of the building, while providing the high levels of amenity required of flexible learning and support space.

DESIGN GUIDANCE



The Ministry has developed a number of guidance documents for design teams. These include the overarching framework Designing Schools in New Zealand – Requirements and Guidelines and project specific Project Brief. Both are informed by and are responses to the National Curriculum.

Designing Schools in New Zealand – Requirements and Guidelines has two parts. **Part A** establishes an overview of the delivery process and identifies programme objectives, compliance requirements, outputs and deliverables for school projects. **Part B** establishes the design principles for working on school property. It forms the critical link between the National Curriculum and the design of environments that will support the learning outcomes to which it aspires. It sets out the Ministry's expectations for designing both learning spaces and the broader school environment.

National Curriculum

Composed of The New Zealand Curriculum and Te Marautanga o Aotearoa, the National Curriculum sets the direction for learning and provides guidance for schools as they design and review their curriculum.

Both the English and Māori medium documents start with a vision of young people developing the competencies they need for study, work and lifelong learning, so they may go on to realise their potential. The design of teaching and learning environments must support this vision.

Project Brief

The Project Brief is prepared by the Ministry and the school board of trustees, and is customised for each project. There is a template for the Project Brief available from the Ministry's Property web pages.

It sets out the initial briefing requirements and will be issued to design teams. It comes in two sections:

A. The Education Brief is prepared by the board of trustees with assistance from the Ministry Project Lead.[1] It sets out its aspirations for the project along with key information about the character of the school, how it operates, and how it sees the link between pedagogy and learning space. If available, the education brief will be provided by the Ministry Project Lead to the successful design team before design work begins on the project.

B. The Property Brief is prepared by the Ministry and sets out the specific requirements for the project, including:

- High level information
- Project scope
- Roles and responsibilities
- Project programme
- Project handover documentation required
- Compliance documents
- Project information
- Roll projections
- Project budget

The project specific property brief is included in the package to the design team at the time that submissions for consultant services are sought.

PRECEDENCE OF DOCUMENTS

Should any ambiguity or contradiction occur between the Design Guidance Suite documents on individual aspects of briefing then Designing Schools in New Zealand – Requirements and Guidelines takes precedence over the Project Brief. Within the Project Brief, the property brief takes precedence over the education brief.

[1] Ministry Project Leads have different titles depending on the area of the Ministry in which they work. These may variously include Project Manager, Delivery Manager, Case Manager, Regional Property Adviser or School Property Adviser.

A

PROCESS AND COMPLIANCE REQUIREMENTS

1. BACKGROUND

Part A of the **Designing Schools in New Zealand – Requirements and Guidelines** provides an overview of the school's entitlement to property and existing information on the school site. It identifies the project delivery process, portfolio strategy objectives, compliance requirements, outputs and deliverables for school projects.

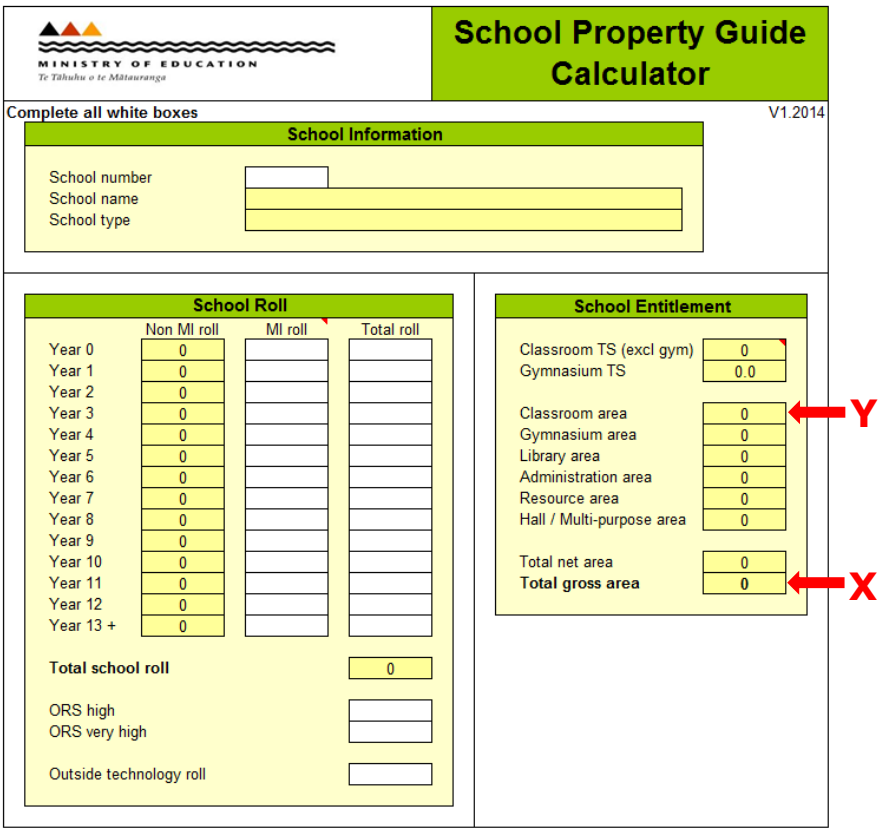
These guidelines outline the general requirements for all school infrastructure projects and are mandatory for Ministry-run projects. Specific **Project Brief** will identify requirements and processes specific to that project, its value and funding sources.

2. SCHOOL PROPERTY ENTITLEMENT

A school's space entitlement to Ministry-funded property is based on its roll. The School Property Guide (SPG) Calculator calculates the school's total net and gross area entitlement. The calculator also provides an area break-down for specific parts of the school (e.g. administration area). The total gross area should be viewed as an envelope of property within which the school can decide the appropriate mix of area types.

The School Property Guide Calculator

The school's entitlement will be shown in the Project Brief in a table similar to the following:



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School Property Guide Calculator

Complete all white boxes — V1.2014

School Information

School number	
School name	
School type	

School Roll

	Non MI roll	MI roll	Total roll
Year 0	0		
Year 1	0		
Year 2	0		
Year 3	0		
Year 4	0		
Year 5	0		
Year 6	0		
Year 7	0		
Year 8	0		
Year 9	0		
Year 10	0		
Year 11	0		
Year 12	0		
Year 13 +	0		
Total school roll			0
ORS high			
ORS very high			
Outside technology roll			

School Entitlement

Classroom TS (excl gym)	0
Gymnasium TS	0.0
Classroom area	0
Gymnasium area	0
Library area	0
Administration area	0
Resource area	0
Hall / Multi-purpose area	0
Total net area	0
Total gross area	**0**

Y

X

The Project Brief will identify a number of school roll iterations that will form the basis of the master plan and of the project specific work. These are likely to include:

Master plan or final roll - the design roll for the school at capacity.

Build or interim roll - the roll that forms the basis of this specific project.

Current roll - the roll at the last roll return period.

The SPG table identifies entitlement net area allocations based on student roll projections which are then converted to a total gross area allocation (Net x 1.3) [shown as **X** on the SPG Calculator above].

Designing to entitlement

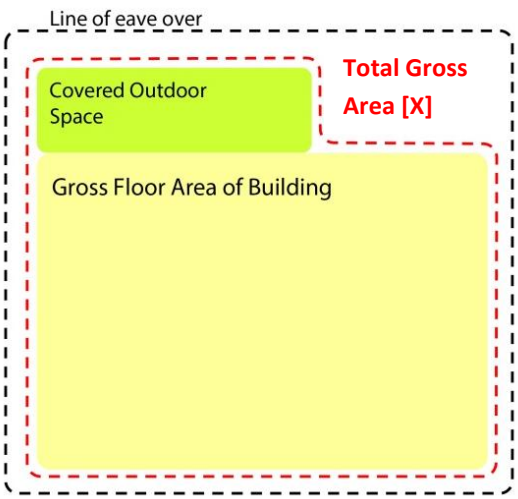
The total gross area must be designed for and built, within the following framework.

The net 'teaching and learning' area (SPG Category 'Classroom area' [shown as **Y** on the SPG Calculator above]) must be delivered for teaching and learning purposes.

Other SPG net area allocations can be redistributed for other purposes with the agreement of the school and the Ministry. (These allocations must be noted on the Property Management Information System (PMIS) plan under their original category to help audit.)

The area difference between gross and net area can be used with some flexibility to provide for areas such as circulation, learning streets, breakout spaces or bag storage, indoors or outdoors. Decisions should be influenced by environmental and climatic considerations and options should be discussed with the school and Ministry through the Ministry Project Lead**.**

This area difference can be used as follows: The teaching and learning net to gross area difference



[**Y** x 0.3] can be used for additional indoor learning, or covered external outdoor learning, covered external circulation, or covered external bag storage areas where:

- (Gross Floor Area (GFA) of the building) + (GFA of covered outdoor space) ≥ (Total Gross Area (TGA) allocation [**X**]).
- The net to gross area difference from all allocations can be used to provide additional teaching and learning space.
- The net and gross area from allocations, other than teaching and learning, can be used to provide ancillary

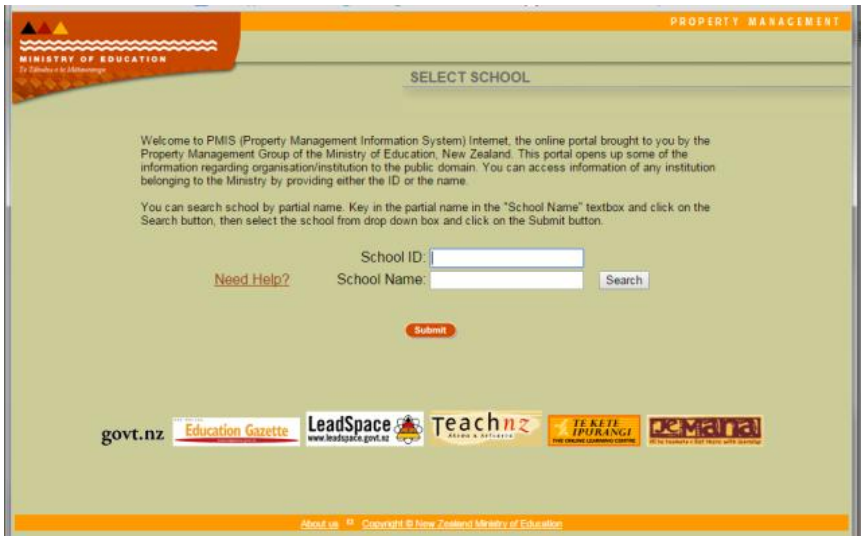
student social areas and cafeterias as long as they are well connected to and visible from learning areas.

