6 technical investigation

structural composition
floors
glazing: curtain walls & doors
roof system
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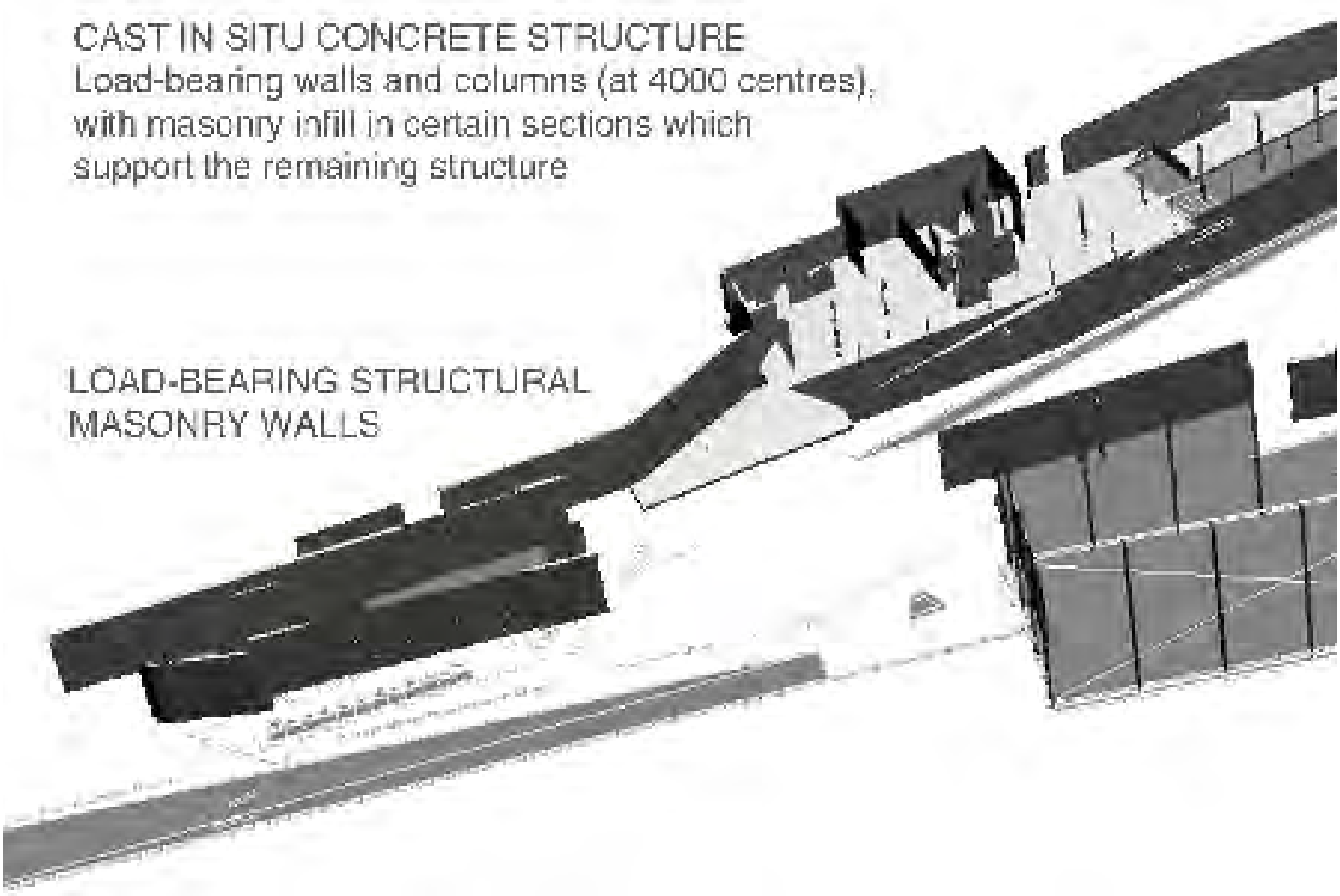
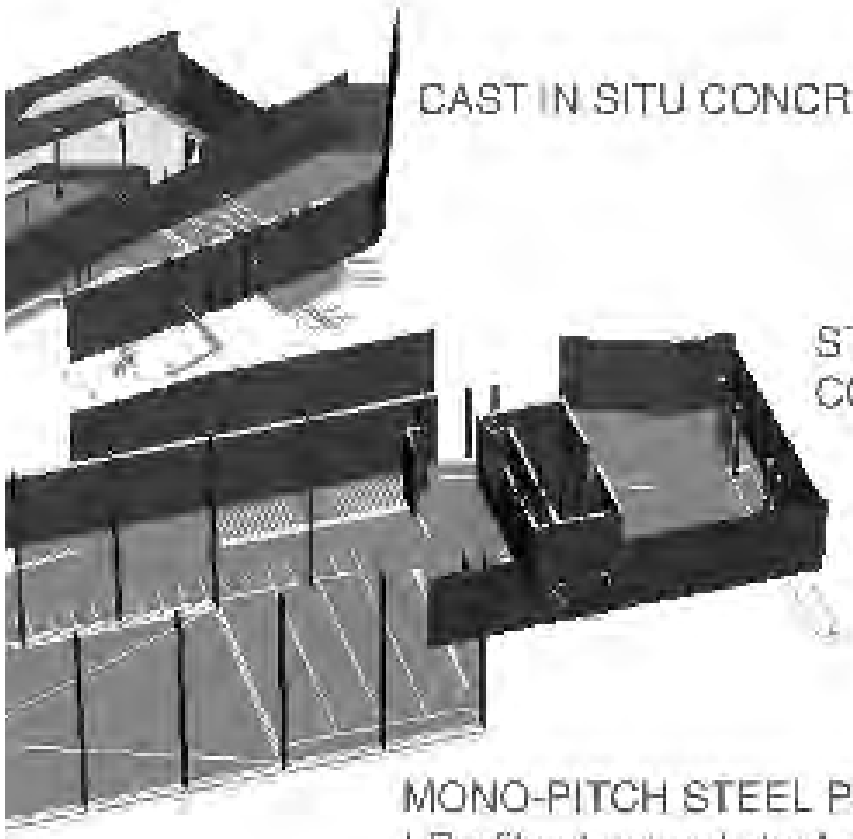
movement and safety
passive control systems
lighting requirements
noise and sound control
inclusive design
fire control



Illus. 71 : 3D diagramme of the strctural composition of elements



CAST IN SITU CONCRETE SLAB

STRUCTURAL STEEL COLUMNS FILLED WITH CONCRETE, WITH BEAM OVERHEAD

MONO-PITCH STEEL PORTAL FRAME

I-Profile structural steel columns (at 4500 centres) and rafters with beams and cross bracing

NOTE: THE STRUCTURAL SYSTEM IS REPEATED ON FIRST FLOOR LEVEL AND EXTENDS TO THE ROOF

External landscape paving consists of different materials, each marking a movement route within the landscape and around the building. The edges of the site are emphasised by 30 x 3000 concrete blocks which alternate with the adjacent materials to provide a gradual transition over site thresholds. Main movement routes are covered with a 5 mm stone aggregate bound by a macadamised asphalt base [03]. Surfaces are pigmented in certain areas to demarcate certain spaces. Surrounding movement routes consist of fine-aggregate cast in situ concrete blocks of 1000 x 3000 mm. These blocks will be cast with patterns in certain areas which mark activity zones [02]. Parking and service areas are covered with concrete paving blocks and gravel [01]. The main ramp has an off-shutter finish, but mosaic tiles and small pieces of glass will be cast onto the surface to reflect light at certain times of the day [04].

Ground-level concrete floors are finished in one of three ways. Since all areas on the ground floor will experience very heavy traffic and may suffer potential damage in their lifetime, finishes have to be robust. Concrete surface beds within the exploratorium wing are finished with a mechanical floor grinder after most of the construction work has been completed. The finished surface is given a smooth polished look and the aggregate used in the concrete mix is slightly exposed after 2 mm of the surface has been removed. In large surface areas where cracking can occur, the concrete is cast in one session and movement joints are later cut into the surface using a grinder [07]. In play areas, smooth rubber tiles are placed over the floor to prevent injury and to provide shock absorption [05].

In the information node, the concrete surface bed is finished with a layer of epoxy resin. All other ground-level concrete surface beds, which form part of the community activity areas, receive a concrete screed which is delay-trowelled, power-floated, and polyurethane sealed. In the informal trade areas, white mosaic tiles are inlaid into the concrete screed, presenting a uniform surface. The ground floor finishes should read as a continuous surface where different materials read more like textures and tones of the same surface rather than separate entities.

The post-tensioned slabs on the first floors are left in their off-shutter state in some areas and in others, are finished with timber laminate or parquet floor boards over the concrete slab [06]. Ablutions are finished with tiles as indicated, and service areas retain their off-shutter.

External walkways consist of a mentis grid and a marine grade timber surface resting on structural steel round hollow sections. Views through the floor pane in a vertical direction challenge the perception that floors should be solid. Saligna, is also used in vertical circulation routes, and promotes the idea of a temporary versus a permanent structure or hard versus soft finishes.

Illus. 72 : Vairous floor materials are shown; paving, cast in situ concrete, maosaic, rubber tiles and plywood

Most glazing is fixed to the building structure by aluminium frames. The life span benefits of using aluminium in the building outweigh the initial costs; the recycling potential of aluminium members and their clean finish will ensure the consistent appearance of the building façade. Areas with fixed programmes such as the information node and exploratorium will use aluminium-framed glazing sections, where other areas with more open ended programmes within the public domain will use structural steel members.

Because of the public nature of the building and the potential for spontaneous, informal activities derived from community participation, glass panes used are mostly 9 mm laminated safety glass. Panel sizes do not exceed 6 m^2. All glass panels, which might not be obvious in their position and which may cause injury will be marked appropriately.

The curtain wall below the main ramp has a clean finish achieved by using fins and fixing the glass to the bottom of the ramp using the appropriate structural members. These will enhance the appearance of the ramp growing out of the ground unsupported.

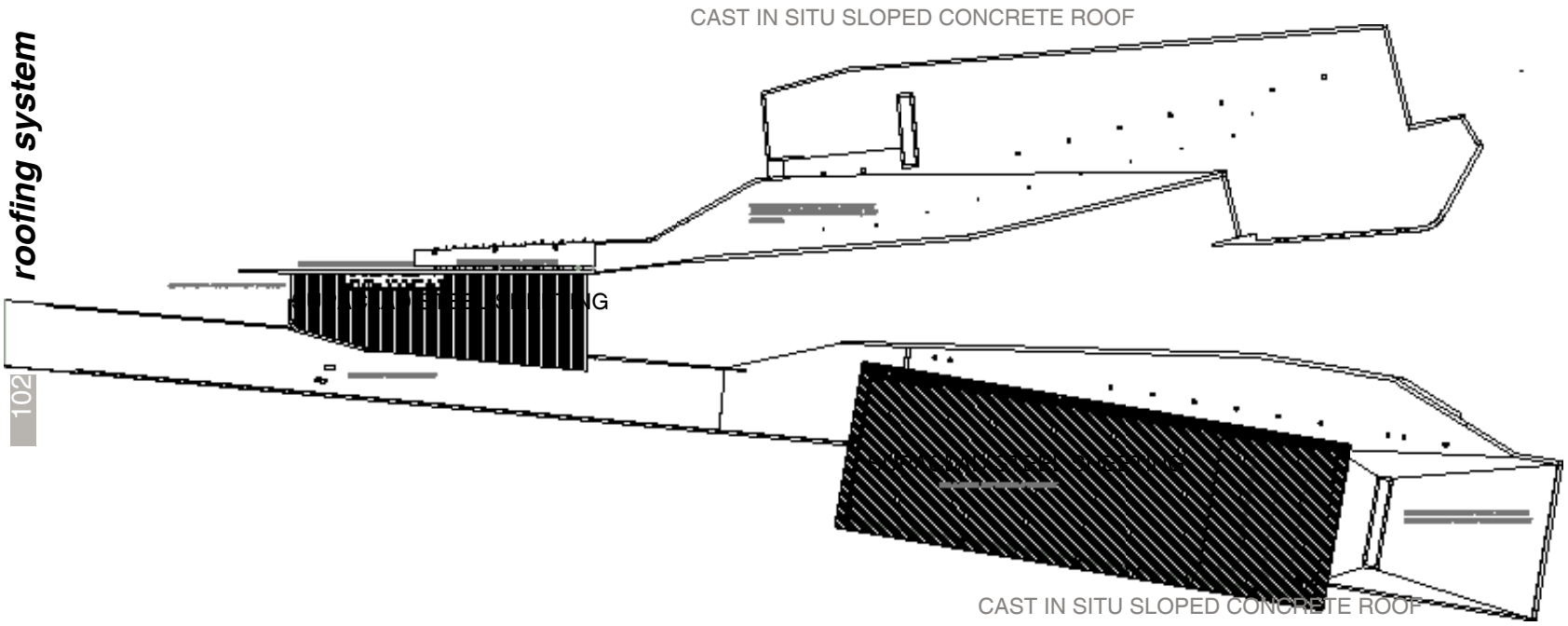
Glazing is used in the design with the purpose of linking the exterior and interior spaces, to expose part of the structure, and to create illusions as to how the building works. It is for these reasons that most external doors are glazed. Most glazed areas are on the southern edges of the building to maximise natural light and to limit heat gain. Where glazing has been used on the eastern and western edges, overheating has been controlled by using walls, overhangs or vegetation to block the amount of direct sunlight entering the building. The ends of each wing terminate in glazed surfaces, indicating that a transition into a new space is about to occur.

Cast in situ concrete roofs have been used for the exploratorium wing as well as the area surrounding the steel portal frame on the southern wing. Both concrete roofs are partially sloped to continue the theme of challenging perceptions of what architectural materials should do. In this case the concrete roofs appear light and slope at an angle resembling lightweight roofs. The concrete appears to emerge out of the natural landscape following the lines established by the main outdoor ramp. It provides stability to the architectural form.

Lightweight roofing materials are used over areas accommodating community activities and act as more traditional roofing solutions. The lightweight structure gives the impression of being an impermanent intrusion into the environment, capable of being removed should the community outgrow the need for these facilities.

The lightweight sheeting material used is Supaclad, a patent material which allows for the minimum slope of 3 degrees. Supaclad has a cover width of 890 mm and is connected to purlins at 1,8 m intervals. Thermal insulation is achieved by using bubble foil D10 insulation with aluminium foil on either side laid between the purlins and roof sheeting. It provides insulation of 1.71 m^2 K/W including air gaps.

The sloped concrete roof slabs will have a layer of waterproofing placed directly over the slabs. Areas which are flat will consist of waterproofing laid over a 1:70 gradient screed.

