

# Stadium Design

Context-ure: The active edge and asymmetrical destabilisation

How can stadium design change to provide an interactive edge that could act as a catalyst for urban generation?

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# A b s t r a c t

Stadium designs have long presented themselves as enclosures from their settings, introverted spaces with limited opportunities for interaction. The primary focus of this architectural type has been containment: maximum capacity for maximum economic gain, and the delivery of major events constrained to specific intervals of time. As an object, the Stadium does little to provide a permeable interface with which to engage the public beyond these events, that is, at times when it is 'open'.

Many cities have sought to use sports facilities, in particular stadiums, to initiate urban renewal in areas of declining growth. Their reliance has been upon the presence of the facility and not the way in which it could be designed. The challenge: to design stadiums that facilitate interaction outside of time constraints, acting as a stimulus or catalyst for urban generation and regeneration.

Looking to integrate various externally driven activities and facilities into a stadium design, my research involves the investigation of a series of different sites in Auckland, possible circulation and pathways, and potential points of engagement with owners and users of the surrounding setting.

The resulting design takes the life of a stadium beyond intermittent events and challenges the common organising principle they are formulated around that of symmetry. The purpose of this design is not to propose a model that can guarantee urban generation, but a design methodology that, if adopted, has the likely outcome of urban generation.

The turning point in my approach to the process of stadium design originates from the point at which symmetry in the game of rugby destabilises, leading to an "asymmetrically destabilised" plan, a peeling away of the enclosure and a response to the topographical context of the chosen site, Mutukaroa (Hamlin's Hill).

# I n t r o d u c t i o n

It was a major coup! Not since 1986 had New Zealand been host to the Rugby World Cup. With five years to prepare for 2011, excitement inspired extravagant expectations, in-depth planning and architectural research, and great national debate. The NZ Government decided Auckland needed a new stadium - the Auckland CBD waterfront was its trophy destination.

Public outcry eventually persuaded politicians to back down and, with time running out the site selection defaulted to Eden Park to undergo a major overhaul to provide a venue worthy of hosting such an event. Had Eden Park not been in existence, surrounded by nostalgic references to rugby, and just the old swamp land that it was originally, I would venture to say that there would be little chance of finding a stadium there today.

To me these factors posed the question, “if given the opportunity, where would I locate a stadium and why locate it there?”. This further inspired me to undertake a small investigation of my own. I made contact with Rod Sheard (HOK - Sport Architecture), who said the question of stadium design, as a catalyst for urban generation, was a subject that had been ignored by the academic world as far as he knew, suggesting little academic research had been undertaken in this area.

The composition of stadium design for many years has largely remained unchallenged and it is only in recent years that urban planners and architects have sought for a more interactive approach, one that provides a use beyond that for which it has been designed. For this to happen, the way in which stadiums are designed must also be challenged.

Under today’s conditions, architects do not just look for space large enough for a stadium to occupy, but consider proximity to public transport, connections to existing retail facilities, ability to create new public spaces and economic benefits to the city.

My research involves a design-led proposal with a design model where, if employed at sketch design stage, urban generation could be a likely outcome. The development of the ‘Cluster Relationship Model’, with three key activities that seek to form relationships with the proximate, local, and regional environments, provides the potential to draw upon a wider range of users and thus lay the platform to initiate urban generation.

# L i t e r a t u r e   R e v i e w

## “Sport and Economic Regeneration in Cities”<sup>1</sup>

This paper investigates sporting infrastructure and development related to specific events. Data collected and analysed suggests the primary aim was not to encourage greater participation by the local community, but encourage investment into the city, and economic regeneration as a result.

In Britain, the cities that have used sport as an economic regeneration tool have been industrialised cities, not the common tourist spots. Urban regeneration has become more of a focus for governments around the world as they adopt national sports policies with the intent of hosting major sports events.

The cities of Sheffield, Birmingham and Glasgow have all used sports in promoting urban regeneration, this, coupled with serious expertise to place quality bids with a high probability of success. An interesting note, they point to two events that generated highest economic impact: the London marathon and a cricket Test Match, events that did not require new sporting infrastructure.

A Case study on Manchester City for the 2002 Commonwealth games found that £200 million was spent on sporting venues, with a further £400 million spent on non-sporting infrastructure.

The objective was to ensure that the benefit of hosting the event would not disappear when the event was complete, but would have a long term and permanent lift to the local economy. As the evidence for long-term urban regeneration benefits is scarce, the Dept. of Culture, Media and Sport/Strategy Unit reviewing sport strategy in England were sceptical over the existence of such benefits unless regeneration underpinned the whole planning process. Interestingly, soon after, the government backed the bid for the 2012 Olympics, which was argued as political rather than a rational planning process.

A normal result is that the public sector finances such events, in which they incur losses in order for the local economy to benefit.