See Part B Section 6.1 for commentary on priorities for space.

3. INFORMATION ON EXISTING SCHOOL PROPERTY ASSETS

Records of a school's existing building and property stock is recorded on Ministry's Property Management Information System (PMIS). This allows access to records relating to:

- data on existing buildings including area breakdowns, active and completed projects,
- building age and cladding materials,
- teaching space entitlement, and
- Property Maintenance Grant (PMG).



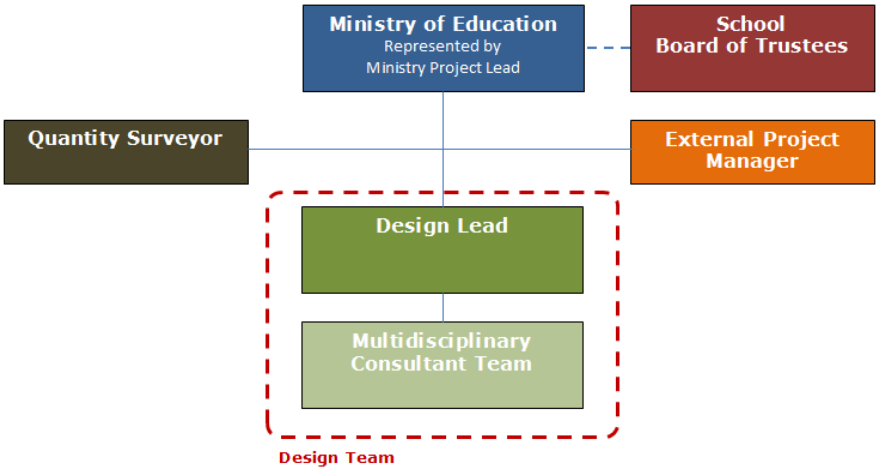
Diagrammatic site plans of school sites identifying buildings listed on PMIS are not yet available online and should be included in the Project Brief.

Before relying on information in PMIS the design team should confirm the accuracy of the information with the Ministry Project Lead.

4. PROJECT DELIVERY STRUCTURES

Project structures have common attributes regardless of type and scale. Projects will range from completely new schools on green field sites, to major projects on existing school sites, to less extensive alterations to existing buildings on existing school sites.

Project structures for Ministry-run projects are likely to be configured as set out in the chart below, but specific project team structures and reporting responsibilities will be outlined in the project specific Project Brief.



The Ministry will be represented by the Ministry Project Lead. In partnership with the school board of trustees, the Ministry project lead will prepare the specific Project Brief for the project. New schools are unlikely to have boards of trustees or management teams at this point, but may have an Establishment Board of Trustees.

The Ministry may appoint an external project manager and an independent quantity surveyor. The quantity surveyor will advise and report to the Ministry directly on matters affecting cost, programme and risk in relation to the project.

The external project manager will usually assist the Ministry to appoint a Design Lead and a design team. The Design Lead may be a design build contractor or an architect.

The appointment of the Design Lead will typically include their multidisciplinary consultant team, providing the specific skill sets required for that project. The design team is likely to include the architect, structural and geotechnical engineers, building services and fire services consultants.

Board of trustees-run projects may be configured under different structures. Check with the specific board of trustees.

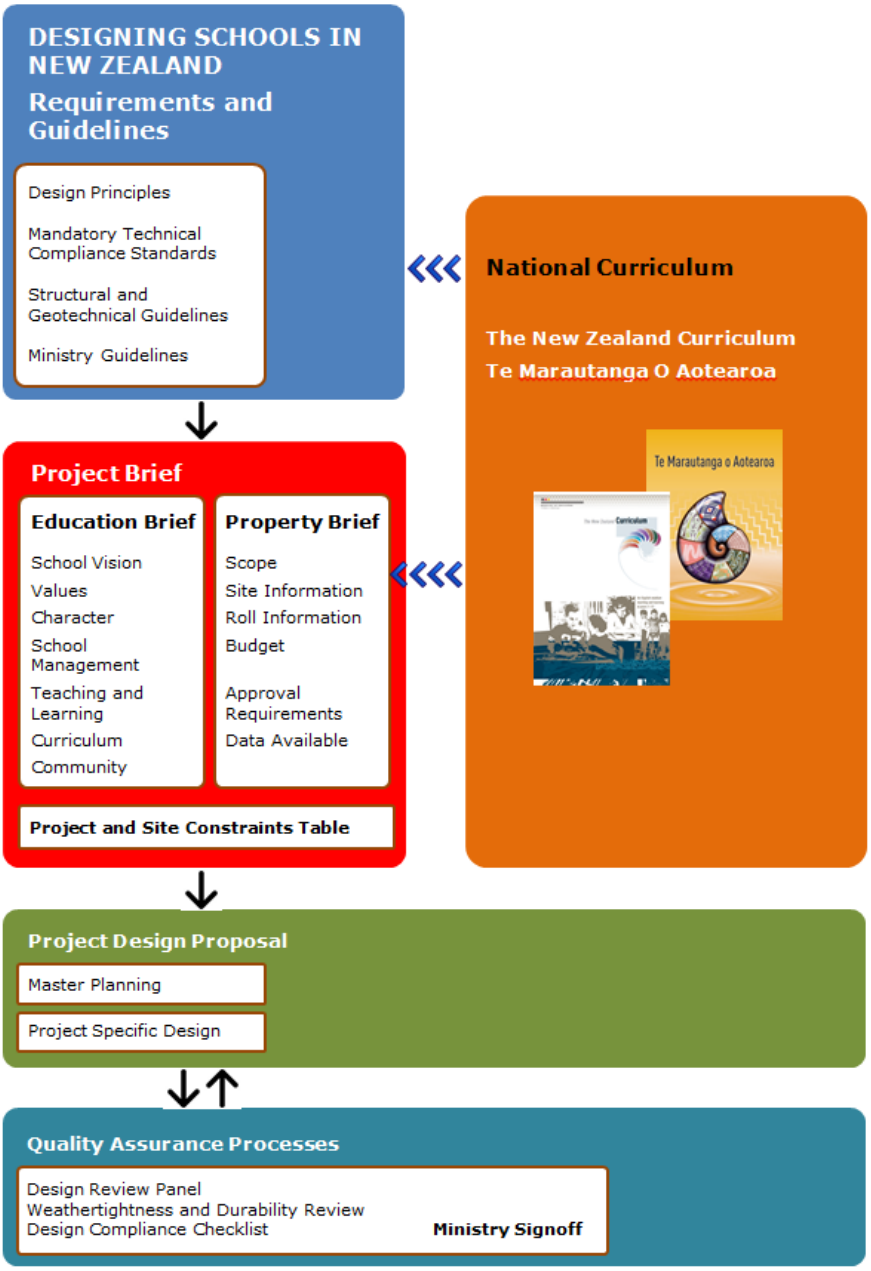
5. THE DESIGN DELIVERY PROCESS

Most major projects will commence with a master planning phase as set out below. Once this is approved project specific work as set out in the Project Brief can commence.

Ministry delivery processes follow traditional staged developments with an overlay of targeted design, technical reviews and signoffs, required to maintain compliance with the Ministry's property objectives.

Compliance is assessed against the mandatory and guideline technical standards documented in Part A Section 9 of this document, and the design principles set out in Part B of this document. These mandatory and guideline standards are reflected in the **Design Compliance Checklist**.

The following graphic establishes a process map to describe the relationship of the various design inputs and processes:



5.1 Vision for design

For large projects, including major redevelopments and new schools, the Ministry will have worked through a series of workshops with the board of trustees or the establishment board of trustees to understand how the school property can change to better support its vision for teaching, learning and to align with the Ministry's broader property objectives. The result of this stage will form the Education Brief component of the Project Brief as a resource for designers and to inform the master planning and onward design stages.

5.2 Master planning

The Ministry will decide whether a master planning phase is required before the preparation of project specific design proposals. This will depend on the scale of the project, and the requirement will be set out in the Project Brief. Where master planning is required the Ministry will appoint a design professional to develop a master plan for the school site.

A master plan is an evolving long-term planning document that will reflect a clear vision for the school site over a 20 year period. The master plan is a high level vision for the future development of the school to be delivered at the level of 'bulk and location'. The complexity of the brief and the site will determine the level of multidisciplinary input required. The outputs of master planning must meet the master plan design deliverables set out in Part A Appendix I.