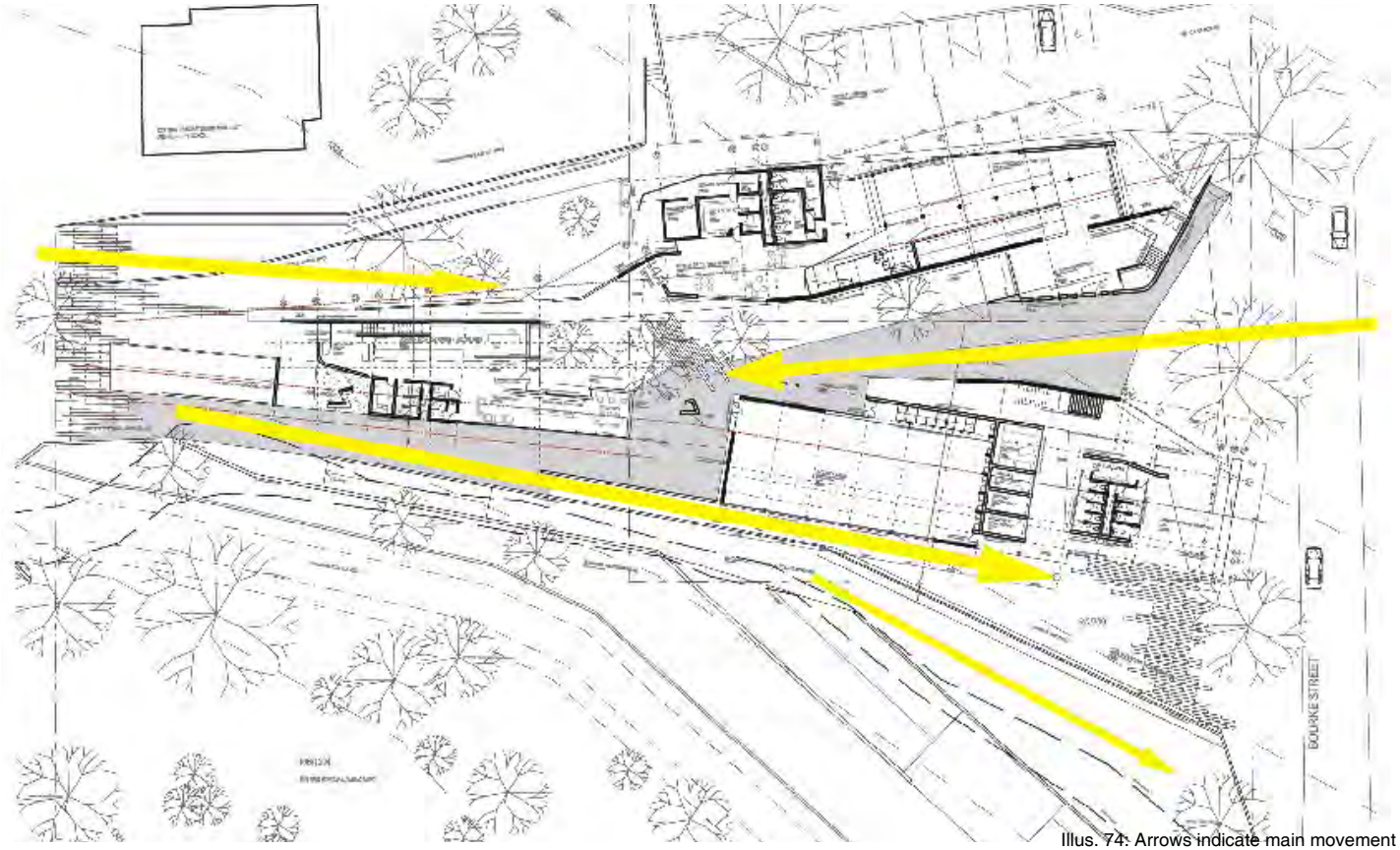


Illus. 73: The diagramme indicates the areas over which sheet metal or concrete placed.

The building, explodes itself into the site, forming an architectural extension of the natural landscape. Most movement in the area occurs in a north-south direction along Bourke and Leyds Streets, but a high number of people also use the site as a shortcut or prefer to walk along its shaded green areas rather than along the roads.

The openness of the site is continued in the design by allowing the open spaces between the built forms to be used as pedestrian movement routes. The choice to create a movement route rather than a square or piazza follows from the desire to create an area rich in opportunities for accidental meetings and spontaneous activities. In Tshwane, most activity takes place informally along building edges and street fronts. Most open public squares are not utilised to the same extent as sidewalks are. These factors influenced the design of movement routes versus courtyards in the proposed building.

The spaces concerned will, however have to provide adequate safety, so apart form being properly lit at night, they will also be observed through passive surveillance during the day. Where buildings have views onto these spaces, a relative degree of control is established. Also, informal trade activity is encouraged to occur within outside spaces so that users can monitor them, for example in areas around the public ablutions. The openness of the design on plan is extended into the vertical plane by creating openings which promote views into and out of the building.

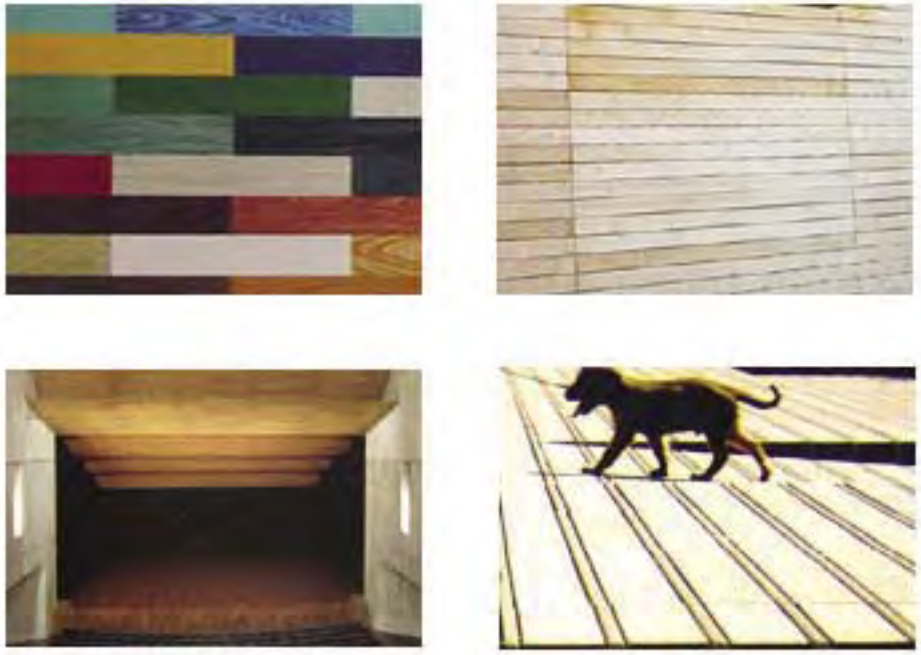


Illus. 74: Arrows indicate main movement axis

timber

As used in the design, timber represents the warm, more natural type of building materials. Within the structure of the building, timber is used in vertical circulation areas and on floors. It has also been used to clad various doors and partitions to improve the accoustic quality of spaces and to soften the interiors.

Apart form being a “warm” material, timber also acts as a reminder of the vegetation of the site, and brings these qualities into the interiors. Wood has a quality of impermanence which within the design creates a strong contrast materials such as concrete and masonry. The implication of using timber in the design is that, should the need of individuals change over time, part of the design can too.

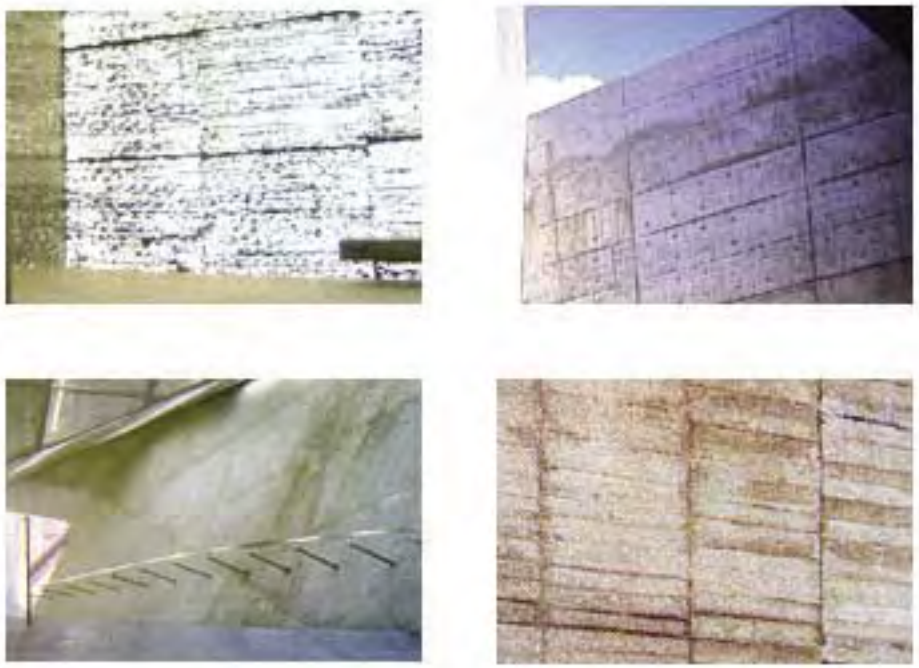


concrete

Concrete is used for the basic permanent structure of the building and consists of concrete columns with masonry infill and load bearing walls. Floors and roofs consist of concrete slabs, as mentioned previously. Although concrete can be perceived to be a heavy, cold material, this view is challenged by making it appear to be plastic and lightweight in ramp and staircase designs or by giving it a warm appearance by using different off-shutter methods. These methods include horizontal timber panels, vertical rough timber panels and smooth steel panels. In some areas the scaffolding marks will remain exposed, where in others, they will be filled in.

Pigments used in the concrete work are mainly applied to ensure that the colour remains consistent despite the aggregate used. Two neutral hues are used in the design, namely, off white and light grey. These hues have been chosen to ensure that the interior spaces seem light and airy. This is enhanced by the application of a light-transmitting concrete wall in a section of the exploratorium.

Illus. 75 Examples of timber and concrete to be used in the building design
Illus.76 on facing page: more material examples to be sourced for the design



masonry

Brickwork is used as a reminder of conventional building materials and to provide an alternative texture and colour to the design. Being a durable material, it also provides suitable weather resistance and load-bearing support. Facebrick masonry work requires little maintenance and can be laid by labourers less skilled than those who do concrete work.

steel

Steel is used throughout the proposed design as a lightweight and seemingly temporary intervention in the concrete structure. In certain finishes, perforated cor-ten and stainless steel is used to emphasise this lightweight quality. While the concrete work in the proposed building is used in such a way that it challenges perceptions of its usual functions, the steel work is conventional and straightforward. It provides an appropriate contrast to the other materials used and can be erected very quickly. Should the lifetime of the building expire in the future, then the steel members can be removed and recycled elsewhere.

mosaic, ceramics and acrylic sheets

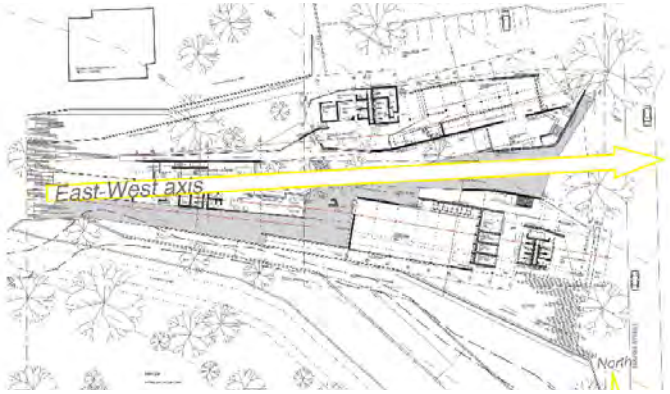
Mosaics and ceramic tiles are used in certain parts of the design to introduce colour and texture. As discussed, mosaics are embedded in a few concrete surface beds. Ceramic tiles have been attached to some concrete walls of the exploratorium. Whenever they are applied, they are placed individually and not laid as an entire surface. Acrylic sheets are used to transmit coloured light to interiors and to provide colour diversity.

natural site vegetation

The existing trees on site are seen as part of the design, in that the structure of the building is orientated in such a way that the existing trees are maintained and optimised in the design. As elements they are incorporated into the design by being framed as views out of the building. The feeling inside the building is that of a voyeur who is experiencing interior and exterior space from a different perspective as physical boundaries begin to blur and disappear.

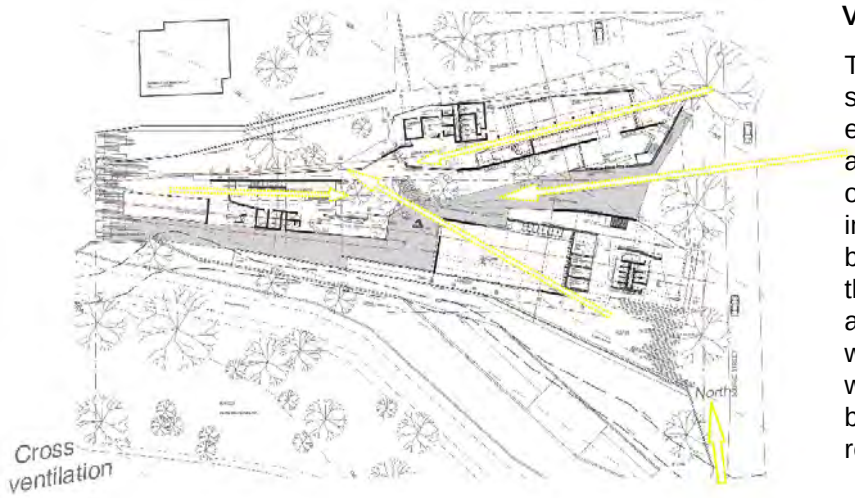
massing

The thermal mass required is achieved by concrete work absorbing direct solar radiation during the day, and releasing the accummulated heat into the interior spaces after a certain time delay. This delay is determined by the density and thickness of the absorbent surface. A slab depth of between 230 to 500 mm is usually sufficient to produce an adequate time delay so that day and night temperatures even out.



orientation

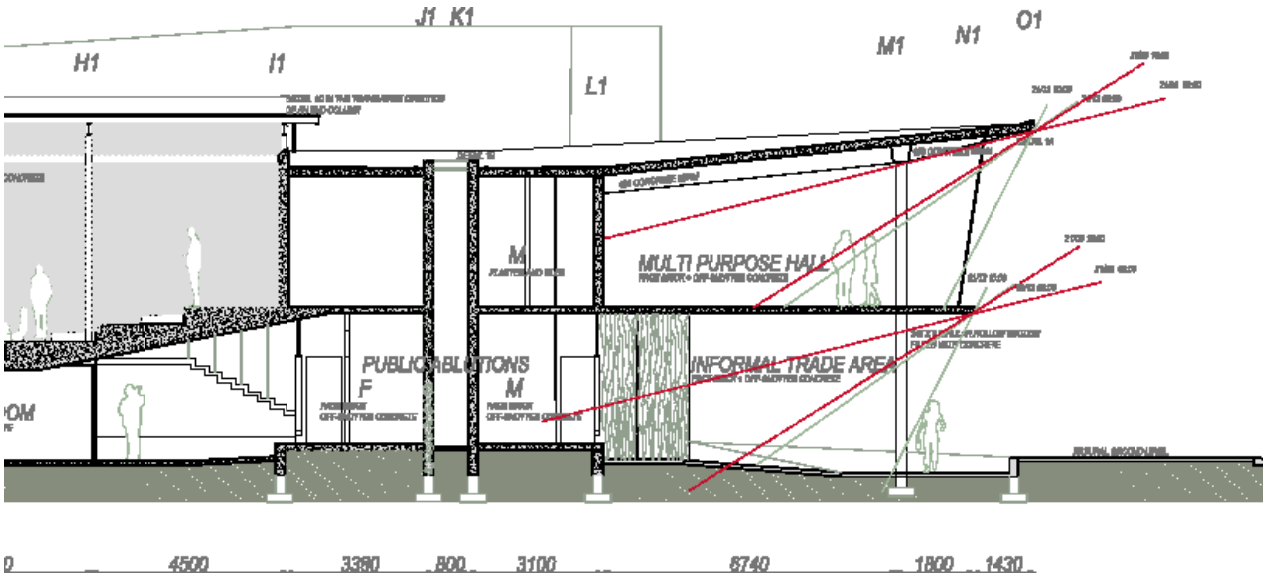
The site runs along an east-west axis, which enabled proper north orientation of most of the building. Façades facing east or west are limited in size and where they are glazed, they are screened from direct sunlight. The building is divided into three sections; by pulling these apart, the spaces within sections are exposed more effectively to the benefits of passive systems. Also, as a result, various micro-climates, such as evaporative cooling in the terraced flooding plain or shading and cooling from existing trees, develop between the built forms.