In the US, public expenditure has tended to provide considerable amounts of funding on the basis that investment of public money is worthwhile as long as the economic impact generated by having a resident sports team is viable.

The events were assessed in a wider context than direct profit and loss, as they were linked to urban regeneration and tourism development. It was suggested that sufficient data exists to gauge the immediate economic benefits of these events, but future research needs to focus upon longer term urban regeneration benefits that sport based developments have the potential to deliver.

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1 Chris Gratton, Simon Shibli, and Richard Coleman, “Sport and Economic Regeneration in Cities,” *Urban Studies* 42, no. 5/6 (2005).

## “Sports facilities as Urban Redevelopment Catalysts”<sup>2</sup>

Professor Tim Chapin asked this question in the USA, “*are sports facilities indeed catalysts of urban redevelopment?*”<sup>3</sup>

His research focuses upon two Case Studies that provide the background material for much of the paper - Oriole Park and Raven Park, Camden Yards, Baltimore, and the Gateway Complex, Cleveland, Ohio.

Chapin points out that many systematic studies focus around economic benefits for sporting facilities and largely miss the mark emphasising spin-offs, multipliers, and job creation. He utilises a framework for assessing catalytic capabilities – S.A.G. (Special Activity Generator – Robertson 1995), which seeks to determine whether redevelopment has occurred.

The 3 underlying strategies of S.A.G. are:

1. Generate spill over spending benefits for the surrounding district;
2. Generate new construction in the district, and;
3. Rejuvenate a blighted area

Chapin takes these 3 objectives and derives 3 indicators for urban redevelopment:

1. Reuse of existing buildings or spaces, i.e. activity generated as a result of SAG projects catalyse in spill over development to the surrounding district, particularly new businesses in vacant downtown buildings.
2. New construction within the surrounding district – construction that can be linked to investments in a SAG
3. Emergence of new entertainment or sports district – the district becomes predominantly known for activities directly resulting from the primary anchor (SAG) in the district.

To further test the propositions Chapin implements a ‘but for’ argument, which questions whether change in a district would have occurred without the expenditure of public funds on the sports complexes.

Chapin’s methodology sought to identify physical changes to the district surrounding each sport project between the late 1980’s and 2000. This first step established conditions prior to investment in the sports project in the 1980’s; this involved reviewing aerial photographs and planning documents in order to build a GIS (Geographic Information System) that could map the built form prior to construction. The second step involved similar process in 2000 to update the GIS database, following the same methods with additional information from newspaper and business articles, and interviewing local development officials.

These stadiums were chosen for their similarities: they had similar downtown locations, common design features, were located adjacent to major interstate exits, and in close proximity to a formerly vibrant but now stagnant retail corridor.

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2 Chapin, “Sports Facilities,” 193-209.

3 Chapin, “Sports Facilities,” 193.

For Camden Yards, it was hoped that the two stadiums would bring large numbers of people into a part of the city largely devoid of activity after dark and on weekends, and that new businesses and construction projects would spring up in the nearby neighbourhoods of Pigtown and Sharp-Leadenhall.

In assessing the first criteria for urban redevelopment – the use of existing buildings – the old B & O Warehouse was the catalyst for this. The Warehouse houses the team's offices, gift shop, restaurant, and several other private firms. However, in spite of the successful reuse of these buildings, and the millions of people attending events at the complex yearly, a considerable number of other vacant and disused properties remained untouched, particularly the old retail district north of Camden Yards.

Evaluating criteria number two – new construction in the district – this western edge of Baltimore was noticeably unaffected by the stadiums. Plans for new hotels in this region had long existed, but the stadiums did not provide the supposed stimulus.

The immediate area surrounding Camden Yards experienced an unusual twist, instead of catalysing new development, land was cleared for surface parking lots to serve the influx of vehicles and buses on game days.

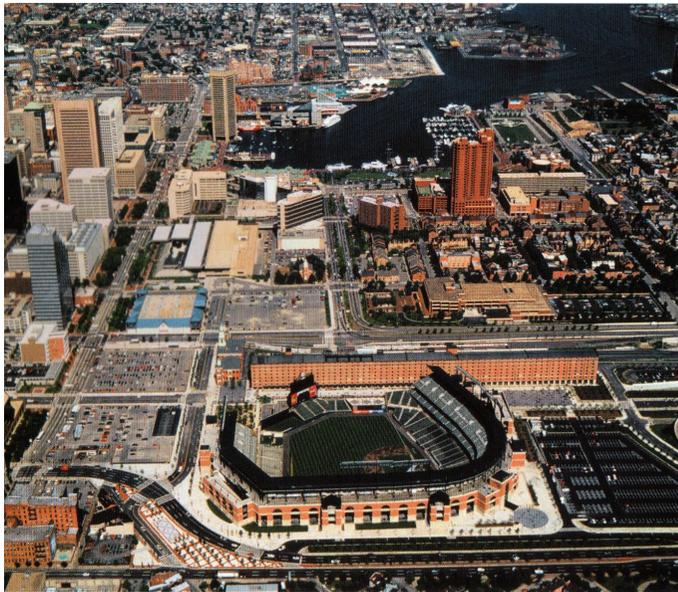


Fig. 1 Oriole Park - Camden Yards

The final indicator of urban redevelopment – establishing an entertainment district – achieved modest success. The stadiums and facilities appear on the must-see list of attractions for city visitors.