As shown below, master planning is a multidisciplinary planning process. The master plan needs to identify design strategies for all elements of the development, including the school's vision for education, response to future growth, architecture, structural, geotechnical and civil engineering, building services, sustainability, landscaping, cost control, acoustics and traffic management. The strategies must be underpinned by a thorough site analysis.

Design strategies established in the master plan must be clearly communicated in sketch and/or narrative form, with sufficient detail to enable a high-level cost estimate to be established by a professional quantity surveyor.

Early engineering contribution to the master plan is required. Engineers must assimilate any existing engineering reports that are available, address site hazards and constraints, identify new building locations and develop initial strategies for foundations and substructure. Additionally, any available geotechnical reports, geotechnical advice or zoning maps should be obtained for the purpose of identifying any land constraints.

The Ministry requires that a **Project and Site Constraints Table** and a **Design Features Report** are supplied as part of the deliverables for every project. These should be commenced at the earliest practical opportunity and updated during the project and on completion. At completion, they must be submitted to the Ministry as part of the record for the project. More detailed information is available on the Property web pages here.

The master plan will be reviewed by the Ministry's Design Review Panel. Processes for Design Review Panel reviews are described in Part A Section 6.2.

5.3 Design for specific projects following master planning

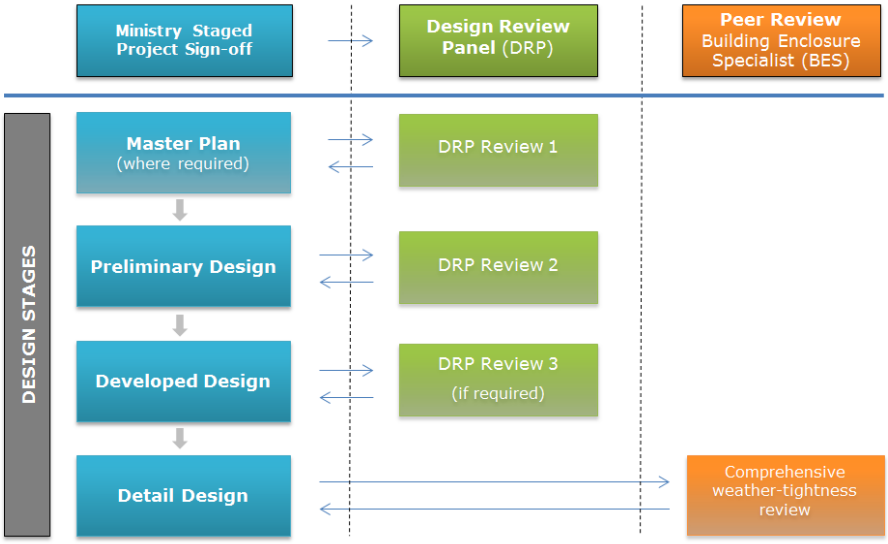
Once master planning is complete and has been reviewed by the Design Review Panel and approved by the Ministry, approval will be granted to enable the next design stage to begin.

6. MINISTRY APPROVALS, DESIGN AND COMPLIANCE REVIEWS

Ministry approvals and reviews are in place to manage the quality and consistency of school building design, and to manage the risk of future weather tightness and durability issues. See below for more information about Ministry approvals, design and weathertightness reviews.

6.1 Ministry approvals

Ministry approval is required at the completion of each of the stages (set out below) before the project can progress to the next design stage.



In order to gain signoff at each of these stages the external project manager submits the following documentation to the Ministry Project Lead:

- Design documentation including a design report (refer Design Deliverables tables Part A Appendix I).
- Design Compliance Checklist, completed by the design team specific to each stage.
- Project and Site Constraints Table, completed by the design team specific to each stage.
- Weathertightness/durability signoff report at detailed design stage (refer Part A Section 6.3 below).
- When a Design Review was required, the Design Review Panel summary report issued after the review.

The **Design Compliance Checklist** is a set of checklists for designers, design/build consortiums and construction contractors. It is a quality assurance tool and can be used as a running checklist of requirements for school projects in preparation for staged approvals submissions, and for submissions to the Design Review Panel. It contains key considerations forming a set of basic criteria for a design to

meet minimum compliance standards. It is also a reference for boards of trustees.

6.2 Design reviews

The Ministry has established a Design Review Panel with the goal of developing a consistent approach to school property design and associated outcomes.

Design reviews are required on all projects funded or managed directly by the Ministry with a value of over $3 million. Other projects may require design reviews at the discretion of the Ministry project lead and these requirements will be set out in the specific Project Brief.

Design reviews are arranged through the Ministry Project Lead. It is their responsibility to coordinate with the design team and provide the documents to the Design Review Panel as required.

The Design Review Panel undertakes high-level independent project reviews, and reviews project documentation that is submitted before the formal review meeting. The Design Review Panel process operates on the basis of 'snap-shot' appraisals.

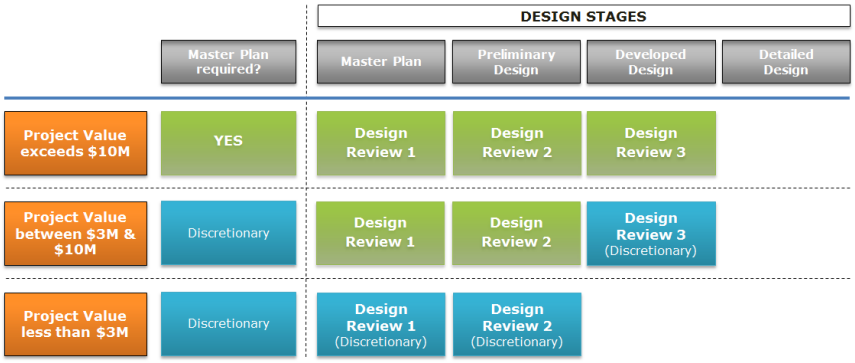
During design reviews, Design Review Panel members use their industry experience to raise questions and make suggestions based on the information made available. Typical agendas will cover:

- architecture
- geotechnical
- structure
- building services
- civil and infrastructure
- external environment
- sustainability
- cost and budget
- whole of life costs
- safety in design.

The Design Review Panel will undertake reviews at the earlier stages of the design development process, where the ability to influence project outcomes is more effective and less likely to result in substantial rework.

A follow-up summary report is generally issued to the Ministry Project Lead within one week for dissemination to the wider project team.

Review by the Design Review Panel is required according to the following schedule. Where reviews are shown as 'Discretionary' in the diagram below, the Ministry Project Lead will determine whether they are necessary and will specify the requirement in the Project Brief.



Additional reviews may be required at the discretion of the Ministry.

6.3 Weathertightness and durability reviews

It is a Ministry requirement that all new buildings and major building extensions undergo a full weathertightness check at the detail design stage. Ministry appointed Building Enclosure Specialist (BES) must undertake a review of weathertightness and durability based on a desktop assessment.

The Ministry's *Weathertightness and Durability Requirements for School Property* document, along with detailed requirements for submission for this assessment, can be obtained online through the Ministry's Property pages.

Weathertightness assessments are arranged by the external project manager or the Ministry Project Lead, who is required to submit full construction details to the BES along with the submission check sheet sign off to be completed by the designer.

At the completion of the review and once all modifications required by the BES have been completed to their satisfaction, the BES will issue a weather tightness/durability signoff report. This report will be required for Ministry signoff of the detailed design stage and to gain approval to call tenders for construction.

6.3 Special school satellite units

Where projects include a satellite unit of a special school the Ministry Project Lead will arrange a separate design review of the special education facilities to be undertaken by the Ministry's Special Education (Sector Enablement and Support) team at the developed design stage and as a prerequisite to developed design stage signoff.

7. COST MANAGEMENT

Effective management of project costs is essential to keep school project budgets under control. This is the process of planning, recording, monitoring and controlling the budget and expenditure against that budget throughout the life of the project. It also includes assessing the potential impact of risk to help reduce the chance of going over budget, ensure the budget is used optimally, and that the benefits identified in the Project Brief are not put at risk.

Effective cost management or control needs to be implemented at the earliest possible design stage with the provision of a cost estimate established by a professional quantity surveyor and based on market rates. This will differ from the project budget, which is determined by the Ministry based on the school's roll and specific entitlement calculations, and on other sources of funding available.

The project budget and cost estimate are fundamentally two different tools that should not be mixed or artificially adjusted. It is not unusual for a tension to exist between the budget and the cost estimate with design aspirations often stretching available funding. The role of the design team and external project manager is to continuously test the design against the cost estimate and reconcile this against the budget to ensure that it remains affordable.

At the master planning stage it is anticipated that the cost estimate will be based on new-build square metre cost rates with allowances for project overhead costs (preliminary and general, margins and contingencies), professional fees, statutory fees and escalation as appropriate. New-build rates need to be representative of the type of building(s) being proposed. The cost estimate should therefore itemise what has been allowed for with a suitable description. Blind use of new-build rates without sufficient anchorage or qualification will lead to an inaccurate estimate.

In the design stages after master planning, it is expected that the cost estimate will be prepared on an elemental basis. Cost estimates must have increasing levels of refinement in line with the New Zealand Construction Industry Council (NZCIC) guidelines. Provisional sums within cost estimates need to be used cautiously to manage the risk of cost blow-outs and overruns. Contingency sums also need to be appropriate to the scale and complexity of each project.