Illus. 77: Passive control systems of orientation and corss-ventilation

ventilation

The building dimensions allow it to rely entirely on passive control systems. The prevailing summer wind direction is from the north-east. The glazed openings in the end points of the building open up and thereby promote cross ventilation. Since cross ventilation can only occur when there is enough difference in temperature between indoor and outdoor areas, the building increases its exterior skins by layering the east, north and west elevations, thereby protecting the interior core of the building from direct heat gain from the hot afternoon sun. The design responds to the predominant winter winds by extending exterior walls out into the landscape forming wind screens during winter months. Furthermore, the curved building façade channels wind into the interior spaces and the residual movement routes formed by the building footprint.

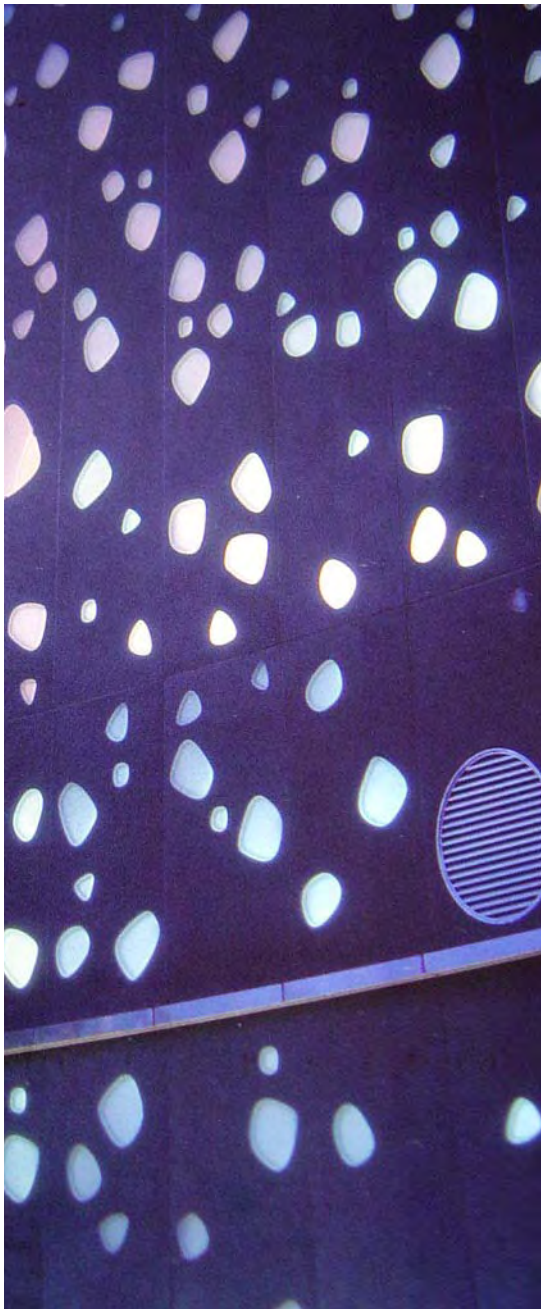


Illus. 78: The effects of solar angles on part of the design faicng east

During the day, indoor activities are to be naturally lit, as far as possible. Direct light into the interior cavity space is not recommended as it often causes glare and increases the internal air temperature considerably. It is for this reason that the building employs a layered façade, such as in the area adjacent to the activity hall. The concrete walkway in this case acts not only as a thermal protector, but provides an overhang so that the natural light filtering into the space may be diffused.

The following lighting requirements have been established and the building façades have been designed in response to these:
Ablutions: 50 lux
Kitchens: 100 lux
Reading areas: 150-200 lux
Offices, computer areas and writing areas: 200 lux
Drawing and craft work: 300 lux
Class, lecture or instruction rooms: 70 lux
Workshops: 500 lux

The exploratorium requires diffused lighting so that its areas are lit under controlled conditions. This will also allow for the area to be used as a craft exhibition space when necessary. The workshops, store rooms and the main activity hall open up on ground floor to allow for maximum daylight to penetrate the interior spaces. The top half of the southern façade of the main hall is clad with polycarbonate sheeting and continues around the uppermost part of the remaining facades, thereby increasing the amount of illumination within this space. Where direct sunlight is not desired, such as that on the main eastern and western elevations, a variety of screens provide options for its control.



Illus. 79: the quality of light as a building material.

light as a building element

Light plays a major factor in man-made environments. It has an influence on man's psychological reactions and physiological well-being [Gallagher: 75]. Lighting transports architecture beyond its physical attributes. Beyond form, it merges with other qualitative aspects of architecture: sound, texture, colour and movement. These aspects are especially relevant to the design of the exploratorium which promotes psychological development. Therefore, this wing has been design to provide a constrast between well lit and medium lit areas to emphasise the importance of light on interiors. Spaces where countless possibilities for the perception and representation of architectural form emerge from lighting techniques. Space becomes animated through the exploitation of light, thereby altering perceptions. Shadows may emphasize certain elements or may be obliterated to provide abundant light that it envelops everything.

Light traces the cyclic passage of time. Seconds, hours, days, months, seasons and years recur infinitely, whereas the time we spend in certain buildings and spaces is limited. We are reminded of the short and rapid lives we lead compared to the endless progression of universal time. The diurnal lighting effects on the building are emphasised by the placement of glazed openings, and the interaction of the building with view over the site.

Light as a powerful building element, explodes architecture into its metaphysical dimension. It plays with illusion and perception by creating a unique and qualitative experience of space. Artificial lighting, however is known to have negative physical and psychological effects on people. Natural lighting is not only a sustainable option, but is furthermore of great importance to the well-being of the users of a building.

colour_ a frequency of light

Colour in the built environment emphasises the importance of spaces. Colour is created by light and is therefore a form of energy, which affects body function just as it influences the mind and emotions. Therefore man's response to colour is complete; both psychological and physiological. [Mahnke: ix, 1]

Cultural associations affect colour perception. For example, the notion that children prefer primary colours has been disproved. When offered a wider spectrum of colours, children select a sophisticated and balanced colour palette. [Fehrman: 29, 117] Colour is introduced into the building design through finishes, from coloured roof lights to mosaic and ceramic tiles placed on surfaces. People are conscious of colour and texture variations in built environments. Studies point out that the presence of colour on exteriors gives rise to positive reactions, while the absence of colour is generally negative [Mahnke: 62]. Therefore, the design has a varied material pallette whose inherent properties provide colour and textural variations.

The proposed design tries to avoid monochromatic environments, which may be vandalised, perhaps as a result of displeasure or lack of stimulation. High-density developments with no playgrounds, little vegetation and cramped, small spaces reflect an impersonality and disregard for human emotions which is recorded in the minds of children. The environment therefore plays an important role in an individual's orientation and interaction with society [Mahnke: 64].

noise and sound control

The site is in a residential area with low levels of noise pollution occurring from traffic or industry. Peak hour pedestrian traffic and a neighbouring crèche will produce higher levels of noise during certain times of the day, but these are low enough to be controlled by the mass of the building structure and materials. Activities have been located so that those producing more noise are placed closer to each other, while quiet environments may enjoy more private spaces. Music and sounds escaping from the main communal activity areas are allowed to filter into the surrounding areas so that people may be able to hear what is happening inside the building and therefore may be drawn to discover more. Because the building is separated into different areas, this improves the overall sound insulation to prevent noise pollution between different areas.

Acoustic solutions for large areas consist of movable screens and roof insulating materials which are added to the structure in areas such as the main activity hall and the exploratorium. Because in theory, any type of activity can occur within these spaces provision has been made for the building to adapt to changes.

inclusive design

Because of the public nature of the building on ground floor level and because of the open communal nature of the spaces created, the building offers design strategies to cater for people with disabilities.

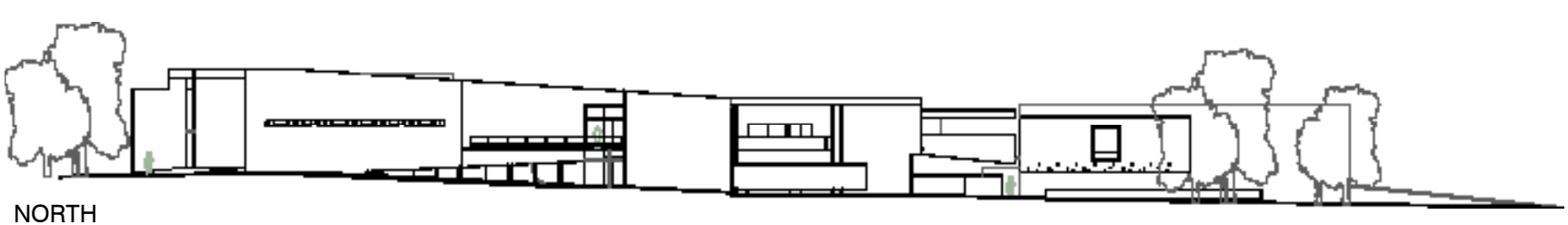
People with movement-related disabilities, have the option of using one of the multiple ramps located in and around the building. The maximum gradient for any ramp used in the design is 1:12, but ramps range from 1:12 to 1:40 gradients. With gradients such as these the ease of movement between spaces is encouraged. However, for people such as the elderly who suffer from arthritis and similar conditions, there are also various staircases with generously dimensioned risers and treads and also the necessary balustrades.

Colour is used in certain areas to accentuate aspects of the design and its functions and to provide clues to individuals with partial sight impairments as to the different spaces of the building. In areas which will house individuals with sensory sensitivities to colour, sounds, smell and even touch, the difference in materials and other interventions will be subtle to create gradual changes between different surfaces, while still maintaining their rich diversity and complexity.

The public and communal nature of the building calls for a high degree of safety in the event of fire. The specifications set by the NBR TT have been followed. Communal areas require a 120 minute fire resistance rating and offices need 60 minutes. Therefore, the concrete work will satisfy this rating, and as previously discussed, the steel members will be coated and thickened to accommodate the safety requirements.

Because the building is spread across the site, the actual design areas and dimensions allow for a higher degree of control over the spaces. An escape route is located every 45 m on straight movement routes and where a change of direction occurs, this distance will not be more than 15 m. Escape routes are clearly indicated and in most cases, because in essence the building only rises two storeys, most escape routes exit onto the ground floor.

All structural steel components will be coated with a thin-film mastic intumescent coating which will provide the adequate protection in the event of fire. The steel members in the design are mostly located on the ground floor, which ensures that appropriate escape routes are available within the required time limits. Further design measures include increasing the size of structural members to improve their fire resistance. Concrete work has a high fire resistance and does not require further treatment.



NORTH

7 product drawings

site plan
ground floor
first floor
section 1-1
section 2-2
section 3-3
section 4-4
elevations
details
3D model