In the pursuit for cost-effective buildings and property, design teams need to engage with the project quantity surveyor and ensure that industry guidelines are followed. Cost reduction principles include designing with:

- low ratios of external wall to floor area
- fewer large sized buildings
- regular building forms

- residential type solutions
- passive ventilation and natural daylighting solutions.

7.1 Whole of life cost

The Ministry's objectives are to promote cost-effective buildings that provide flexibility for future modes of education delivery, and meet expectations for capital cost, future maintenance, operating cost and anticipated repairs in the event of damage.

Whole of life cost analysis should be used for option evaluation and decision-making for key components of buildings with the aim of minimising costs throughout the life of the asset. Examples of where whole of life costs should be considered include, but are not limited to:

- external cladding
- building frame
- internal flooring
- foundation systems
- heating systems
- electric lighting.

While focus is often placed on the up-front capital costs, the Ministry expects its design teams to take account of the longer-term costs of an asset that include ongoing operation and maintenance. In situations where an increase in up-front capital cost is recommended for longer term benefits, design teams should discuss this with the Ministry Project Lead to reinforce a project culture of informed decision-making.

8. DESIGN DELIVERABLES

A list of minimum deliverables for each of the design stages has been provided in the design deliverables tables in Part A Appendix I.

The tables are modelled on the NZCIC guidelines and outline the additional requirements and terminology that relate to the Ministry's standards and requirements.

9. TECHNICAL COMPLIANCE STANDARDS

9.1 Mandatory Ministry requirements

Developments of all school projects must meet established legal and regulatory requirements. Additionally, the Ministry has developed design standards that reflect the special nature of school buildings and their occupants. In some cases these will be a higher standard than the legal requirements. These are:

- Structural and Geotechnical Guidelines for School Design
- Ministry of Education Fire Safety and Design Requirements
- Weathertightness and Durability Requirements for School Property

- Fire Alarms Ministry of Education Standard Specification SFA1
- Information and Communications Technology (ICT) Cabling Infrastructure: Policy and Standards for Schools
- Electrical Installations: Standards for Schools

These documents are available on the Property pages.

9.2 Ministry guidelines

Non-mandatory guidelines assist designers to develop technically sound school environments. This advice comes in a range of formats and can be found in the Property pages.

Flexible Learning Spaces (FLS)

Flexible learning spaces are a design outcome based on a series of parameters that promote and facilitate modern, flexible teaching practice and vibrant, well connected learning spaces.

Design Quality Learning Spaces (DQLS)

Essential requirements within FLS that relate to the internal environment of learning spaces and cover:

- acoustics
- ventilation and indoor air quality
- heating and insulation
- lighting.

10. REFERENCE DESIGNS

The Ministry is in the process of developing reference designs for new buildings and alternation of standard blocks. Guidance documents for the following are scheduled for lease in late 2015:

- Toilet planning and design guidelines
- Standard block ILE upgrades: Avalon, Formula, and Canterbury blocks.

Part A Appendix I

Design Deliverables Tables

The following tables cover additions or departures from the standard list of design deliverables as published by the New Zealand Construction Industry Council (NZCIC) that are required by the Ministry.

Reference should be made to the standard NZCIC design documentation guidelines that are available for the key design stages.

The NZCIC guidelines differentiate the design process and deliverables into project phases including:

- preliminary design
- developed design
- detailed design
- construction design.

As master planning is not currently covered in the NZCIC Guidelines, the first table provides the Ministry's requirements for this stage. While the NZCIC guidelines and attached tables of deliverables assist in defining the level of design services, there may be other management and administration tasks not covered that include design management, preparing conditions of contract, tender evaluation/negotiations, resource and building consent applications, construction monitoring etc.

Master plan - deliverables
Master planning overview The master plan is required to provide a clear vision for the school site that can evolve over time. It will establish the framework for the site and key areas of future development. The document shall be all-inclusive as a stand-alone deliverable, with a cover page, list of contents, chaptered headings, numbered pages, indexed with appropriate use of appendices, all of which compile and address the criteria set out below
Scope and confirmation of brief ○ Confirmation of strategic intent and purpose including vision. ○ Response to the Project Brief.
Development record ○ Record of the process, assumptions and discussions to arrive at the preferred option. ○ Record of the stakeholders consulted/engaged in the preparation of the master plan.
Schedule of accommodation ○ School Property Guide (SPG) gross floor area entitled areas – short and long term, identifying existing and proposed facilities (all in m^2). ○ Gross areas for the site broken down to reflect the building categories in the SPG calculation. Must cross reference to the block diagrams on the site.

Site analysis

- Identification of current state, including existing structures, spaces, patterns of use, infrastructure and geotechnical information etc.
- Site context and key attributes: urban design parameters, integration of existing buildings, strategic and local linkages with current and future developments within the surrounding locality.
- Assessment of constraints and opportunities associated with the site and wider locality and design responses under the Master Plan, as associated with:
  - climate and microclimate
  - sunlight and shadows
  - noise
  - passive surveillance and security
  - key views and vistas
  - heritage and archaeology
  - urban framework
  - transport and circulation routes, both pedestrian and vehicular
  - site history
  - site features, site levels and dimensions
  - existing buildings and condition issues
  - existing infrastructure and condition issues including any land hazards
  - sustainability.
- Indicative geotechnical cross sections of the site in a graphical format and/or a plan showing geotechnical domains that may influence building location or form – based on available desk-top information.

Development principles

- An overarching set of principles that will ensure the school has a sustainable future – long life, flexible spaces with both growth and contraction (rationalisation) options.
- Design themes, ideas and concept images.

Preferred scheme

- An outline of all options considered and the detail of the recommended option assessing multi-storey against single storey options and deep plan against narrow plan options.
- Current and proposed diagrams showing all building footprints, structures, services, surfaces, roads, paths and landscaped areas for the school with consideration to the site analysis undertaken.
- Open space analysis and building entry points.
- Future growth options including projected surge roll accommodation.

Multidisciplinary design strategies

- Information to be clearly communicated in either sketch or narrative form in sufficient detail to inform/support the high-level cost estimate for:
  - geotechnical
  - structure including design features report
  - civil
  - building services (mechanical, electrical, hydraulic, ICT and fire)
  - acoustics
  - traffic management
  - landscaping
  - whole of life cost considerations.

Alternative options explored

- Detail of all options considered with block diagrams including gross floor area analysis.

Development schedule

- Staging framework for future development which clearly indicates the first stage of development and subsequent stages.
- Outline project timelines.
- Strategies for minimising disruption to students during the construction phase.

Cost estimate

- A high-level estimate for implementation of the development works, prepared by a professional quantity surveyor.
- Include allowances for project overhead costs (preliminaries and general, margins) contingencies, professional fees, statutory fees and escalation as appropriate.
- Any exclusions should be clearly identified*

* Note: the cost estimate should include all reasonable costs that are identifiable through design documentation.

Appendices

- Attach copies of any relevant supporting notes, data or reports.

Preliminary design – deliverables Refer to the current list of design deliverables under NZCIC guidelines. Additional deliverables are noted in this table.
Architecture (including landscaping)
Within the design report: ○ Updated response to brief, development principles and design themes. ○ Updated strategies for: ◗ natural and artificial lighting ◗ heating and natural ventilation ◗ acoustics ◗ quality learning and teaching areas ◗ sustainability. ○ Updated schedule of areas based on SPG entitlement showing both net and gross allocations.
Within the conceptual drawings: ○ Preliminary landscape drawings with detail of the options considered, inclusive of a site plan and perspectives.
Structure
Combine the design brief, options study and design features into a single document titled 'Design Features Report' or 'Design Report'.
Civil
Design Features Report ○ Confirmed strategies for site-wide infrastructure including services. Drawings including: ○ Overall site plans covering water, stormwater and sewer.

Mechanical, electrical, communications, hydraulic and fire
A preliminary design report for building services to include a section on each discipline confirming the proposed system, the whole of life costing information, and the analysis used to support that selection. It must also identify how each service will be supplied and distributed, including any connections to existing services, confirmation that there is sufficient available capacity, identification of primary reticulation routes, the primary energy source and proposed operation/control. The report shall include schematics and indicative layouts to illustrate the proposed strategies, however we would not expect outline services specifications or preliminary equipment schedules at this stage.
Other disciplines
Preliminary design stage reports for the following disciplines: ◗ traffic management ◗ acoustics ◗ geotechnical ◗ structure ◗ civil ◗ building services (mechanical, electrical, hydraulic, ICT and fire) ◗ acoustics ◗ traffic management.
Programme
Project timelines for design, procurement and construction stages in gantt chart format.
Cost
Cost estimate and cost plan: ○ A cost estimate for implementation of the development works, prepared by a professional quantity surveyor. ○ Allowances for project overhead costs (preliminaries and general, margins) contingencies, professional fees, statutory fees and escalation as appropriate. ○ Any exclusions should be clearly identified and the cost estimate should include all reasonable costs that are identifiable through design documentation. ○ Reconciliation against previous design stage cost estimate.

Developed design – deliverables Refer to the current list of design deliverables under NZCIC guidelines. Additional deliverables are noted in this table.
Architecture (including landscaping)
Within the design report: Finalised response to brief, development principles and design themes. Finalised Strategies for: ○ natural daylighting including a daylighting analysis: a graphical representation of lux level predictions that cover schooling hours on both sunny and overcast days at the summer and winter solstices ○ heating and natural ventilation ○ acoustics ○ quality learning and teaching areas ○ sustainability ○ weathertightness compliance ○ avoiding aggravated thermal bridging. Schedule of accommodation areas based on SPG entitlement (net and gross).
Drawings: ○ Landscape layouts at both a site plan level and individual buildings level showing images and details of access ways, ramps and any retaining walls.
Structural
Design Features Report.
Civil
Design Features Report.
Developed drawings including: ○ overall site plans covering water, stormwater and sewer ○ typical details for stormwater detention systems ○ details of underground services trenches.

Mechanical, electrical, communications, hydraulic and fire
A Design Features Report to cover all disciplines and include confirmation or otherwise of the preliminary design report selections, with a list of any design changes affecting the project since its issue and the justification from a whole of life perspective for that change. As per NZCIC Guidelines, single line pipework, ductwork, cable distribution drawings and associated schematics of each service shall be provided within the report. Provide detailed equipment schedules rather than generic technical specifications.
Programme
Project timelines for remaining project stages in gantt chart format.
Cost
Cost estimate and cost plan by quantity surveyor. ○ Cost estimate on an elemental basis. ○ Allowances for project overhead costs (preliminaries and general, margins) contingencies, professional fees, statutory fees and escalation as appropriate. ○ Any exclusions should be clearly identified and the cost estimate should include all reasonable costs that are identifiable through design documentation. ○ Reconciliation against previous design stage cost estimate.

Detail design – deliverables Refer to the current list of design deliverables under NZCIC guidelines. Additional deliverables (or differing definitions of NZCIC deliverables) are noted in this table.
Architecture (including landscaping)
Drawings: ○ landscape.
Mechanical, electrical, communications, hydraulic and fire
Where there are any changes to the developed design strategies and systems, provide an updated design features report with justification from a whole of life perspective for that change.
Programme
Project timelines for procurement, consenting and construction stages in gantt chart format.
Cost
Cost estimate and cost plan by quantity surveyor. ○ cost estimate on an elemental/trade basis ○ allowances for project overhead costs (preliminaries and general, margins) contingencies, professional fees, statutory fees and escalation as appropriate ○ any exclusions should be clearly identified.* * Note: the cost estimate should include all reasonable costs that are identifiable through design documentation.

B

DESIGN PRINCIPLES

1. BACKGROUND

This part of the **Designing Schools in New Zealand - Requirements and Guidelines** establishes the design principles for working on school infrastructure. It establishes the critical link between the National Curriculum and environments that will support the learning outcomes to which it aspires. It further provides guidelines for the design of quality learning spaces and the broader school environment that will support contemporary pedagogy and meet Ministry property objectives.

The Ministry's investment objectives for property are set out in The New Zealand School Property Strategy 2011-2021.

Designs for education buildings must be:

- **Efficient** in form and operation. They should be of consistently high quality, regular shape, and efficient to construct and maintain.
- **Durable**, resistant to wear and tear, and must not require extensive maintenance.
- **Cost effective** over the whole life of the building, while providing the high levels of amenity required of flexible learning and support space.

2. THE NATIONAL CURRICULUM

The environment in which we learn has a significant influence on the effectiveness of that learning, on our engagement in it, our enjoyment of it, and on our desire to keep coming back for more.

The **National Curriculum** makes it clear that education in New Zealand puts students at the centre of teaching and learning, asserting that they should experience a curriculum that engages and challenges them, is forward-looking and inclusive, and affirms New Zealand's unique identity. It represents a clearly articulated shift from a teacher-centric model of education to a learner-centric model.

Ongoing research into teaching and learning suggests that spaces for learning are important to successful learning outcomes and that effective learning happens in many contexts. The design of schools must recognise this reality and innovative teaching practice is aligned to this understanding. Spaces for learning must support and enhance this practice and be flexible enough to support future developments in pedagogy.

The National Curriculum further establishes that students will be encouraged to value:

Excellence by aiming high and by persevering in the face of difficulties.

Innovation, inquiry, and curiosity by thinking critically, creatively, and reflectively.

Diversity as found in our different cultures, languages, and heritages.

Equity through fairness and social justice.

Community and participation for the common good.

Ecological sustainability which includes care for the environment.

Integrity which involves being honest, responsible, and accountable and acting ethically, and

Respect themselves, others, and human rights.

The specific ways in which these values find expression in an individual school will be guided by dialogue between the school and its community. They should be evident in the philosophy, structures, curriculum, classrooms, and relationships of schools.[2]

School design should embody the principles of the National Curriculum and the vision and values that underpin these principles.

3. RESEARCH INTO EFFECTIVE PEDAGOGY AND LEARNING

Research into effective teaching practice provides schools and communities with guidance into the kinds of approaches that are most likely to make a difference for their learners. These include the use of:

- caring, inclusive, and cohesive learning communities based on quality relationships
- meaningful, authentic contexts that connect with learners' lives and experiences and foster engagement in learning and curiosity about the world
- agency in learning, whereby learners are given space to plan, set goals, organise, self-monitor and self-evaluate throughout learning sequences
- inclusive approaches that build on learner strengths and provide multiple means of representing ideas, engaging with and expressing ideas, and maintaining motivation and engagement for learning

[2] The New Zealand Curriculum, p10

- culturally responsive practices that allow learners to draw from their culture and background to achieve as themselves. This includes strategies such as ako, whanaungatanga, wananga that meet the needs of Māori and Pasifika learners but also learners from a wide variety of diverse cultural backgrounds.

A growing body of research offers some essential principles for those designing effective learning spaces to support the expectations of the National Curriculum. This research establishes that to meet the range of different learner's needs and enable effective teaching practice, schools require spaces that are designed to promote the principles of inclusion, agency, evidence-based practice and collaboration.

Inclusion

Spaces that are sufficiently varied and purposeful are most likely to include and support all learners and their diverse needs. Effective spaces cater for a wide variety of needs including collaboration and independent learning, discussion and quiet reflection, direct instruction and independent practice, practical and abstract activities etc. Learners should also be able to see themselves, their progress and their achievement celebrated in the spaces around them.

Agency

Effective spaces allow teachers to offer learners choices, often around the what, how, where, why and with whom of learning. There is a strong correlation between providing students with agency and outcomes like intrinsic motivation for learning, overall achievement, creativity and higher-order thinking. Spaces which support the ability of students and teachers to customise the layout and control building systems within the space will enhance that agency.

Evidence-based practice

This means providing spaces that support effective teacher-led and student-led learning, peer and collaborative learning, active, problem-based learning, culturally-responsive pedagogies, and other emerging evidence-based practices.

Collaboration

Spaces that facilitate and encourage collaborative teaching are likely to lead to improved student outcomes[3]. In addition to improved student achievement outcomes, research suggests other benefits, including increased interdisciplinary and opportunities to pool insights about individual student's learning[4] .

[3] Darling-Hammond, 2002
[4] York-Barr et al.,2007

4. WHAT DOES THIS MEAN FOR TEACHER PRACTICE?

The vision of the National Curriculum has created a professional mandate for teachers. The principle of high expectations states 'The curriculum supports and empowers all students to learn and achieve personal excellence, regardless of their individual circumstances'[5]. This, in turn, sets high expectations for teachers to model the values and principles, to develop their professional practice and ensure it is based on a learner and learning-centric approach. This requires teacher practice to include open and collaborative teaching – not simply collaborative planning.

Collaborative practice builds organisational capacity, which leads to improved outcomes for learners. Collaboration has been shown to improve coherence and consistency across schools, leading to more equitable outcomes. It also provides relevant and sustained job-embedded professional learning for teachers, leading to improved knowledge and practice. Other advantages of collaborative teaching models include the use of diverse areas of teacher expertise to differentiate instruction, enabling smaller group instruction that is coherent, engaging and appropriately challenging.

This leads increasingly to teachers actively collaborating in order to meet broad and diverse learning needs, develop the student as a whole person and authentically model positive behaviours.

5. DESIGN PRINCIPLES

A number of researchers have proposed design principles as guides in the creation of contemporary learning spaces. These principles[6] typically require that the design of spaces for learning be:

Flexible so that they can accommodate current and evolving pedagogies, particularly collaboration and to allow multiple use both concurrently and consecutively. They should be designed to integrate previously discrete school functions and to encourage community use.

Sustainable so that space can be reallocated and reconfigured, to be ubiquitous in time and space, and to demonstrate care for the environment and for ongoing resource consumption.

[5] The New Zealand Curriculum, p9

[6] JISC Designing Spaces for Effective Learning, A guide to 21st century learning space design. Oblinger, DG (2005) Leading the transition from classrooms to learning spaces, Educase Quarterly, 1: 14-18. Jamieson P et al. (2000) Place and space in the design of new learning environments, Higher Education Research and Development, 19(2), 221-236.

Creative to energise and inspire learners and teachers, and the communities they serve.

Supportive to be comfortable, safe and functional and to maximise teacher and student control and ownership of the learning environment. To acknowledge a diverse range of student needs.

Connected spaces well connected internally and to the outside, to ensure equity, and buildings connected or in close proximity, to develop a sense of a learning village.

Technology overlays all of these considerations and allows the creation of environments where learning can happen anywhere, where the teaching can move to the student and where equity of access can be assured, where "technology can be brought into the space rather than built into the space"[7].

[7] Long PD and Ehrmann SC (2005) Future of the Learning Space : Breaking out of the box, Educase Review, July/Aug 43-58.