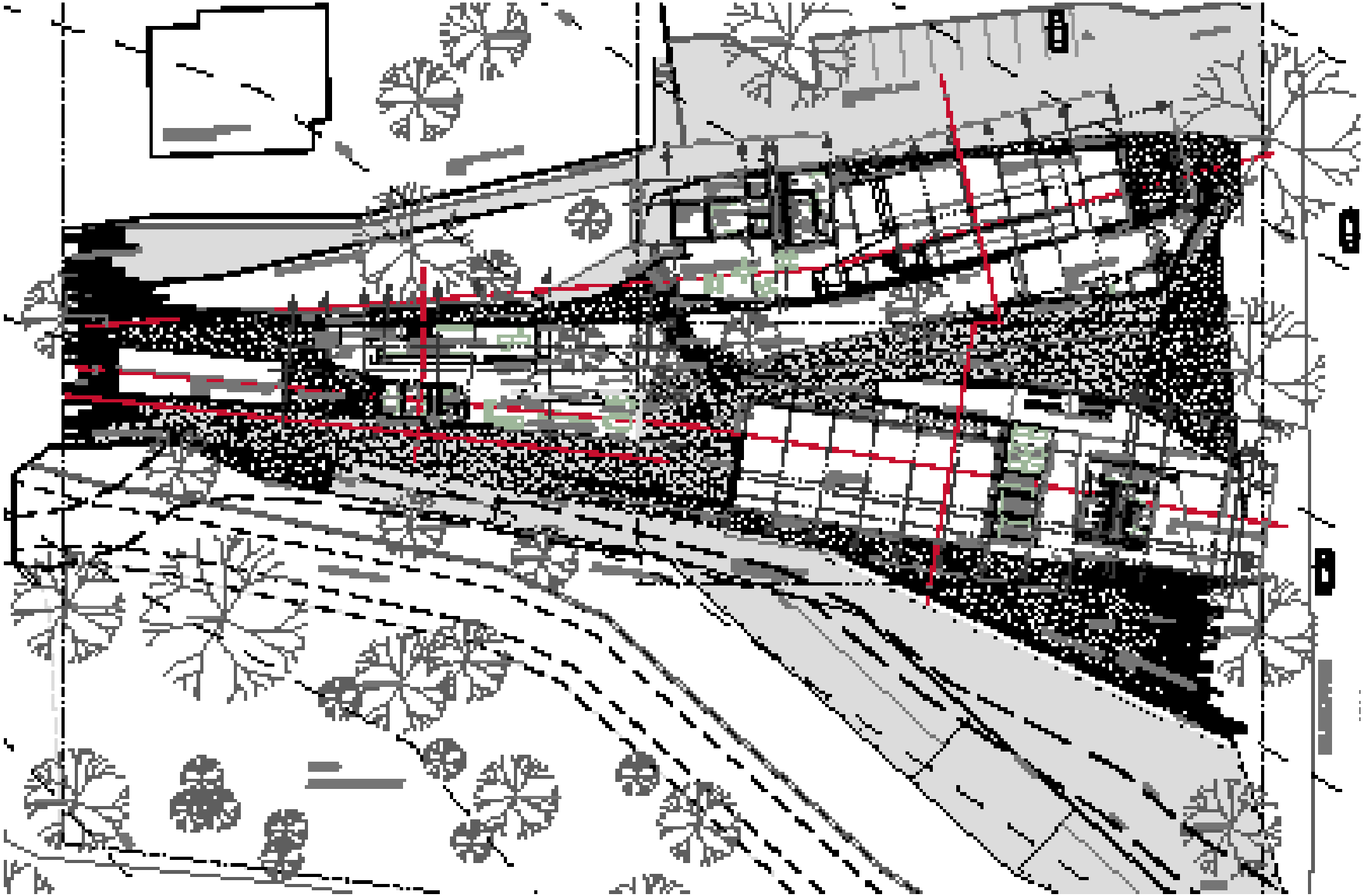
site plan
scale 1:1000

NORTH


1
Bound
1-20

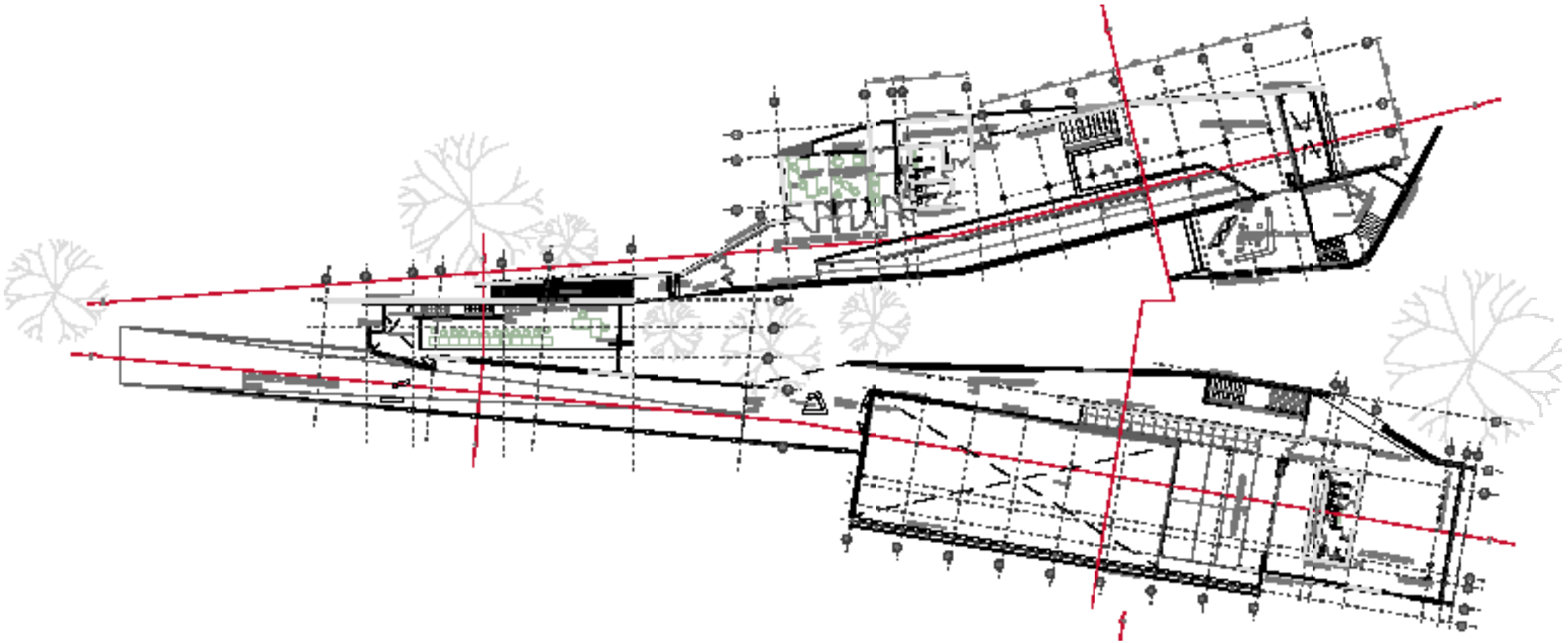
ground floor plan
scale 1:500

NORTH

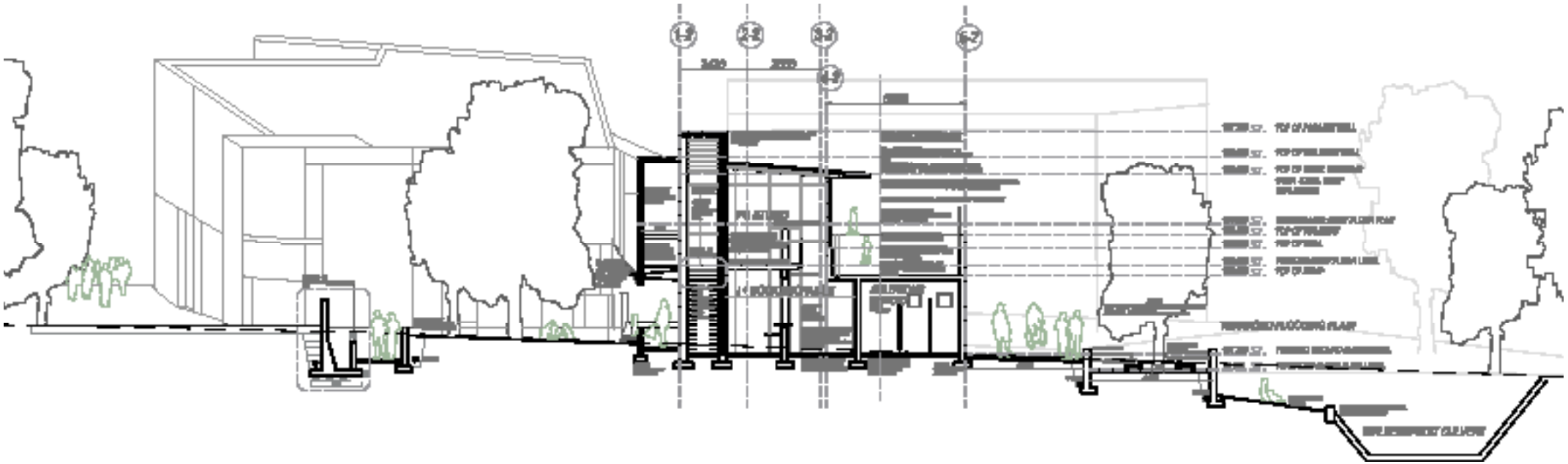


first floor plan
scale 1:500

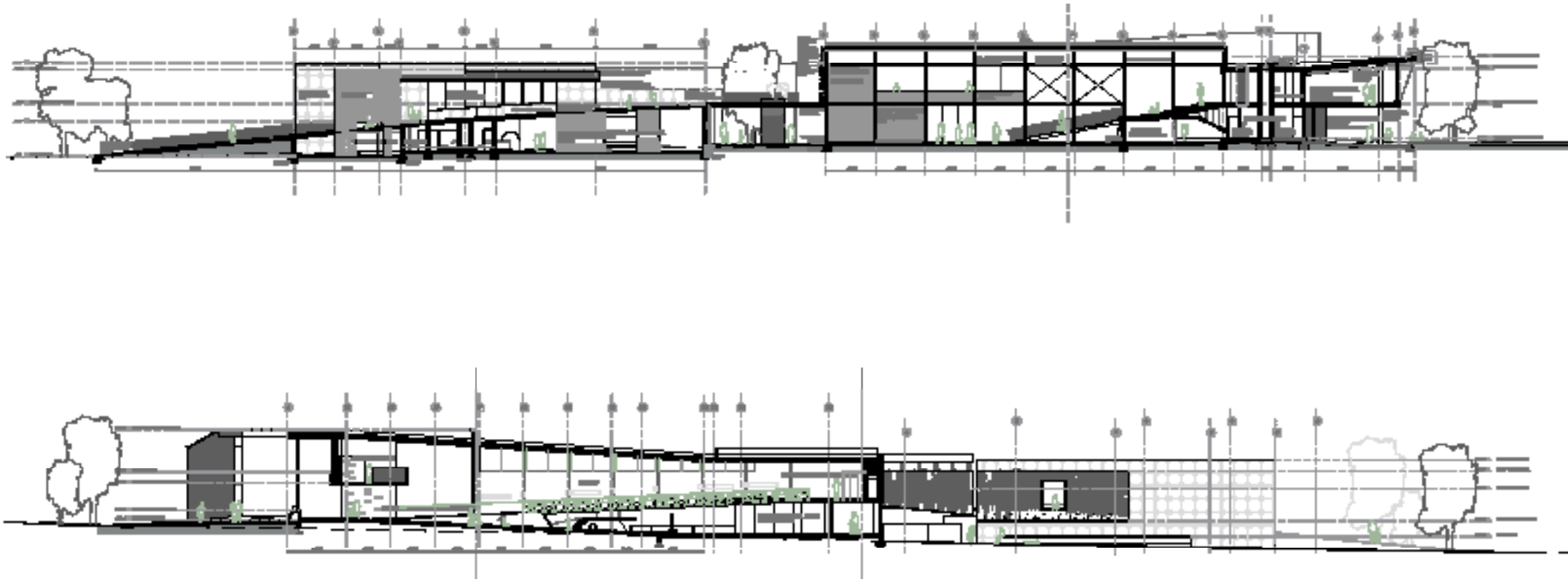
NORTH



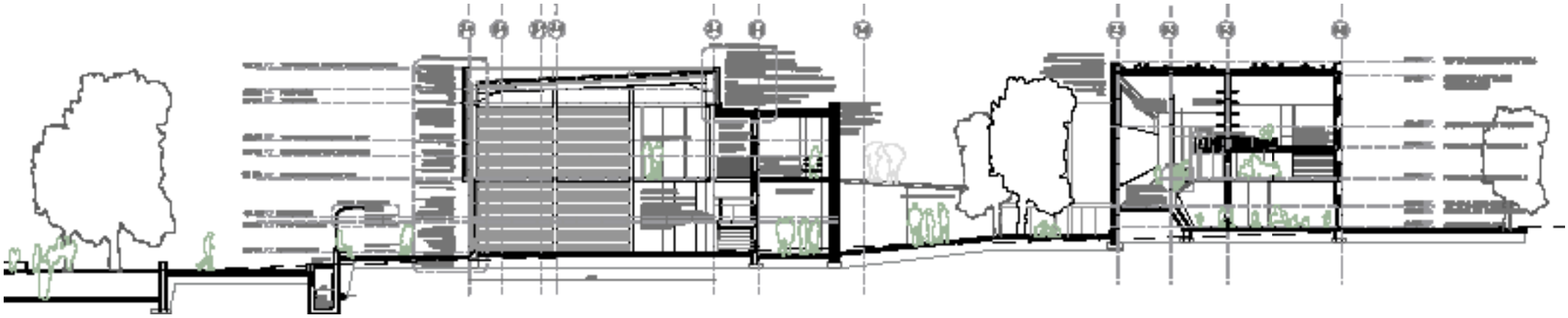
section 1-1
scale 1:200



section 2-2 and section 3-3
scale 1:500



section 4-4
scale 1:300

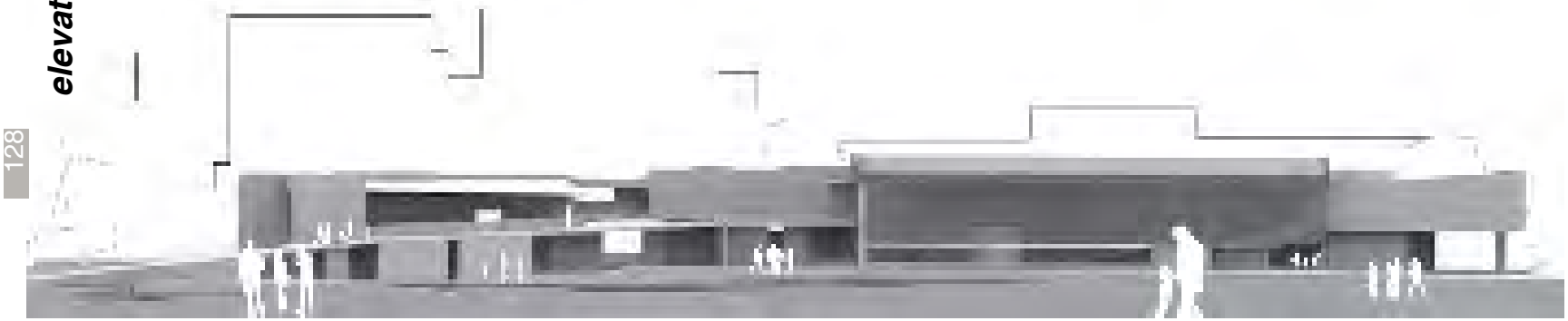


elevations

west


east

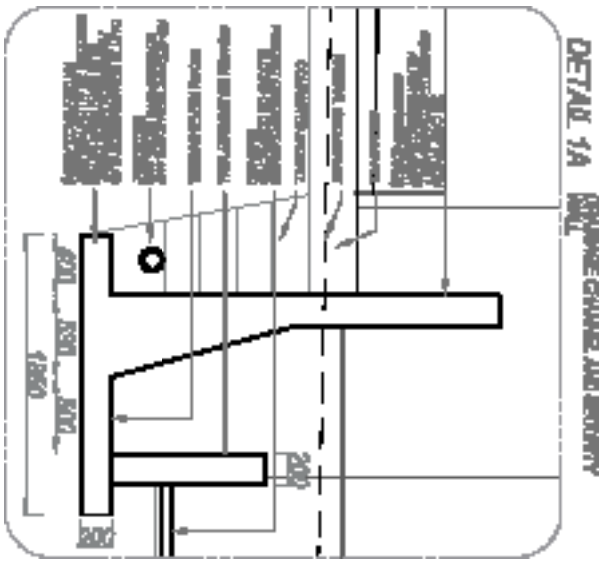
elevations



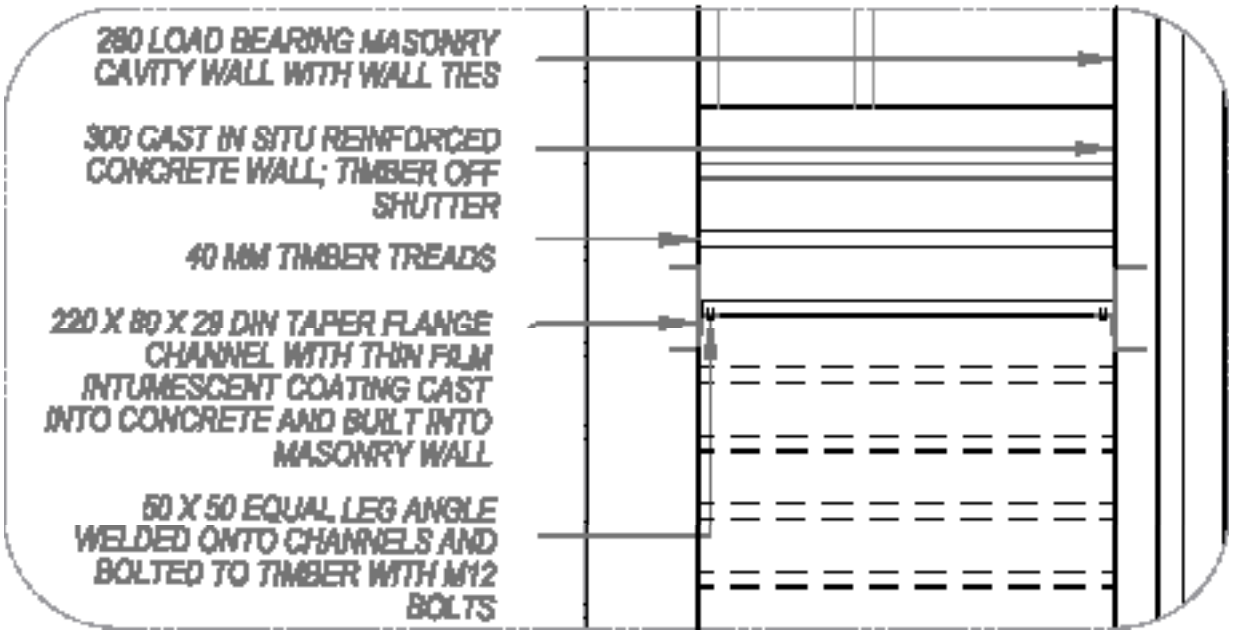
south

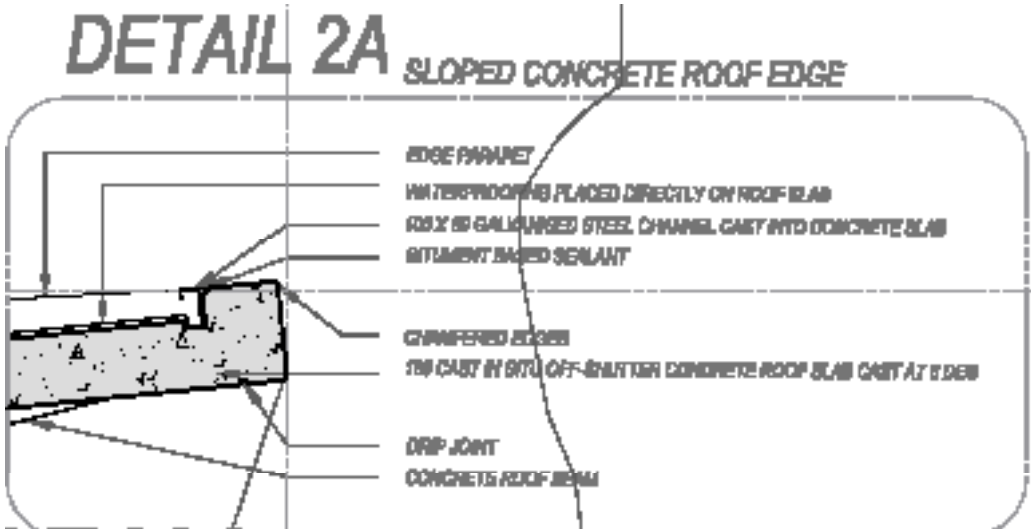
north

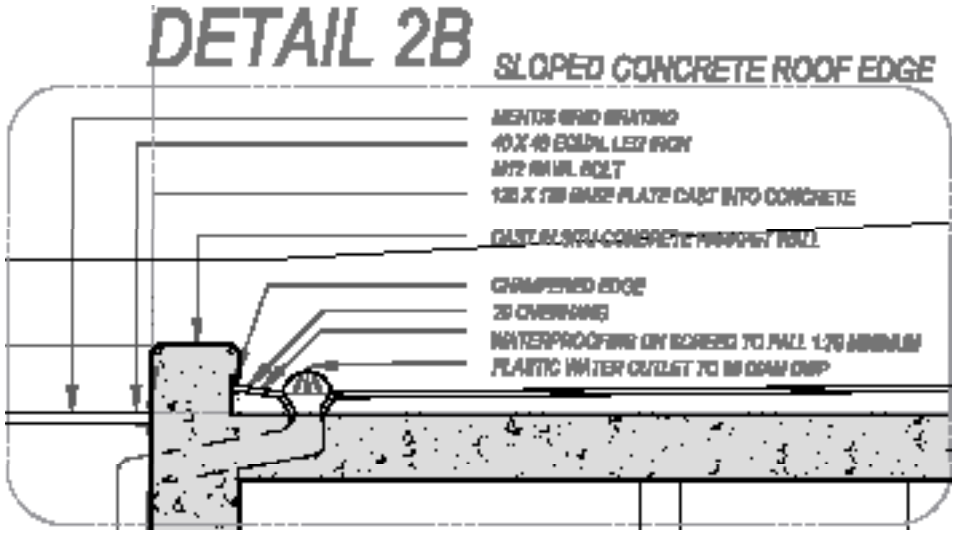
details
scale 1:50



DETAIL 1B TIMBER STAIRCASE

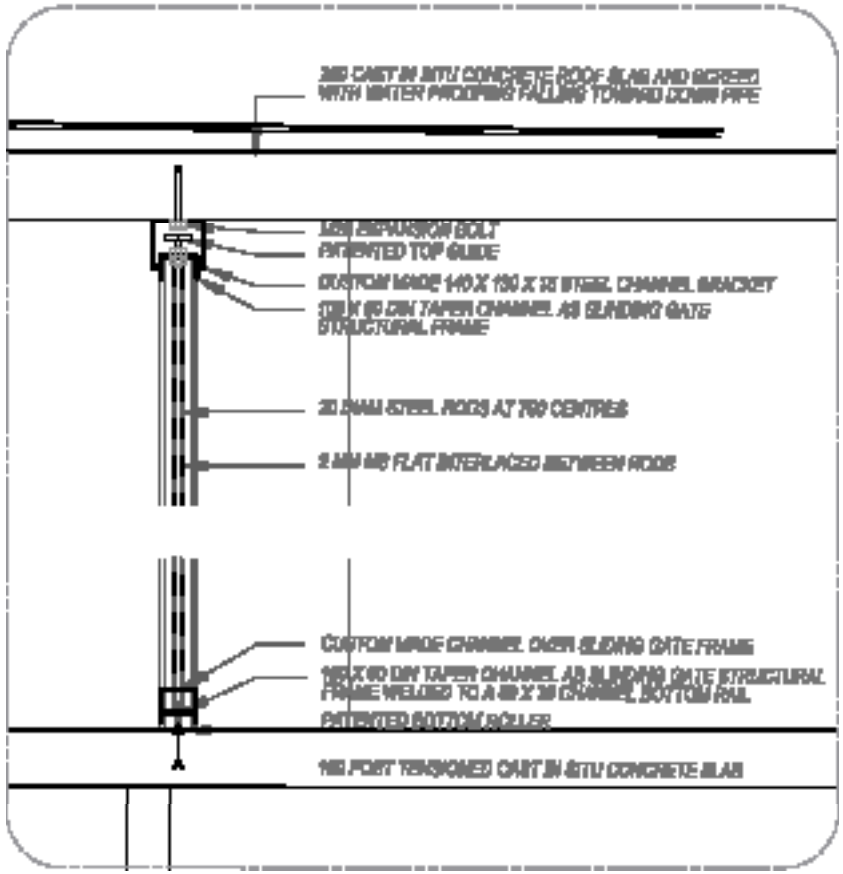




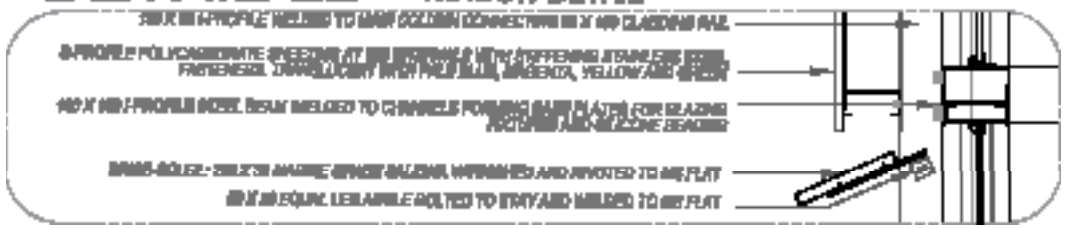


details
scale 1:20

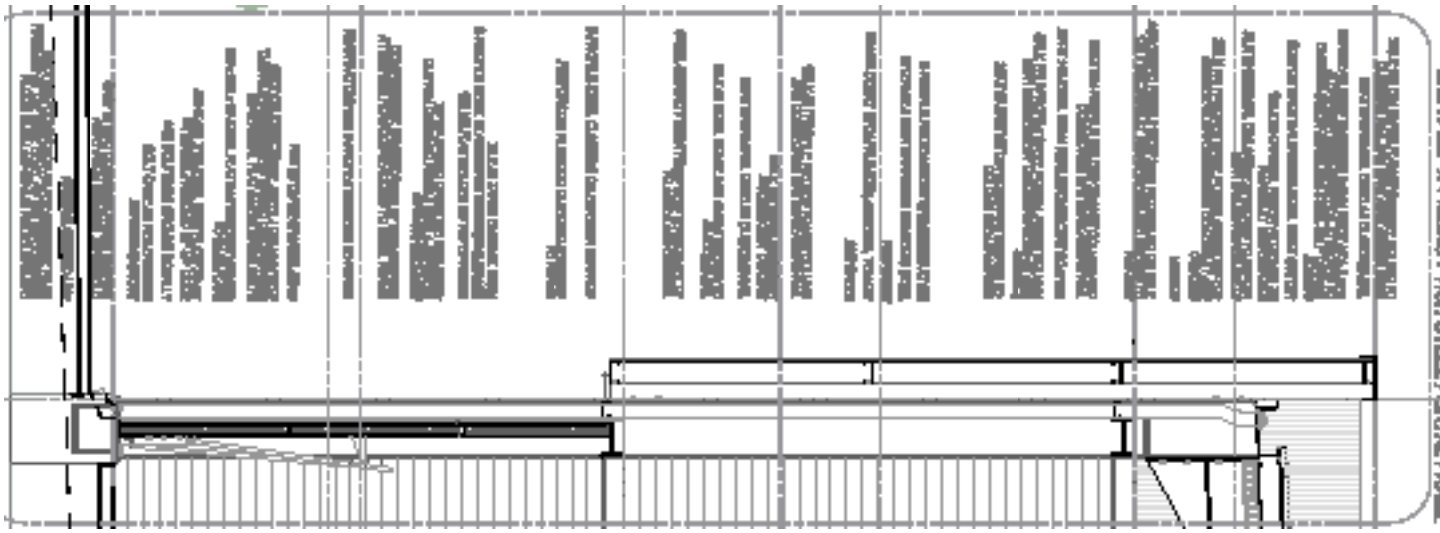
DETAIL 2C SLIDING GATE

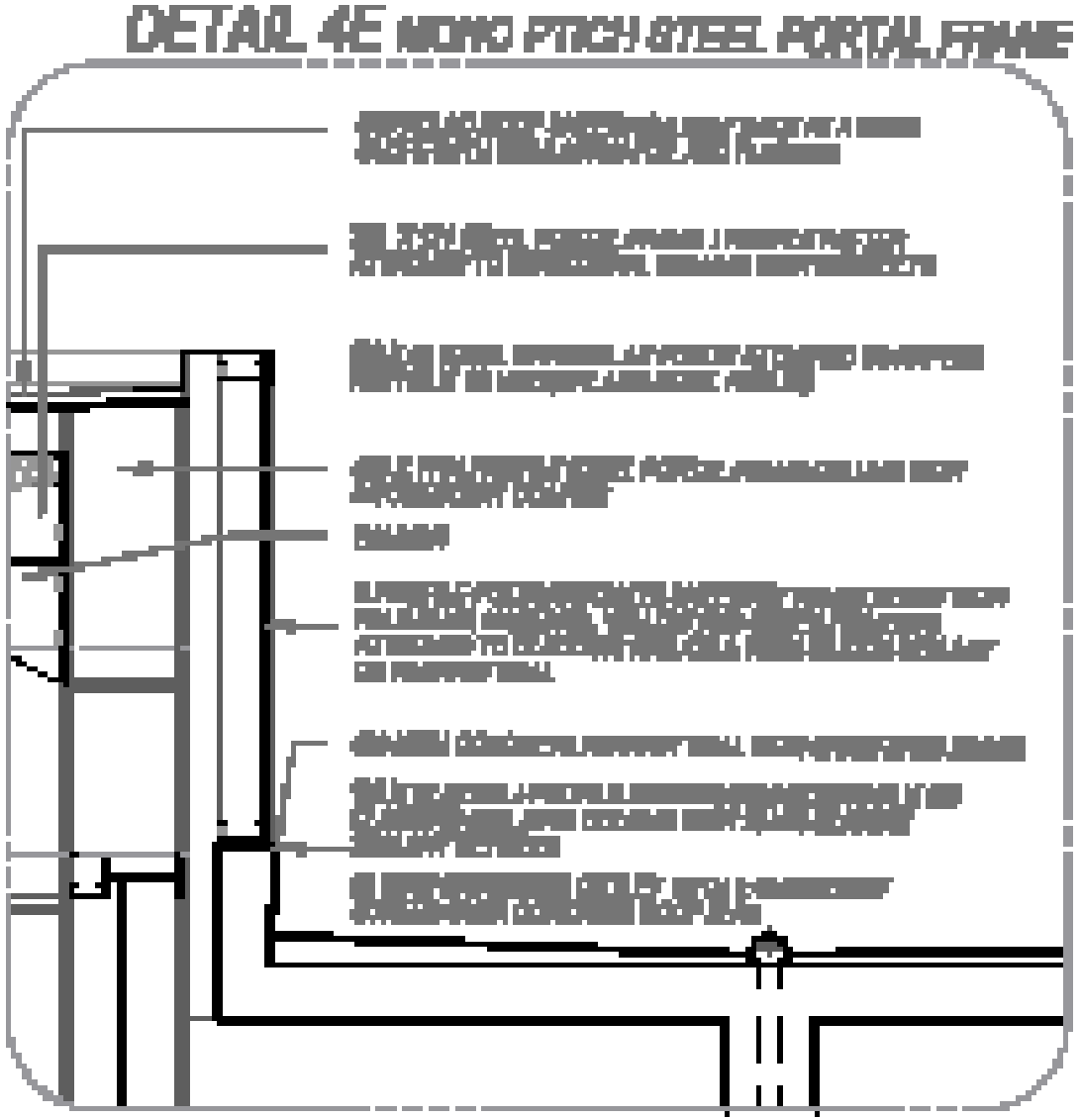


DETAIL 2D BRISE - SOLEIL AND WINDOW DETAIL

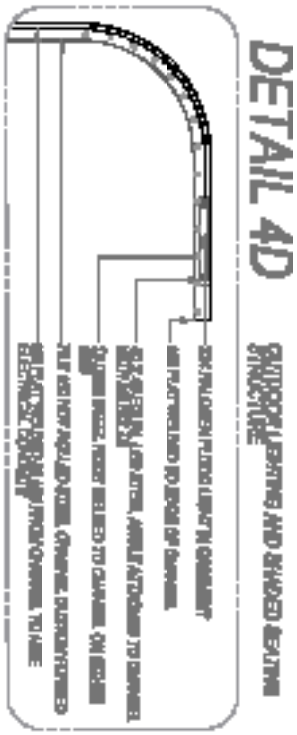


detailed cross section
scale 1: 50



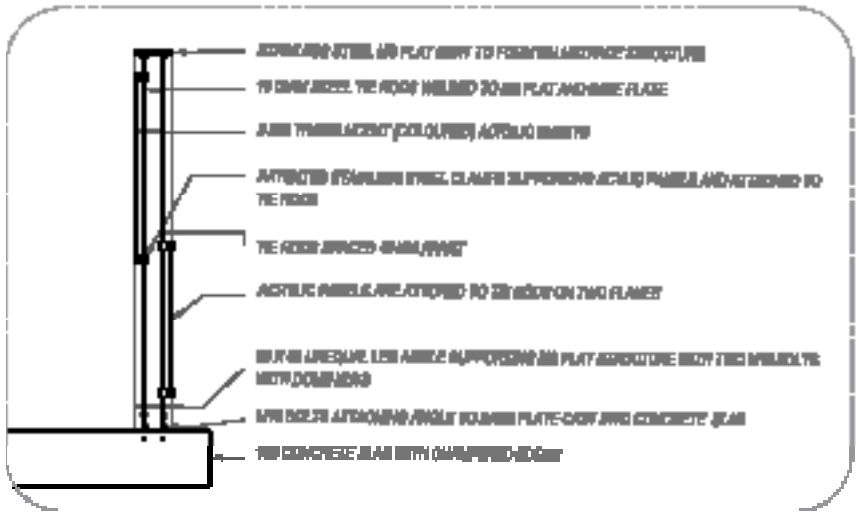

DETAIL 4E MONO PITCH STEEL PORTAL FRAME