6. DESIGN FOR LEARNING

6.1 School wide learning

Schools are first and foremost centres of learning and design for effective learning and the delivery of the curriculum must take precedence over all other objectives. Schools should be designed to promote school wide learning. This means that spaces should be designed to:

- promote active, student-centred learning for all students through the creation of flexible, varied, functional and connected spaces.
- enable multiple teachers to engage in collaborative teaching and learning as well as to facilitate cross-curricular learning.
- be inclusive, so that the whole school is available for learning opportunities for all students.
- be multifunctional, accommodating a wide range of learning activities. Spaces should be able to accommodate at least two types of learning activity, rather than being highly specialised spaces that cannot be used for any other purpose. Single use spaces should be kept to a minimum. For example, specialist learning spaces can be configured to be used by more than one faculty/subject to foster cross curricular learning. Spaces not traditionally considered to be learning spaces, e.g. staff rooms, can be configured to be used as breakout spaces.
- use furniture and equipment to create smaller learning areas within the larger space, for small group and individual learning activities. This can often be achieved with moveable furniture and moveable screens. Where furniture defined learning areas are not possible, consider using glass sliders or hinged panels.

6.2 School planning objectives

School planning is important to build a campus that is useable, easily navigable, and welcoming to the community. This means that school planning should aim to:

- promote a sense of community and belonging within the school, and welcome connections to the wider community.
- actively promote community access, engagement and use of the facilities.
- encourage parents and the wider community to participate in the learning community.
- enable school buildings and outdoor spaces to be used as learning tools in themselves.

- promote delight, inspiration and belonging among students and the broader school community.
- have durable and adaptable buildings that are able to be expanded and reconfigured in the future as required by the Ministry.
- embed ecologically sustainable principles in the design, construction and operation of the facilities to be learning tools in themselves.
- promote the safety and security of all students, staff and visitors and promote positive social interaction between students, and collegiality amongst staff.
- promote safe and easy access by all modes of transport and encourage students and staff to travel by sustainable modes of transport wherever possible.
- enable collaborative teaching and learning by:
  - making provision for meeting spaces for professional collaboration and learning in small, medium and large groups,
  - enabling teacher modelling by ensuring teaching is visible and can be observed unobtrusively in situ,
  - designing spaces for seamless flow of students and teachers between integrated learning settings and spaces.
- respond to how people interact with the built environment and how the design can minimize anti-social behaviour.

6.3 Learning spaces

Design learning spaces to promote and facilitate the range of collaborative, individual (self-directed), conceptual and instructional learning styles[8]. Examples of the learning activities that spaces should support are:

- direct, explicit teaching and demonstrations.
- meetings for discussion and decision-making.
- creative activities with media, general and specialised equipment, materials.
- investigative activities with general and specialised equipment, materials.
- construction, modelling and simulation.
- dialogue, storytelling, community of inquiry.
- presentations.

[8] Space for Personalised Learning: EBDOG Conference Liverpool 7 May 2009

- display of learning resources and student work digital and static.
- quiet reflective activities and/or individual research.
- rehearsal and performance in the Arts and physical activity.
- structured and free form interaction and collaboration.
- gatherings, assemblies and ceremonies.

Many of these learning activities do not need walls or acoustic privacy. The separation of student groups can occur side by side in the same space in which the activities are managed by the teachers.

Learning spaces should be designed to promote and facilitate a wide range of teaching strategies including collaborative teaching, with groups of up to five teachers collaborating.

Learning spaces should be designed to support connectivity between students of all ages, students with teachers and students with other members of staff. Connective spaces create an educational village where no one is isolated or segregated without purpose. Internal connectivity needs to be balanced with connectivity to the outdoors.

Design learning spaces to provide a maximum amount of flexibility for potential changes in the mode of future education delivery. Flexibility is most easily provided with open plan and connected environments. Schools (and teachers) will have a comfort level somewhere on a continuum between singular teaching in a cellular space to fully collaborative teaching in a flexible space. Consideration may need to be given in the design and layout for teachers to transition into collaborative practice.

Teachers may need to be shown how flexible design allows for didactic teaching within connected spaces and how teachers can use breakout spaces to support this. There are educationalists who are able to assist with this.

Learning spaces should:

- promote learning for students, professionals and community through active investigation, social interaction and collaboration.
- inspire curiosity.
- support a full range of teaching strategies from direct explicit instruction to facilitation of inquiry and engagement in authentic projects.
- support subject specific and interdisciplinary learning.

- support a range of group sizes from one on one, small group and class group, or multi-class group learning activities
- support spaces appropriate for learning, recreation and socialisation at different age-stages.
- include multipurpose spaces and special purpose spaces and facilities.
- facilitate learning anywhere, anytime, by any means, through seamless access to ICT and distribution of learning resources throughout learning spaces.
- be virtually connected globally, nationally and locally.
- be activated and invigorated, indoor and outdoor.
- enable all aspects of the buildings, building design and outdoor spaces to be learning tools in themselves.

Learning spaces should enable cross curricular learning. Open plan learning spaces can house a range of integrated specialist learning areas, and can accommodate cross-curricular learning as well as enabling enquiry based and self-directed cross curricular learning.

As a rule of thumb only place walls and doors around a space when:

- the space is used for activities require acoustic separation or lighting control for the majority of the time that space is in use, or
- the space is used to house equipment or resources which pose a risk to health, safety or wellbeing.

In secondary schools a higher number of specialised learning activities can require acoustic separation, lighting controls, or equipment resources that might pose health and safety risks. These spaces may require controlled separation but should be designed to enhance connectivity as much as possible.

6.4 Breakout spaces

Breakout spaces should be connected to the general learning spaces and accommodate small groups learning, specialised learning, and one on one learning. Breakout spaces should be easily accessible and visually connected to the general learning space. This connectivity should take precedence over acoustic separation.

6.5 Outdoor learning spaces

Effective outdoor learning spaces are an important part of collaborative, enquiry based learning. They can be achieved by allowing internal learning areas to spill out onto adjacent open decks or protected courtyard areas.

Sliding door or wall panels allow for unimpeded access at times when the environmental conditions are appropriate.

Outdoor learning spaces should be positioned so that they are climatically pleasant, by orientating them to the sun and sheltered from the prevailing winds. Take care to ensure that these spaces are comfortable, sheltered and provide appropriate surfaces.

Covered outdoor learning spaces which form part of the total gross area allocation must have sufficient eave cover to ensure that the outdoor learning space remains useable in wet weather.

7. DESIGN IN DETAIL

7.1 Access for people with disabilities

Ministry policy is to provide access to all people, including those with disabilities, to meet the requirements of NZS 4121:2001 Design for Access and Mobility - Buildings and Associated Facilities.

The design requirements for approachability, accessibility and useability ensure that accessible facilities are melded into the design of the building as a whole, including landscaping, so that the occupants of the building can use the facilities without being conscious of their underlying purpose.

Lift car minimum sizes have been increased to ensure that the lift car can accommodate a carer and a student in a motorised wheelchair, and allow them to manoeuvre. These requirements are set out in Section 7.24 Lifts of this document, and are additional to NZS4121.

Each building should have at least one wheelchair accessible entry, minimum 1.8 metres square, and accessible entry points for a continuous accessibility route through the school.

7.2 Acoustics

Flexible learning environments that support collaborative and enquiry-based learning require careful use of highly acoustically absorptive materials. Absorptive surfaces will reduce overall noise levels and enhance acoustic privacy between learning groups. It is essential to ensure good acoustics are achieved when building new facilities or upgrading older buildings.

Refer to the Ministry’s DQLS documents for further information.

7.3 Administration area

Administration and support spaces should be welcoming and accessible to students and visitors as well as staff and be designed around the same principles as learning spaces. They should be designed to encourage collaborative work practices between administration staff, consistent with expectations of teaching staff.

Consider integrating administration and learning spaces as much as possible to ensure that support spaces can also be used for learning.

7.4 Arrival

Schools must accommodate the use of private vehicles for permanent members of staff, school visitors and parents/caregivers who drop-off students and for senior students. It is important that traffic patterns for vehicular drop-off are considered alongside those for visitors and staff who may park for longer periods of time. There are benefits in separating the two streams of traffic so that drop-off vehicles are not routed unnecessarily through areas of longer term parking. This will reduce the risk of conflict with pedestrians. Work through an arrival and departure strategy placing priority on pedestrians, then bicycles and scooters, then bus and public transport, then private vehicles.

7.5 Brickwork and masonry veneer

Masonry veneer with unsecured fixings or inappropriate design or construction presents a falling hazard in earthquakes. However, the use of masonry veneer is often favourably considered as it is a highly durable cost-effective cladding.

The Ministry's requirements for use of masonry veneer for new buildings are set out in Structural and Geotechnical Guidelines for School Design.

7.6 Building form

In planning the building consider the depth of the floor plate and its implications for teaching and learning as well as for natural daylighting and natural ventilation.

Buildings of around 12-14 metres depth allow more building envelope per square metre of floor area and opportunities for light and ventilation to penetrate the building without mechanical ventilation, even when multi storey. They can relate well to outdoor learning areas but do not allow for as much connectivity between learning areas.

Buildings in excess of 12-14 metres increase the possibilities of educational connectivity particularly for maximizing cross curricular learning. The reduced building envelope per square metre of floor area may therefore require overhead daylighting

provision (clerestory windows or roof lights) and/or mechanical ventilation to be considered, particularly for multi-story buildings. The cost and benefits of connectivity between learning spaces, connectivity to the outdoors, and well proportioned and climatically pleasant outdoor areas need to be considered in the design.