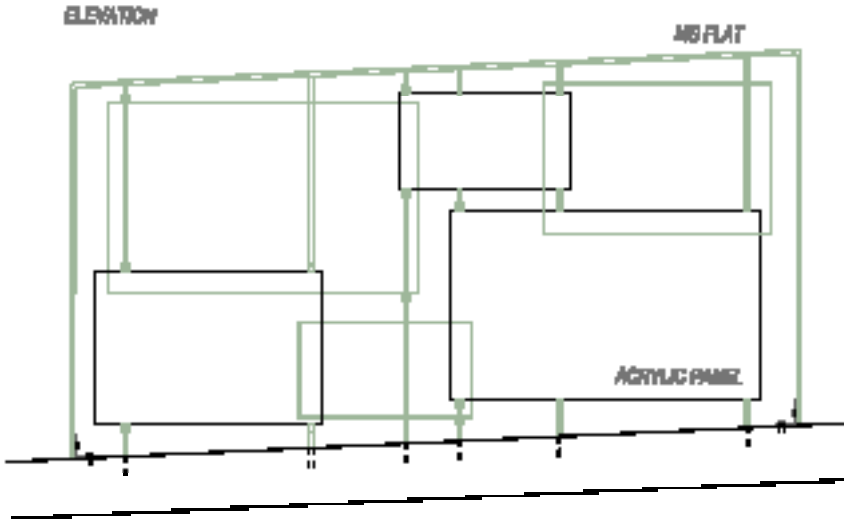
details
scale 1:20



DETAIL 4B

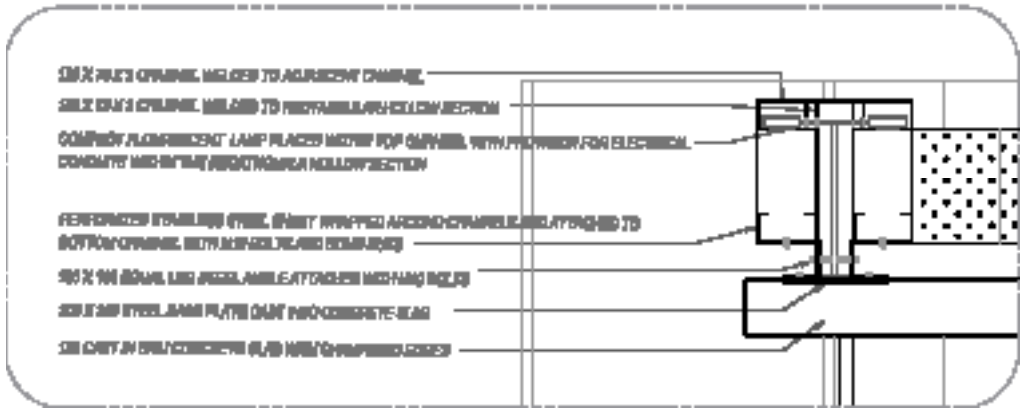
TRANSLUCENT [illegible] ACRYLIC PANEL BALUSTRADE





DETAIL 4C

PERFORATED STAINLESS STEEL BALUSTRADE / [illegible] WALL



masonry specification and steel portal frame
scale 1:20

BRICKWORK
CLAY BRICKS TO SABS 227

FACE BRICKS
CLASS 1
WATER ABSORPTION LIMITS: 10%
MOISTURE EXPANSION LIMITS: 0,05%
WORK SIZE: 230 X 110 X 76 (IMPERIAL)
YELLOW

MORTAR:
PORTLAND CEMENT TO SABS 471
COARSE RIVER SAND TO SABS 1090 FROM THE SAME SOURCE THROUGHOUT CONSTRUCTION
LIME FOR MIXING MORTAR ACCORDING TO SABS 999 (READY MIXED MORTAR MAY ONLY BE USED WITH APPROVAL)
CLASS 2= 1:1:6 FOR GENERAL WORK (MPA)

MIXING:
SAND AND LIME TO BE MIXED DRY ON A CLEAN SURFACE. ADD WATER TO STIFFEN AND ALLOW TO REST FOR 3Hr.
MIX WITH CEMENT USING A MECHANICAL MIXER. ADD WATER TO THE REQUIRED PLASTICITY.
USE WITHIN 2 HOURS OF MIXING

METAL WALL TIES SABS 28:
BUTTERFLY WALL TIES USED IN ALL CAVITY WALLS

STORING:
UNLOAD CAREFULLY. PREVENT CHIPPING OR BREAKAGE AND STACK ON A LEVEL AREA.
PROTECT CEMENT FROM MOISTURE AND USE IN ORDER OF DELIVERY WITHIN 8 WEEKS.