Avoid raised buildings with open undercrofts. These are often expensive and the open space beneath a building can be shaded, cold and windy and difficult to passively supervise.

7.7 Context

Schools are civic places and must be designed accordingly, respecting their urban, suburban or rural context. Buildings need to respond to the local environment and to the community in which they reside. They should be inviting, open, inclusive and welcoming places. They should inspire learning. They are community assets.

Design to contribute to the built form of any adjacent street with the placement of buildings aligned with, and located as close as practicable, to adjacent street facing boundaries.

Consider how the external visible elements, including the built form, lighting and landscape are integrated into the design.

Consider the issues of scale and proportion, visual balance and order, architectural expression, detailing and the use of external materials and colour.

7.8 Crime Prevention through Environmental Design (CPTED)

The Ministry is committed to creating a healthy, enjoyable and safe environment in New Zealand schools. Crime Prevention through Environmental Design (CPTED) is a crime prevention philosophy based on proper design and effective use of the built environment leading to a reduction in the incidence, and fear, of crime, as well as an improvement in quality of life. CPTED reduces criminal opportunity and fosters positive social interaction among legitimate users of space. The emphasis is on prevention rather than apprehension and punishment.

There are four key overlapping CPTED principles. They are:

- Surveillance – people are present and can see what is going on.
- Access management – methods are used to attract people and vehicles to some places and restrict them from others.
- Territorial reinforcement – clear boundaries encourage community 'ownership' of the space.
- Quality environments – good quality, well maintained places attract people and support surveillance.

For further guidance see the Ministry's CPTED and Ministry of Justice publication National Guidelines for Crime Prevention through Environmental Design in New Zealand.

7.9 Emergency vehicle access

Vehicular access requirements to schools for fire appliances are set out in the Building Code Acceptable Solutions but should be subject to a site specific conversation between the NZ Fire Service and the design team's fire engineer.

Fire engineers should consider the degree to which it is reasonable to treat the school complex as one building for the purposes of Fire Service vehicular access.

Ensure that other emergency vehicles, particularly ambulance, have access to sports fields.

Generally fire alarm panels and inlets to fire sprinkler and fire hydrant systems should be located at or near the obvious front entry to the school. Hard standing for fire appliances will be required within 20 metres of this location.

7.10 Entry

The school's main entry and reception must be obvious, intuitive and easy to find without reliance on signage.

The entry must be welcoming and inclusive and not separate students from visitors and staff. The entry should promote community participation.

Plan the entry and associated outdoor spaces so that they are able to function effectively for Māori ceremonial protocols, such as those for Pōwhiri, and for community celebrations and remembrances, recognising the educational value these have.

While dedicated Whare Wānanga and Ātea spaces are not required in a school, discussion needs to be had as to whether the master plan should allow for the future provision of one. If it is, then planning must ensure that is positioned to be clearly visible from the school entry.

Give consideration to the location within the wider community and how the precinct relates to the road network including bus service and any public transport.

Contribute to the built form of any adjacent streets with the placement of buildings aligned with, and located as close as practicable, to adjacent street facing boundaries.

7.11 External play areas

It is particularly important that outside courtyards or playground areas have northerly aspects for the sun given that schooling occurs more in the winter months than it does

through the summer. Typically, schools will be closed over the warmest part of summer (mid-December to late January). Play areas or courtyards overshadowed by large buildings and facing south are not desirable.

Shade is important and can effectively be provided by the careful use of vegetation. See Section 7.33 Verandas.

It is important that students have direct access to toilets without the need to re-enter learning spaces. This can generally be achieved through providing toilet blocks with dual internal and external access.

7.12 Fire design

In anticipation of changes to the Ministry Fire Safety and Design Requirements, designers are advised that fire cells of up to four classroom equivalent spaces will be accepted (the current requirements limit fire cells to three classroom equivalents).

In addition, designers need to be aware that where schools require the ability for students, staff or whanau to sleep overnight in schools, this will change the compliance requirements for fire alarm systems to those spaces and will require that permanent signage is erected to notify occupants of any limits to sleeping activities.

Design leads must discuss these requirements with schools and with their specialist fire design consultants.

7.13 Glazing in schools

Requirements for glazing in schools in some cases exceed those set out in NZS 4223.3:1999 and are set out on the following Ministry property web pages:

Glazing in School Buildings

Use of Translucent Plastic Sheeting as Roof Glazing

7.14 Halls, gyms and multi-purpose areas

Halls or multi-purpose buildings used for indoor sports or gym based learning activities are ideally located adjacent or near to external playing fields or sports courts. Hall buildings often incorporate storage rooms for sports equipment such as goal posts, football nets etc. and thus adjacency to external sporting areas is desirable.

A hall may assist in promoting outdoor learning by incorporating operable elements of its façade to allow indoor-outdoor flow when environmental conditions support such activity. While this is a desirable feature, it can be expensive and also necessitate attention to the internal floor finish as some surfaces can be damaged through excessive ingress of dirt and dust through foot traffic.

Gym areas are generally noisy and don't necessarily work well when connected directly to learning areas, without some form of acoustic separation.

The scale of halls can assist in providing civic presence to a school, as these tend to be dominant structures. Halls are frequently used by the community during non-schooling hours either as meeting venues or for weekend sporting activities.

Consider the ease of community access against the ability to secure this away from other school buildings on the site. Associated car parking for out-of-hours use of the hall also needs to be considered.

While it might not happen often, halls, gyms or multi-purpose buildings may be needed by local communities during times of national disaster or emergency such as in the aftermath of an earthquake. In such a case, the building type may act as a command centre for emergency services or a place of temporary accommodation and shelter for the public. Any requirements for this function will be set out in the Project Brief.

The halls, gyms or multi-purpose buildings, where possible, should consider adaptability for possible community/civic uses in the future.

7.15 Health space - medical facilities

Health space should be sized to accommodate the school population and have an accessible toilet with an integral shower located directly adjacent to it. The health space should have visual connection to the reception/administration staff or to health staff in larger schools.

If the school will have a roll of fewer than 61 students, there must be rest facilities in the staffroom or another appropriate place. If there will be 61 students or more, you must have a rest, casualty or isolation room of at least $7m^2$ – the room must have access to toilet facilities with a hand wash basin with hot and cold water.

7.16 Heating and ventilation

Learning areas require at least 10 times more fresh air than houses because of high occupancy rates. Adequate ventilation must be supplied by passive or active means.

Air quality, ventilation and temperature are interdependent and must always be considered together. While passive ventilation is desirable, consider trickle vents and CO_2 sensors to manage air quality. The comfort and health of students and teachers is dependent on good indoor air quality, adequate ventilation and appropriate thermal control.

Refer to the Ministry's DQLS documents for further information.

7.17 Information and communication technology (ICT)

It is important to ensure that both design and construction work for school infrastructure is compliant with the Ministry's ICT standards. The Ministry's School Network Upgrade Project (SNUP) team, which manages the upgrades of ICT infrastructure in schools, is available to provide design and compliance advice to design teams working in schools. Contact networkupgrades@education.govt.nz.

7.18 Infrastructure in potentially liquefiable ground

For stormwater detention in areas of liquefiable ground, consider using surface stormwater detention structures (e.g. swales, shallow ponds) rather than using oversized buried pipes and/or chambers. Above ground features, especially those formed from earthworks, are expected to be the most easily repaired following strong seismic shaking; buried structures are generally more costly to repair.

With regards to horizontal infrastructure, the following general considerations are made:

- To reduce the potential for buoyancy issues during a future liquefaction event, all pipes and chambers should be kept as shallow as possible. Buoyancy of underground chambers should be carefully considered as any such structures located below the water table in liquefiable soils will likely "float" if liquefaction is triggered.
- Separation of service joints can be reduced by ensuring that abrupt changes in direction of pipework are avoided as much as possible and chambers provided at pipe junctions.
- Flexible joint connections should be provided at all locations where pipework enters a building, manhole or chamber.
- Flexible service connections should be used at building envelope boundaries to reduce the potential for damage to, or loss of, services that result from liquefaction induced settlement or lateral stretch.
- Where applicable, all building services should be installed within foundation slab elements rather than beneath the slab.
- It would be prudent to co-locate service entries at the building perimeter with easily accessible chambers.
- Services should also be detailed to accommodate differential and total liquefaction settlements following site specific geotechnical assessment.
- It is recommend that consideration be given to restricting any ground penetrations to maintain the surface crust above the water table and help mitigate the potential for sand ejecta exiting at ground level under future Ultimate Limit State (ULS) level seismic events.

7.19 Internal corridors

Minimise the use of corridor space as there are alternative ways of connecting learning spaces. Long or dead-end corridor spaces have insufficient passive surveillance.

Consider using circulation space to extend learning areas and provide separation distance between learning groups, or where climatically appropriate use covered outdoor verandas for circulation that can be extended to enable outdoor learning activities.

7.20 Landscaping

Design landscaping to support learning opportunities, respect New Zealand flora and fauna, work with the site location and topography. Design to:

- contribute to the positive physical image of the precinct (the space enclosed by the walls or other boundaries of a particular place or building)
- provide a safe and secure landscape environment for all precinct users
- be sympathetic to the built forms and the functions of the precinct
- provide hard landscaping that supports the movement around the precinct
- ensure that the landscaping does not mask or prevent natural surveillance of the precinct from occurring, and
- provide tree planting and landscaping along the entry road that enhances the approach to the facility.

7.21 Layout and circulation

Design the school layout so that destinations and travel routes are obvious. Spaces that have community functions should be located where possible near to the entry.