PROTECT SAND FROM CONTAMINATION WITH FOREIGN MATERIAL.

BOND:
AS FAR AS POSSIBLE USE FULL BRICKS USING STRETCHER BOND UNLESS OTHERWISE SPECIFIED
TIES TO BE USED AT 450MM CENTRES WHEN USING BRICK TO CONCRETE WORK USING 40 MM SHORT WALL
TIE CAVITY WALLS AT 1M CENTRES ON EVERY THIRD COURSE

LAYING:
LAY BRICKS ON A BED OF MORTAR AND FILL ALL JOINTS SOLID
CONSTRUCT COURSES ACCURATELY AND CHECK HEIGHTS (9MM COURSE)
USE AN APPROPRIATE MECHANIC TO CUT BRICKS
WET CLAY BRICKS 24 HOURS BEFORE LAYING

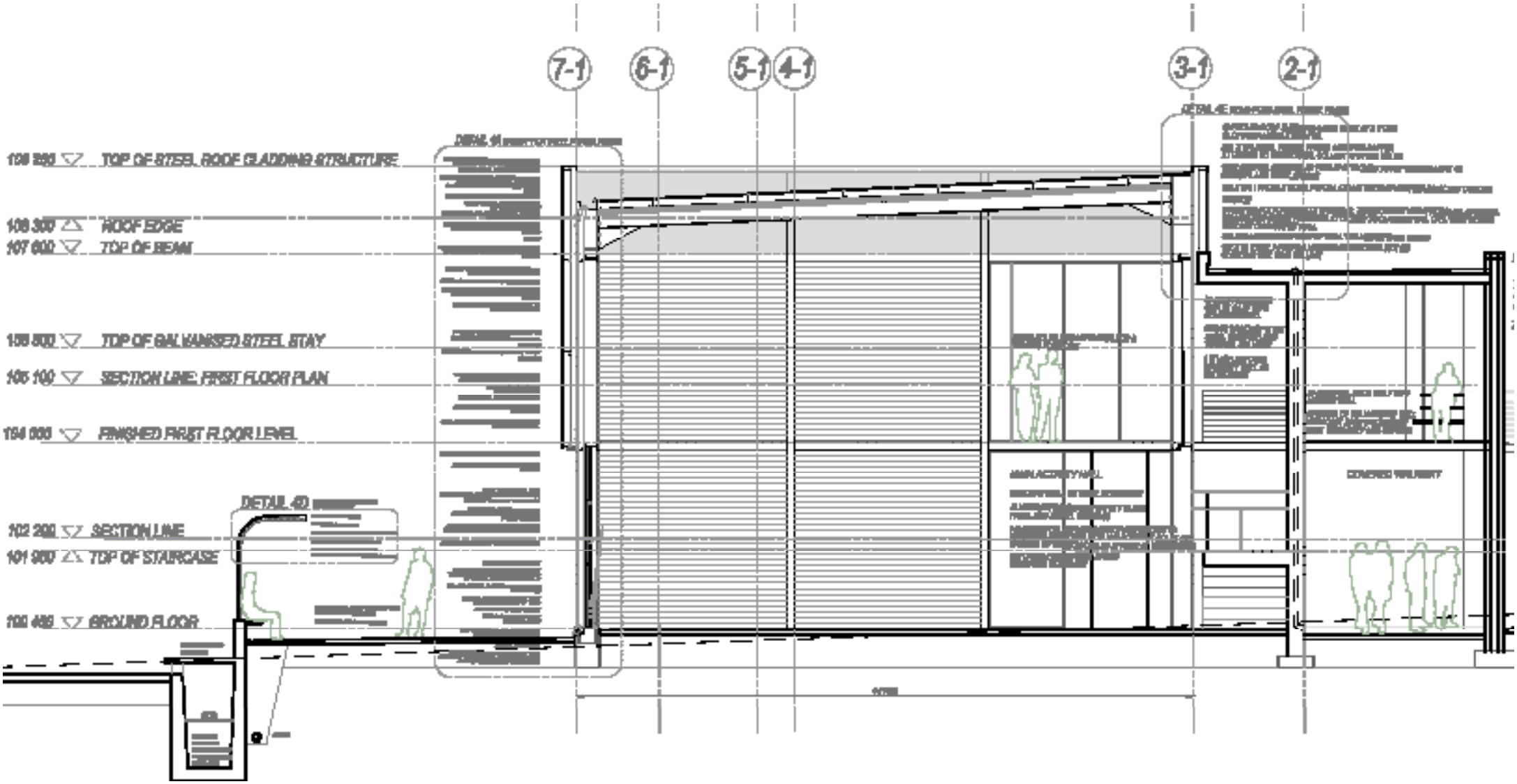
JOINTING:
FINISH JOINTS FLUSH UNLESS OTHERWISE SPECIFIED

CLEANING:
KEEP FACE BRICK WORK CLEAN
DO NOT USE OIL AS A PRIMA. DO NOT CLEAN BRICKWORK WITH HYDROCHLORIC OR SULPHURIC ACID

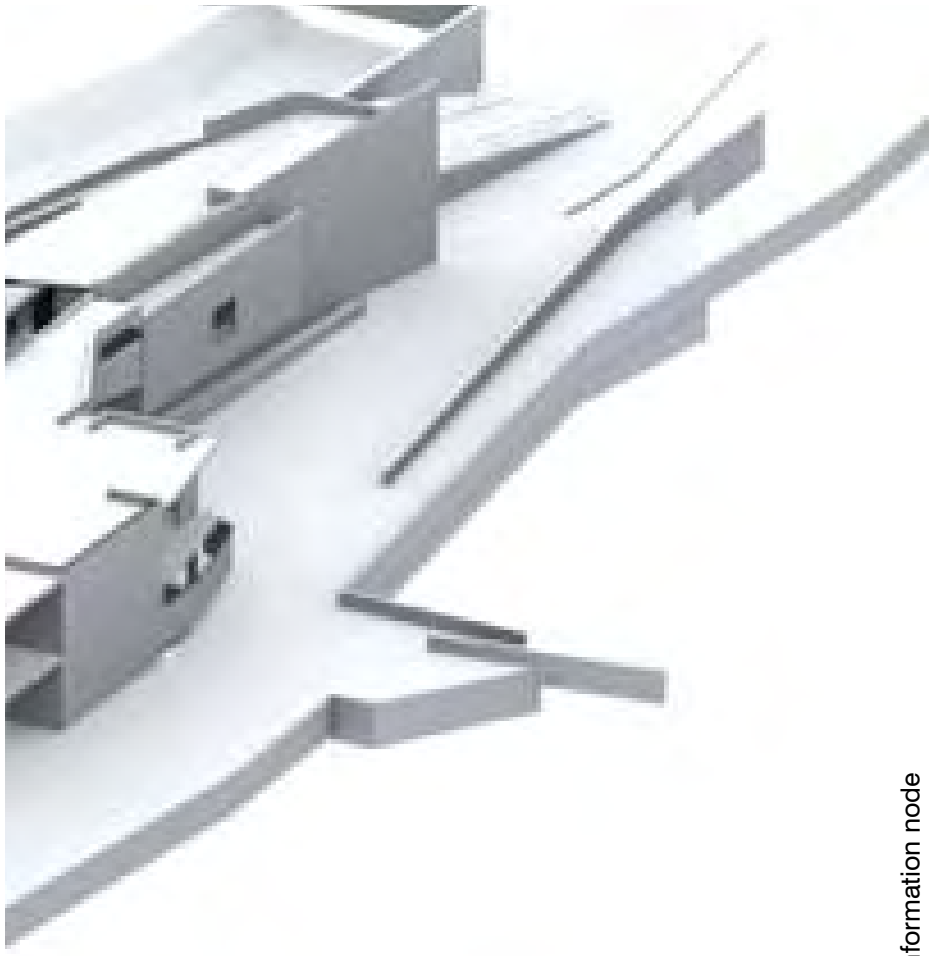
SORTING:
DO NOT USE DAMAGED BRICKS. KEEP TO THE SAME COLOUR THROUGHOUT

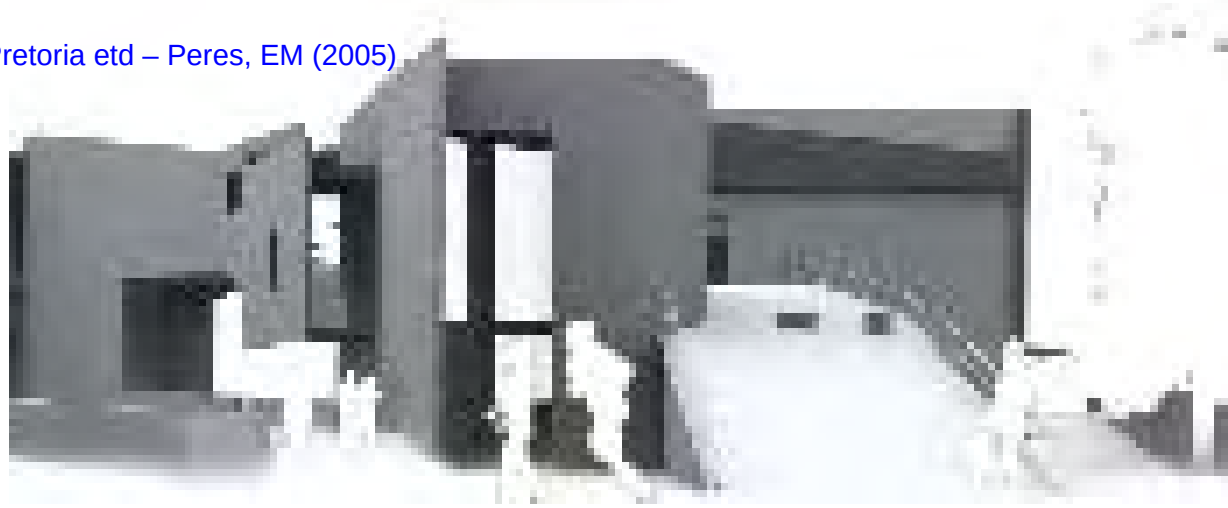
CAVITY WALLS:
KEEP CAVITIES CLEAN. JOIN WALLS WITH 2.5MM BUTTERFLY WALL TIES PUT FROM EMBED TIES IN SMM MORTAR JOINTS AND SLOPE AWAY FROM THE INTERNAL WALL

MOVEMENT JOINTS:
FORMED USING BITUMEN IMPREGNATED SOFT BOARD
FILL THE FOREMOST PART OF THE JOINT WITH SILICONE (UNLESS OTHERWISE SPECIFIED)