Design well-proportioned spaces between buildings and consider the way large groups will flow through these spaces. Spaces must be easily accessible, and designed to reduce the possibility of violence and minimize opportunities for vandalism and bullying.

Design outdoor spaces that are climatically pleasant, are sunny and are protected from the prevailing winds, and provide appropriate shade. Walkways should generally be a minimum of 1.8m wide and be accessible routes.

See Section 7.8 Crime Prevention through Environmental Design (CPTED).

7.22 Learning spaces

See Part B Section 6 of this document.

7.23 Libraries

The National Library of New Zealand provides advice to design teams on the design and fitout of library spaces. Contact National Library of New Zealand (04-474 3000) for further information.

7.24 Lifts

Lifts are required in multi-storey school buildings to provide accessibility for both students and staff in compliance with NZS4121:2001.

Platform or stair lifts are not acceptable as a means of compliance.

The Ministry requires that the minimum car size required by NZS4121 be increased on school projects for all lifts to minimum internal dimensions of 1.8m deep x 1.5m wide with bi parting doors. This requirement is to ensure that the lift car can accommodate a carer and a student in a motorised wheelchair and allow them to manoeuvre.

Lifts should be enclosed within lobbies and not exposed directly to the outside where maintenance becomes a significant issue.

7.25 Natural daylight

The benefits and importance of natural day lighting within learning areas are well recognised and documented. The Ministry's requirement is that natural daylighting is the main source of lighting within schools, supplemented by electric light when light fades in the day or during overcast weather.

See the Ministry's DQLS documents for further information.

7.26 Orientation

Solar access and solar control are important aspects of school design. School buildings will differ from residential buildings in that solar gain and thermal mass principles will most likely be less relevant given that schools typically operate between the hours of 9am and 3pm and the high occupancy rates causing issues with heating control.

However, a north-facing building façade is the easiest to provide solar control by means of overhead eaves or screens or shades structures due to the higher inclination of the sun. North facing orientations are generally the most favourable as this means that adjacent outdoor areas receive winter sun and create bright, warming environments that can support outdoor learning and play.

In situations where floor plans become very deep, say in excess of 12-14m width, there may be merits in choosing a north-south axis for the building on the basis that both the eastern and western facades will receive sunlight throughout the day. A deep floor plan with on an east-west axis will provide for sunlight to its northern façade only, with the southerly faced permanently in shade.

7.27 Passive surveillance

Passive surveillance principles need to be considered and embedded through the site and within each building to create a safe haven for students and staff alike. Unobserved re-entrant areas around the perimeter of a building, or internal closed lobbies or corridors are all areas that can promote or facilitate bullying and are to be avoided.

External pedestrian routes and play areas or courtyards, need to be overlooked throughout the day and evenings to make use of the opportunities for passive surveillance. Toilet lobbies and staircases should have open or glazed lobbies to provide visibility. The location of teachers' work rooms and admin or staff offices should be considered in terms of the ability to overlook other areas.

The position of stairwells, lockers and toilets need to be configured so that they can be easily supervised and are in easy reach of learning areas.

7.28 Paved courts and playing fields

Paved courts for physical education use and marked courts for general use (suitable for netball, tennis or volleyball) are provided to suit the oldest student year groupings.

Bicycle riding track where provided should has a minimum width of 2.0m and has a length of 250m along a curved route.

Site constraints may modify the ability to realise these areas and should be discussed with the Ministry Project Lead.

7.29 Students with special needs - satellite facilities and special needs units

Satellites facilities for students with special needs and stand-alone special needs units on school sites will come with specific requirements in addition to the requirements set out in NZS4121:2001. The Ministry Project Lead will provide the additional requirements and append them to the Project Brief.

7.30 Sustainability

Sustainable design principles should be incorporated to minimise environmental impact and to be used as an educational tool.

Consider the following environmentally sustainable design principles when designing facilities:

i. Design to minimise the whole of life costing.

ii. Design to give priority to measures that improve:

- operational efficiency
- water and energy conservation
- indoor environmental quality
- sustainable and non-harmful material and resource use
- the reduction of emissions to the atmosphere.

7.31 Thermal bridging

Roof structures and ceilings can be subject to thermal bridging issues, refer BRANZ Bulletin 572 for further information. This has become a significant issue in institutional buildings.

Refer also to the Ministry Weathertightness and Durability Requirements.

7.32 Toilets

Toilets should be evenly distributed around the school. It is important that students have direct access to toilets from both within learning areas and from external play areas without the need to re-enter learning spaces. This can generally be achieved through providing toilet blocks with dual internal and external access.

Toilet cubicles should be designed as fully self-contained and have floor to ceiling walls and doors. Schools should be free to allocate the use of toilet groupings acknowledging student age and cultural considerations as appropriate.

Toilets need to be configured so that they can be easily passively supervised and do not form dead ends. Toilets with internal access are likely to suffer less vandalism, be better cared for and offer improved passive surveillance.

7.33 Verandas

Where these are used, consider separate constructions in lightweight form such as suspended timber decking on shallow footings rather than extending floor slabs or a building's sub-structure/roofline. Consider footfall noise mitigations to limit affects for learning activities.

7.34 Wind

Ensure that the site arrangement protects occupants from cold prevailing winds.

ABBREVIATIONS AND DEFINITIONS

BES **Building Enclosure Specialist** is a Ministry-appointed specialist undertaking required weathertightness and durability reviews.

BOT **Board of trustees** is made up of elected and appointed parent, staff and student representatives and has the overall responsibility for the school or kura. Section 75 of the Education Act 1989 says that the board's most important responsibility is for student achievement. To achieve this, the board is also legally responsible for the curriculum, property, personnel, finance and health and safety.

BRANZ **Building Research Association of New Zealand** is an independent and impartial research, testing, consulting and information company providing services and resources for the building industry.

CPTED **Crime Prevention through Environmental Design** is a set of principles that can be applied to the design and development of buildings and other public areas. It seeks to use effective design to reduce the incidence and fear of crime.

DCC **Design Compliance Checklist** is a quality assurance tool and can be used as a running checklist of requirements for school projects in preparation for staged approvals submissions, and for submissions to the Design Review Panel. It contains key considerations forming a set of basic criteria for a design to meet minimum compliance standards. It is also a reference for boards of trustees.

DQLS **Design Quality Learning Spaces** is a series of technical guidance publications prepared for the Ministry by BRANZ relating to specific areas of environmental performance.

DRP **Design Review Panel** is the Ministry appointed panel of independent specialists that provides a high level design review at the earlier stages of the design development process, where the ability to influence project outcomes is more effective and less likely to result in substantial rework.

EBOT **Establishment board of trustees** is formed for new school to provide the functions of a board of trustees during the establishment phase, until the school commences operation and an elected board can be sought.

ESD **Environmentally sustainable design** is the philosophy of designing physical objects, the built environment, and services to comply with the principles of social, economic, and ecological sustainability.

FLS **Flexible learning space** describes the spatial characteristics of learning spaces which will contribute to an innovative leaning environment (ILE).

GFA **Gross floor area** is the area enclosed by all the exterior walls of a building and is measured to the outside of the exterior wall framing. It includes everything within the building, on every floor. Open atrium areas extending up through a multi-storey building are included as gross area on the ground floor only.

Gross area generally excludes uncovered balconies, roof overhangs, porches, sunshades, uncovered external walkways and uncovered outdoor areas.

See the 'Space Entitlement' page on the Ministry's website for more information.

ICT **Information and communication technology** is used as an umbrella term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

ILE **Innovative learning environment** is the complete physical, social and pedagogical context in which learning is intended to occur. We used to refer to it as a modern learning environment (MLE). An ILE is capable of evolving and adapting as educational practices evolve and change. One part of creating an ILE is to modernise the spaces that teachers and students spend their time in.

MI **Māori immersion** in the context of the school roll is the number of students enrolled in a Māori immersion school programme.

NFA **Net floor area** is the usable area within rooms such as teaching spaces, resource rooms, administration spaces, gyms, libraries, auditoriums, halls and multi-purpose spaces. It is measured within the perimeter of the internal walls of a space and excludes circulation, cleaners' cupboards and toilets.

NZCIC **New Zealand Construction Industry Council** is a pan-industry council of property professionals that lobbies and publishes for improvements and efficiencies in the construction industry.

NZS **New Zealand Standards** are documents issued by Standards New Zealand which set out standardised solutions or practices and which are often cited as methods of compliance with building consent requirements.

ORS **Ongoing Resourcing Scheme** is a Ministry funded scheme that provides support for students with the highest level of special educational needs. It allows students to join and learn alongside other students at school. Students meeting the requirements for this scheme attract allocations of floor area in addition to other students at the school.

PMG **Property maintenance grant** is an annual grant that the Ministry provides to boards of trustees. The grant is provided to pay for maintenance work and is part of a school's operational funding.

PMIS **Property Management Information System** is the Ministry's online and publically available information system that provides record of existing buildings and property stock across the schools network.

QS **Quantity surveyor** is a construction cost professional who measures and estimates the cost of resources for construction projects.

SPG **School Property Guide** is an online Ministry tool that provides formulas for calculating how much space a school needs for teaching and non-teaching uses. Space is based on the school's student roll.

TGA **Total gross area** is the allocated total gross built area to which a school in entitled. See Part A Section 2 of this document for more detail.

TS **Teaching space** is defined by the space required for one teacher and a 'classroom' group of students. The number of students per teaching space varies with the year level of the student.

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