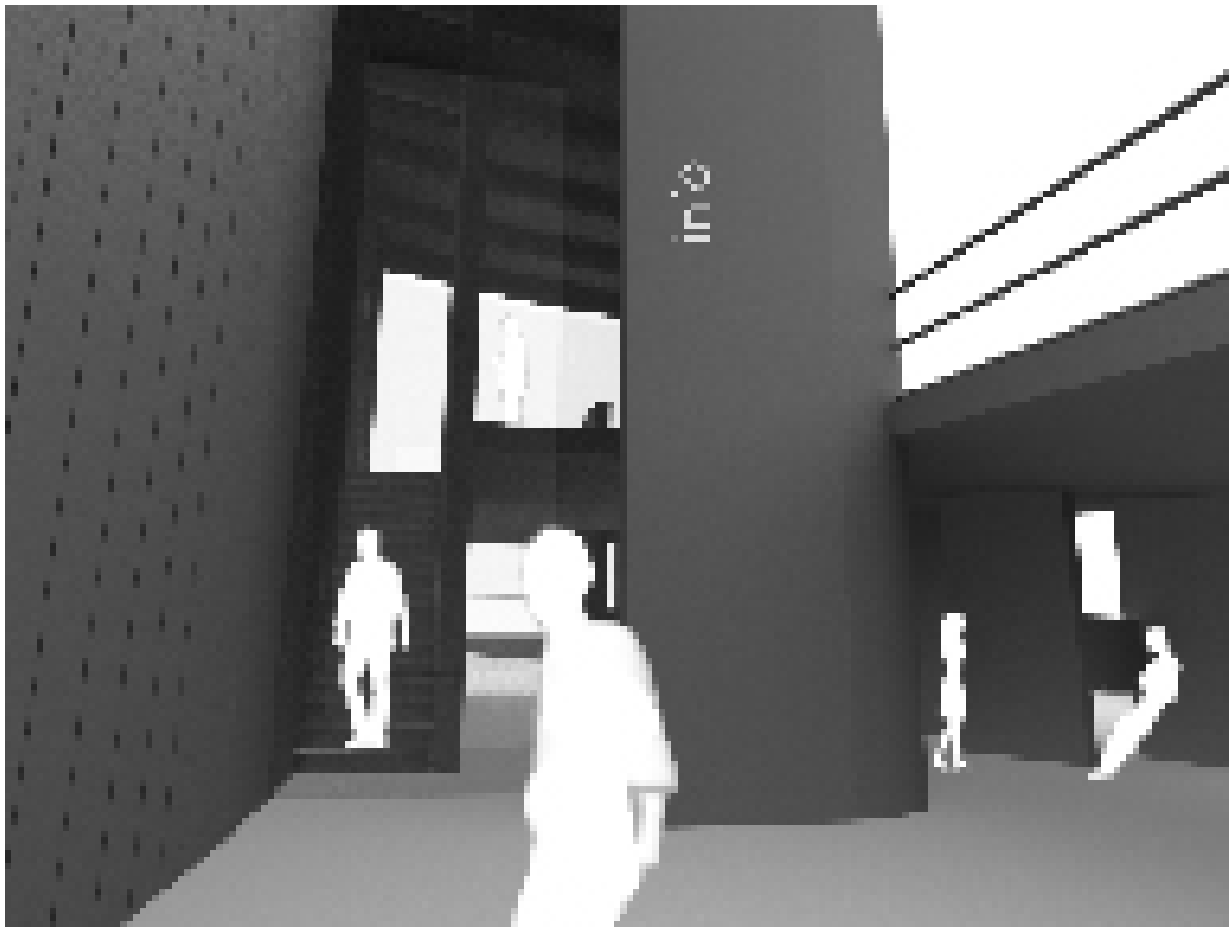

7-1
6-1
5-1
4-1
3-1
2-1
TOP OF STEEL ROOF CLADDING STRUCTURE
ROOF EDGE
TOP OF BEAM
TOP OF GALVANISED STEEL STAY
SECTION LINE: FIRST FLOOR PLAN
FINISHED FIRST FLOOR LEVEL
DETAIL 40
SECTION LINE
TOP OF STAIRCASE
GROUND FLOOR

aerial view of community space

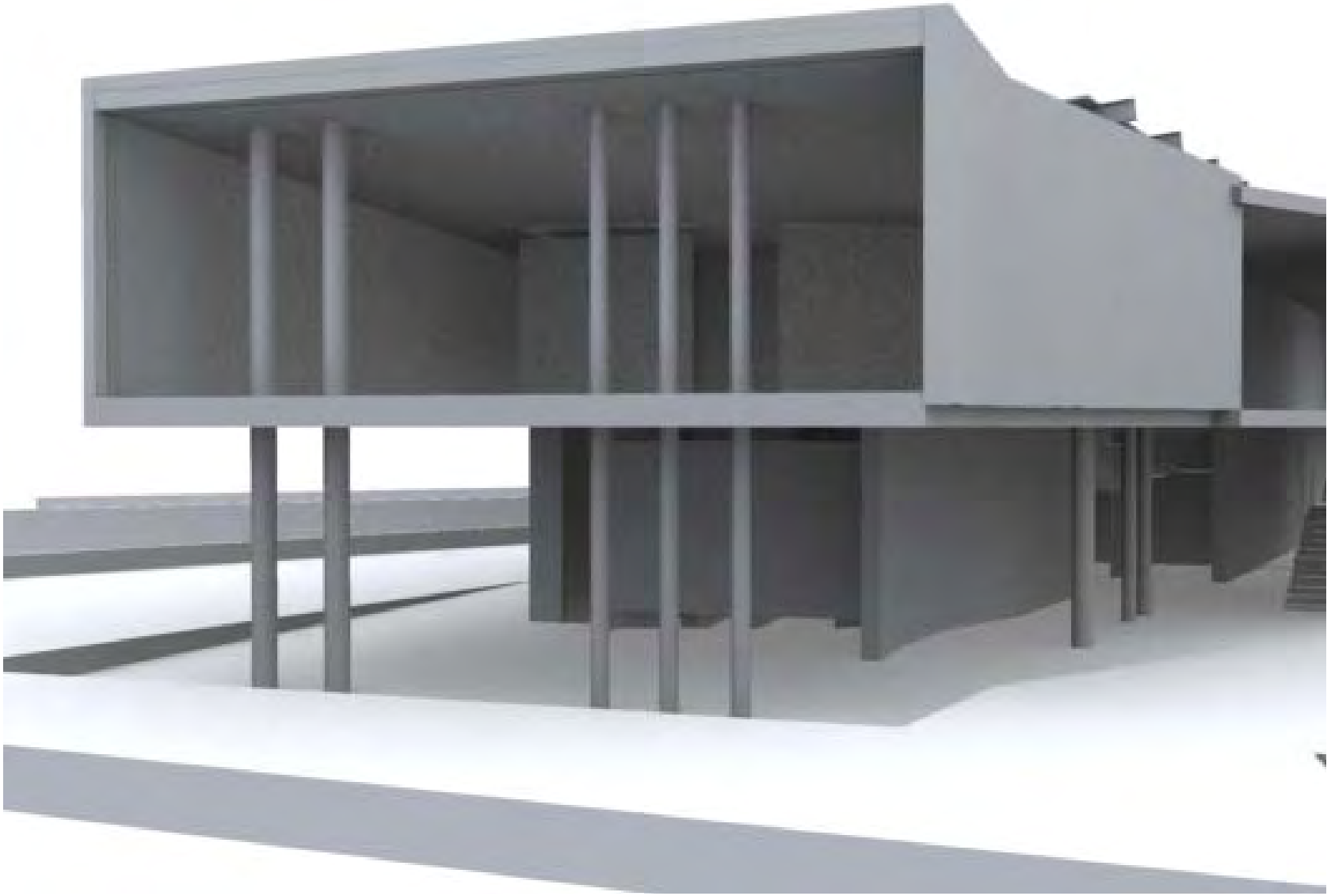




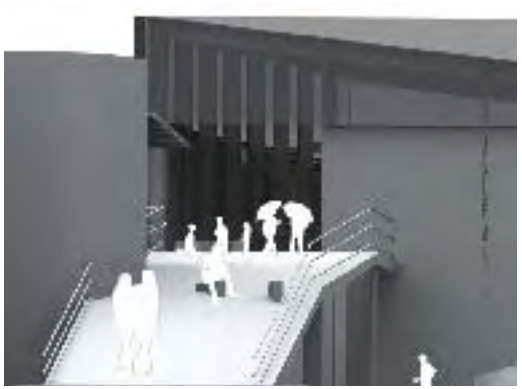
outdoor ramp and information node



3D computer model

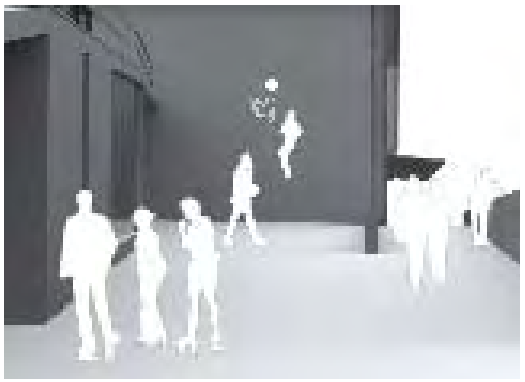


informal trade area and activity hall above



ramped walkway

informal trade area



promenade

movement route

8

conclusion

The decline in the quality of architecture, has resulted in built environments which adversely affect users. This dissertation has investigated how architectural space affects people, and how through design, peoples' well-being can be improved within sensory-rich environments.

The design proposal is based on a search for an architectural solution which offers opportunities for the exploration and personalisation of space. The senses are stimulated in response to a diversity of materials and juxta-positions. Perceptions are challenged by the design, which does not conform entirely to traditional built forms. The design emerges from the programme and is easily adapted to ensure its usefullness.

Lives unfold within buildings; and it has been shown that buildings affect people profoundly. Architecture's powerful effect on humans and consequently society, makes it much more than just a building, it becomes a fundamental part of life.

9 addendum

design influences

***surface architecture >manipulations**

+forum 2004_herzog + de meuron

+yokohama terminal_foreign office architects

+maritime youth house_plot

**programme*

casa da musica_OMA

**local*

faraday precinct_albonico + sack

frameworks

accommodation schedule

list of abbreviations and terms

forum 2004_ herzog + de meuron barcelona

Situated on a terrain vague, a residue of the established city grid and generator of a new urban morphology, the site is informed by dualities. The architectural language camouflages the functional program. The terrain of the site, a free space, undulates between the various parts of the building, where the building itself emphasises the duality between its interior and exterior worlds. The forum interiors are spacious and vast in their lightness. The exterior exhibition spaces are uniform in their appearance and different spaces beneath the floating platform are determined by increments in floor level.

Public space in and around the forum consists of three levels in the sloping terrain. Below the floating slab, the public is encouraged to move freely across the site and subsequently though the building. It becomes a backdrop in which the public may use spaces as they wish. Exploring surface and structure. In essence, the area extends itself into the surrounds and becomes a vast park which creates an unlimited artificial urban landscape.

The approach towards the building plays with visual imagery and the floating blue slab seems to be cut into the sky where mirrored glazing reflects it. The effect on the senses is profoundly stimulating and the building begins to emerge form the terrain to show case its different aspects. The games that light plays with the building are most impressive. Although the exterior spaces are dark, the shafts of light and views to the sky at certain points encourage the exploration of the spaces. Movement through the site is promoted by the different levels on the terrain leading the individual through and beneath the building.

The overall sensory stimulation in the Forum urges the public to move through the building, and while so doing, to touch the blue sponge like texture of the walls; to peer through the openings in the slab with views to the sky; to look at the surrounding context of the Forum through its sheltered interior; or to stare at one's own distorted reflection on the mirrored ceiling of the slab. The success of the Forum as an urban landscape with strong forms contrasted by 'slack' space as well as a high emphasis on experiential value through the use of materials is seen as a valuable precedent for this project.

Illus. 80: Barcelona Forum, showing its form, plans and details [Digitally enhanced image sourced from architectural Review no. 216. 2004]

Illus. 81: Plot youth centre manipulates landscape as shown in the photos and plan [Digitally enhanced image sourced from architectural Review no. 249:2004]

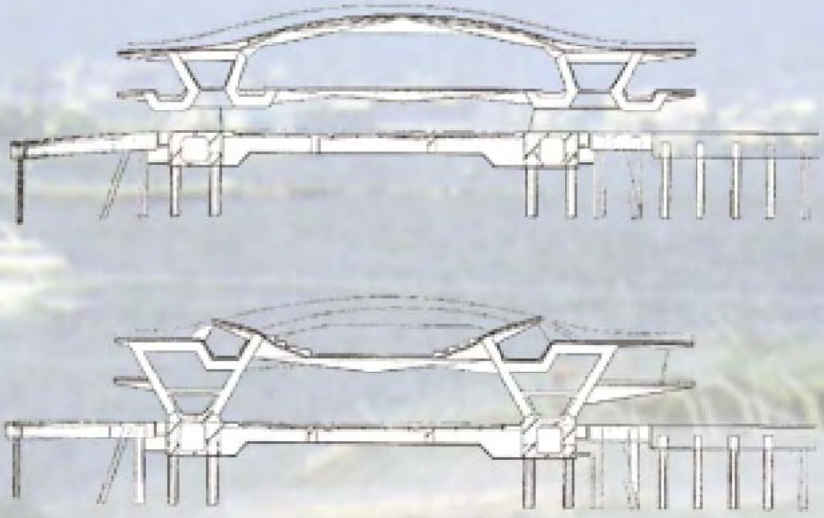
maritime youth house_PLOT
copenhagen

Designed to house two diverse programs, that of a youth centre and a sailing club, the site accommodates both functions by manipulating the landscape. The manipulated geometries in the artificial landscape comprising the deck provides shelter for boats and play areas for children, thereby catering for the needs set by the program.

Constrained by a small budget, the most successful aspect of the design is the multiplicity of the spaces created by the lifted deck, as well as the vertical cross programming. There are two houses within the deck, one housing the youth centre and the other, the workshop for the sailing club. The spaces between these two facilities flow into and out of each other, creating boundless spaces with limitless opportunities for exploration.

Forming part of an urban renewal program over a brownfield site, the transformation of the site into a useful environment creates a successful extension of the landscape, albeit an artificial one. Materials used in the design reflect the varied functions of the building. Wooden outdoor decks are contrasted with white and grey concrete within the houses so as to emphasise the dominance of the outdoor spaces.

The dual program and accommodation of functions within one structure is used as an example of cross-programming. The design does not delimit the types of uses and encourages various interactions and interpretations, while still serving the required functions.



yokohama terminal_
forreign office architects

Open architecture is the architecture of public space, with undefined interior and exterior spaces and merged boundaries. The Yokohama terminal translates technology into a space for social interaction. Locals and tourists mingle in a setting which extends into the surrounding parks and harbour. The resultant civic space becomes a foyer for the city, a melange of promenades, parks, halls, etc.

A new architectural expression is considered by a fresh generation of architects to be one architecture as a supreme object of cultural, artistic and social significance. The terminal represents a place of flux, in which boundaries between interior and exterior spaces dissolve; as do architectural conventions.

The building's monumentality is evident in its approach to function within the society and its unique and extraordinary form. However, the building is intended to be experienced as a series of sequences rather than as a single iconic object. The networks of sequences provide a variety of choices relating to the use of spaces. Movement is not defined and the building becomes a non-orientated space which integrates itself with the city.

The building's qualities are experienced only once users begin to move and purposelessly wander through the spaces, discovering the opportunities contained within them. The tectonic qualities of a structure based on folded steel result in a building which is transformed into an urban landscape sensitive to the context of the harbour. Exploration of movement in its ordinary and functional from becomes anything but. Building as movement and as experience in a built landscape has been taken from this design to influence the proposed building.

Illus. 82: Yokohama terminal [Digitally enhanced image sourced from Domus no. 851. 2004]

casa da musica_ OMA
oporto

The transparency of the building is emphasised by free-flowing spaces and interruptions. The core of the building consists of the "music box" around which all the other spaces wrap. This plywood box is unlike any other auditorium in that it is glazed on one side, thereby further increasing its transparency; here listening occurs through the eyes.

Fusing the monumental with the civic, OMA continues to search for a new architecural typology within a form that loops and merges into different spaces, each with its own surrealist qualities. From the dramatic glass entrance which further breaks the urban front, to the views over the city, the building never ceases to explore new solutions to old problems. The main public areas encircle the auditorium and may be used for a variety of functions simultaneously. Furthermore, the interior spaces open up to the exterior so that passers-by are able to view the activities inside. The building's transparency is thereby extended.

The quality of materials and variety of spatial experiences embedded in the design offer not only the approriate setting for the musical function of the building, but also promote a range of cross-programming possiblities within the surrounding areas.

Illus. 83: Casa da musica create form by wrapping programme and eanalyses traditional spaces [Digitally enhanced image sourced from Architectural Review no. 223. 2004]

The Faraday Precinct was was designed to accommodate a strong transport industry, as well as African healing services. Due to its high historical value, the precint maintains its importance within the urban setting as a gateway to the city for rural commuters and job seekers. Tasked with finding public-sector interventions for the framework, the team identified and honed in on the main site activities: transport interchanges and informal trade.

The design has been developed to reflect the diversity of these two programs. The bus and taxi rank has been designed to “reflect the excitement, and dynamism associated with movement” [SA Digest 2004: 32] [Illus. 01/02]. Nearly two years later, the taxi rank remains empty, not due to a decrease in taxis, but rather to a lack of interest. This project shows that it is at best difficult to prescribe conditions to the informal market. Taxis perfer to station themselves underneath the adjacent M1 highway like they used to [Illus. 03/05]. This project shows that it is at best difficult to prescribe conditions to the informal market.

The traditional healing centre caters for both private and public, and temporary and permanent activities, by providing various halls and rooms placed in such a way that functions are juxtaposed to highlight the diverse uses housed on site. An example can be taken from the internal muti centre which is camouflaged on the street front by conventional trade [Illus.04]. The design adopts the language of the context, and acts as a reminder of the past and present.

faraday precinct_Albonico & Sack with MMA
Johannesburg

Illus. 85: Faraday Precinct. Images show some spaces within the area are still not used [Digitally enhanced image sourced from Architectural Digest South Africa 2004]
Illus. 86 on facing page. Informal activities occuring throughout Tshwane.

informal city activities

Informal urban structures are characterised by their impermanence. Their flexibility and adaptability to different locations means that minimal infrastructure is necessary; in fact, the most important factor affecting them is location. Sidewalks and building edges are therefore characteristically utilised and building entrances or garages become entrepeneurial hubs. These trade activities cater for and rely almost entirely on the movement of pedestrians. Understanding these principles of flexibility, impermanence and movement is essential to inform a sound design for informal facilities.

pretoria inner city_ integrated spatial development program [ISDF]

The ISDF places a strong emphasis on the interaction of the public realm in urban activities as well as connecting urban elements to upgraded natural features. Ultimately, the aim is to develop a sustainable city with a strong identity within a legible urban structure.

The proposed site falls within the Sunnyside proper precinct and borders Sunnyside East. Both of these areas are to develop dense residential areas next to Walkerspruit. The green chain of the Walkerspruit is to form part of the city's wide open space systems, offering opportunities for recreation and urban agriculture. These open spaces are described as high activity nodes and their accessibility has to be improved. Overall improvement of the legibility, linkage and physical continuity of the spaces has to be achieved.

Applicable framework requirements for the site

Well defined urban structure	Multifunctional green open space system	Improve clarity of urban order
		Create visual linkages
		Differentiate between public and private realm
		Structure the interface between urban and open space by increasing access and recreational opportunities
Enhance natural features	Re-establish natural open areas	Protect and develop natural boundaries, edges and seams
		Increase civic development and awareness
Improve mobility and accessibility	Support pedestrian environments	Ensure short walking distances and mixed uses
	Integrate public transport systems	Create a legible, integrated and accessible road system
Enable sustainable economic development	Adapt to change and growth	Provide a flexible and wide range of income-generating opportunities
Create areas with unique identities	Enhance unique characteristics	Strengthen character through labelling and boundary definition
		Promote functional and aesthetic connections between buildings

the nelson mandela development framework

The Mandela Development Corridor (MDC), along Nelson Mandela Drive, creates a buffer of urban regeneration between the inner city and the higher density residential districts of Arcadia and Sunnyside. Emphasis is placed on movement systems and flexible, mixed use development with safe and secure public spaces. These provide infrastructure to act as catalysts for urban renewal and a local district network.

The Apies River and Walkerspruit precints are dealt with in the 1999 'Apies River Urban Design Framework'. The Culverts can become positive spaces if their edges are activated and managed to allow for proper access along them with night lighting. Mixed-use building types with limited vehicular access should front onto the river edge.

Applicable framework requirements for the site

Public open space	Active Edges	Clearly distinguish between public and private
	Perimeter blocks	Define boundaries
		Engage with greater city environment
Local district squares	Streets	Place small parks throughout every local district
	Parks	Create larger green areas for the residents to use as public recreational areas
	Large parks and open spaces	Establish a public square as focal point and to house a variety of public functions linked by a well-identified route within walking distance
	Small squares	smaller squares occur at small wasted land between buildings or at pedestrian intersections
Apies river and Walkerspruit culvert	Active edges, proper access and good night lighting.	Mixed-use buildings should front onto the river edge
		Improve management and security of vehicular access along edges
Verticality	Spatial framework	Provide mixed amenities; accessibility and legibility of a public building and shared infrastructure
		Encourage interaction between people; provide flexibility and variety for the client and the end users.

tshwane inner city development and regeneration strategy

The Tshwane Inner City Development and Regeneration Strategy aims to focus public budget expenditure on specific projects and catalytic developments, thereby creating strong stimuli for private-sector investment using an integrated, multi-disciplinary approach. The proposed interventions will integrate physical, economic and social spheres which deal with certain strategic interventions that are proposed in the Inner City.

The Sunnyside area falls within several of these strategic interventions which include:
+The cultural circle, which aims to map all characteristics of the area to be marketed as a tourist attraction.
+The capital precinct: The government headquarters are placed within the Inner City as the heart of the Capital City. Elements of the Capital Precinct include:
- An axis of expression
- A monumental grid
- Framing grid (Welcoming Boulevards)
- People's squares
- Governmental Clusters
- Strategic or landmark sites
- Anchors (Church Square, Union Buildings)
- Capital junctions

The intersection of the Apies River, Walkerspruit, Nelson Mandela Drive and Church Street has been identified as a landmark for catalytic development for the inner city. The rivers provide settings for quality environments that can inform the design of the development. Further feasibility studies are being conducted into the possibility of widening the streams and providing ponds alongside them.

Movement in the city has been analysed according to three areas:

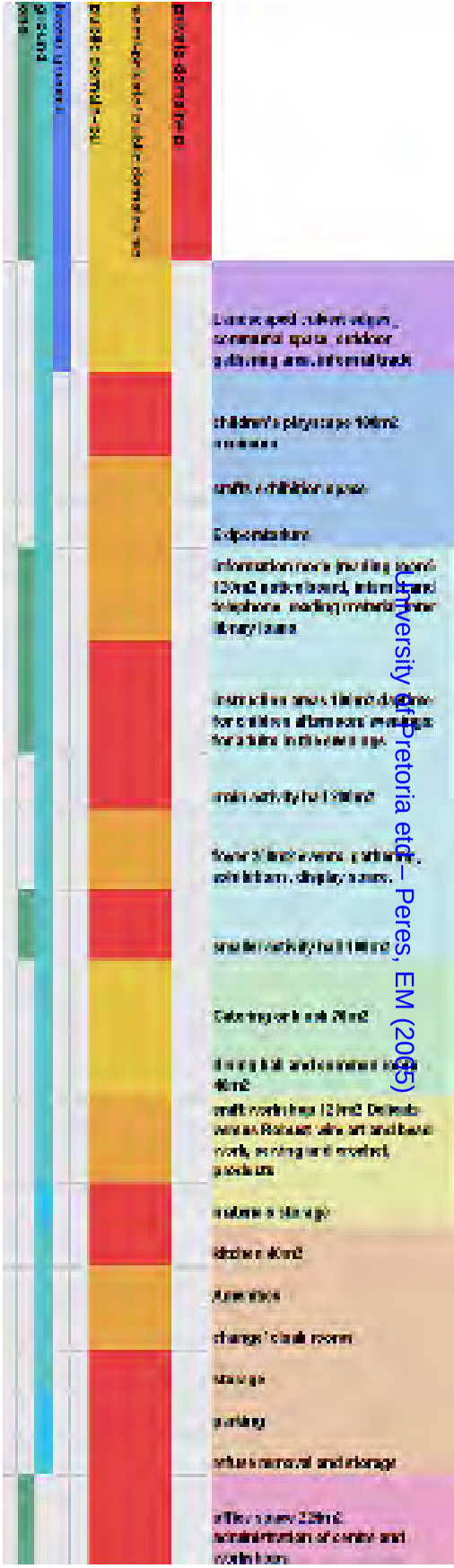
Inter-city movement: Gautrain and the inner city, Gautrain station, Standard Rail, access from Ben Schoeman highway
Intra-city movement: [workers, residents] Taxi's and Buses, Standard Rail, Road Re-alignments
Local Movement: Pedestrians/cycling, dedicated transport system

Urban forestry is considered an important aspect of inner city regeneration in that it is proposed that trees be used as a significant structuring element to define spaces aesthetically and functionally, to create rhythm and legibility along boulevards, and to integrate nature and built form.

accommodation schedule_

odation schedule in accordance with SABS 0400-1990 and SABS 0114: Part 1-1973

public domain	
Landscaped architectural surfaces	
proposed uses	communal space, outdoor gathering area, informal trade
occupant type	A1 (1p / 1m²)
Norms and Standards	SABS 0400 1990 DD2
	no opening >100mm in any balustrade (1m h)
considerations and objectives	link to Wallenpaupa Park
	focus on public accessibility
	passive surveillance: safety and security
foyer/ areas for informal trade	
area	200m²
proposed uses	events, gathering, exhibitions, display space
Occupant type	A1 (1p / 1m²)
norms and standards	SABS 0400 1990 CO7 table 2
	ventilation: 3.5 l/s pp
	disabled accessibility: SABS 0400 1990 Part S applicable to all areas
	general fire resistance: 60 min
	general escape routes: SABS 0400 1990 Part T
lighting requirements	400lux SABS 0114: Part 1-1973
considerations and objectives	scale
	flexible, transparent and robust space
	movement and experential qualities
	accessibility
	finishes
catering and kiosk	
area	50m²
occupant type	A1 (1p / 1m²)
population	20
Amenities	Male: 1WC, 2 Urinals, 2 HWB
	Female: 3WC, 2 HWB
norms and standards	
lighting requirements	
considerations and objectives	opens onto landscape
	accessibility
private domain	
kitchen	
area	work area: 30m2
	cold store: 5m2
	dry store: 5m2
	Goods entry and waste storage: 3m2 ea
norms and standards	SABS 0400 1990 CO7 table 2
	ventilation: 17.5 l/s pp
	fire prevention: SABS 0400 1990 Part T (3)
	refuse disposa : SABS 0400 1990 Part U
lighting requirements	200 lux SABS 0114: Part 1-1973
considerations and objectives	proximity to exterior spaces and activity hall (shared infrastructure)
	proximity to street: extra floor given to the homeless
semi-private domain	
craft workshops	
area	120m²
proposed uses	wire art and bead work, sewing and crochet, products
occupant type	B2 (1p/ 15m²)
population	20
Amenities	Male: 1WC, 2 Urinals, 2 HWB
	Female: 3WC, 2 HWB
norms and standards	fire prevention: SABS 0400 1990 Part T(3)
lighting requirements	400lux SABS 0114: Part 1-1973
considerations and objectives	Robustness of structure and materials
	flexibility and accessibility
	passive climate control to minimise overhead costs
	natural lighting
	interface for commercial activity
children's playscape	
area	100m2 minimum
proposed uses	A1 (1p / 1m²)
norms and standards	SABS 0400 1990 DD2
considerations and objectives	safety and security
	access and link to existing creche
	indoor and outdoor space



information node (reading room)	
area	120m²
proposed uses	notice board, internet and telephone facilities, reading room
occupant type	B2 (1p/ 15m²)
population	10
amenities	1 WC, 1 HWB shared
norms and standards	SABS 0400 1990: OD7 table 2
	ventilation: 8.5 ls pp
	fire prevention: SABS 0400 1990 Part TT31
lighting requirements	
considerations and objectives	proximity to the public domain
	flexibility of space
	privacy and control
	accessibility
centre for creative development	
instruction spaces /Exploratorium	
area	200m²
proposed uses	daytime: instruction areas for children
	afternoon/ evenings: community services for adults
occupant type	A3 (1p / 5m²), G1 (1p / 15m2)
population	30 (day); 30 (night)
amenities	Male: 1 WCs, 2 Urinals, 2 HWB's
	Female: 3 WC's, 2 HWB's
norms and standards	SABS 0400 1990: OD7 table 2
	fire prevention: SABS 0400 1990 Part TT31
	ventilation: 7.5 ls pp
lighting requirements	400-500 lux SABS 0114: Part 1-1973
considerations and objectives	adequate natural and artificial lighting
	sufficient ventilation
	flexible sub dividable spaces
	acoustics and optimum noise levels
	provide visual links
	accessibility
main activity hall	
area	400m²
proposed uses	gathering, practice space, performances, meetings, functions
occupant type	A2 (1p / 1m²)
population	200
amenities	Male: 4 WC, 7 Urinals, 6 HWB
	Female: 10 WC, 8 HWB
norms and standards	SABS 0400 1990: OD7 table 2
	ventilation: 3.0 ls pp
lighting requirements	250 lux SABS 0114: Part 1-1973
considerations and objectives	flexibility and adaptability of space
	acoustics
	connection to the rest of the building and outspace
	adjustable seating
	storage
	accessibility
smaller activity hall	
area	200m²
occupant type	A2 (1p / 1m²)
population	60
amenities (shared)	Male: 1 WCs, 2 Urinals, 2 HWBs
	Female: 3 WC's, 2 HWB's, 3 SWBs
change room	population 16-100: 0.8m2 pp or >12m2
	ventilation: 25 ls pp
norms and standards	4250 minimum headroom
	adequate ventilation
lighting requirements	250 lux estimated
considerations and objectives	lighting and visual link from outside
	length to breadth ratio
	accessibility and flexibility of use
	acoustic performance
office space	
area	225m²
proposed uses	administration of centre and workspace
occupant type	G1 (1p / 15m²)
population	15
amenities	Male: 1 WC 1HWB
	Female: 1WC: 1HWB
norms and standards	SABS 0400 1990: OD7 table 2
	ventilation: 5.0 ls pp
	access to escape areas
lighting requirements	500 lux SABS 0114: Part 1-1973
considerations and objectives	diffused natural lighting and ventilation
	flexible sub dividable space
	accessibility

cognition: noun [mass noun]
the mental **action or process** of *acquiring knowledge* and understanding through **thought, experience and the senses**.
[Oxford English Dictionary definition]

*T*he Santiago Theory by Maturana and Varela involves more than the simple view of the action of thinking. It **involves perception, emotion and action** – the entire process of life. In the human realm this includes language, conceptual thinking, and all other attributes of human consciousness.
[Capra p170]

the mind becomes a process – the process of cognition, which is identified with the process of life. The brain is therefore the structure through which this process operates.
Mind=process
Brain=structure
[Capra p171]

Tshwane refers to the Metropolitan city of Tshwane, the capital of South Africa
Pretoria refers to the CBD of Tshwane

CBD - Central Business District