Concluding the Case Studies Chapin proposed that Camden Yards couldn't be considered an urban redevelopment catalyst as the complex did not catalyse a 'dramatic change of the western edge of town'.<sup>4</sup>

However, in contrast to this he believed the Gateway Complex provided this catalyst with physical connections provided in the way of 'planned, funded and constructed pathways to other nearby activity centers'.<sup>5</sup> In addition to this, a development corporation, HGN (Historic Gateway Neighbourhood), was setup to promote redevelopment in the district. Chapin's 1980-2000 analysis provided evidence that sports facilities can create opportunities to catalyse redevelopment in an urban setting.

The reuse of existing under-utilised buildings experienced great success in the district that coincided with the first indicator of urban redevelopment. The result - market rate housing brought upper and middle class residents into the area. New construction in the district, the second criteria, achieved moderate success with the roll out of hotels and office buildings. The final indicator – establishment of an entertainment district, was very successful. Prior to the Gateway Complex opening, the district was compared to a parking lot; this has now changed to 'the Gateway District... a place for play'<sup>6</sup>. The projects infrastructure upgrade and urban design improvements helped provide a critical mass necessary to support retail establishments and restaurants.



Fig. 2 Jacobs Park - Gateway Complex

4 Chapin, "Sports Facilities," 201.

5 Chapin, "Sports Facilities," 202.

6 Chapin, "Sports Facilities," 204.

Chapin summarised in saying, *"if public dollars continue to be poured into these edifices, then district redevelopment is one positive outcome that can result"*.<sup>7</sup>

In both papers the Stadium is still dealt with as a separate entity to which people arrive to and depart from, the analysis only takes into account the physical location of the stadium and the urban regeneration that did or did not occur; they do not venture to challenge how the stadium is designed and the role this could play in influencing a better outcome.

The focus was upon the contextual positioning of the facility, and evaluation of growth within that area that could be "measured" post construction.

In my research, I wish to examine the way in which the design of the stadium itself can play a part in urban generation or regeneration, and not just the post construction measured impact of it's physical presence to that particular location.

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7 Chapin, "Sports Facilities," 207.  
Masters of Architecture by Project  
Martin Varney 1087511

*“The Stadium: Architecture for a New Global Culture”*<sup>8</sup>

In the foreword to Rod Sheard’s book, “Stadium: Architecture for a New Global Culture”, Peter Cook, founder of Archigram states, “when dealing with the challenge of the event: the Game and the assembly are theatre. Put a body of people hustling and rustling, and you have something infinitely more electric than a town of a similar size around you... You’ve got all that building stacked up there, and when the games over or the planes left: why it’s all just sitting there for goodness sake. What can we do with it?..... does a sports building have to limit itself to a narrow set of consistencies? Imagine the whole underside of stadium terraces infested with a myriad of activities...”<sup>9</sup>

Sheard goes on to cover the 5 generations of stadia, as he sees it. The first generation in the early to mid 20th century centered around large bowls with few amenities, toilets were rudimentary and only club directors and a small number of spectators were seated on grandstands. The second generation came in response to the sharp decline in spectators as sports events were broadcast on television in the late 1950’s. These stadiums focused on greater comfort for spectators and better facilities. Emerging in the early 1990’s a third generation sought to cater for the entire family, with spectator facilities, an abundance of bars, food outlets, and supporters shops. The late 90’s ushered in the fourth generation, the impetus: the demands of satellite TV. The stadium acts as a backdrop for televised performance, with lighting and crowd sizing crucial to the projected image. Finally, the era of the fifth generation: urban regeneration. These stadiums will be identified and categorized by their global presence and ability to provide regional regenerative potential; “stadia are not ‘stand alone’ buildings; they should be seen as dynamic cells implanted into the urban fabric of a city, stimulating growth and inspiring regeneration”<sup>10</sup>



8 Rod Sheard, Robert Powell, and Patrick Bingham-Hall, *The Stadium : Architecture for the New Global Culture*. (Singapore: Periplus, 2005.), 1-161

9 Sheard, Powell, and Bingham, *Stadium*, 10-11.

10 Sheard, Powell, and Bingham, *Stadium*, 161.

# Design Phase 1 - Spiral arm & Site selection

Based on the assertion that current stadiums are predominantly designed to function only for specific events related to their use and provide no peripheral activities or interactive life beyond these events to act as a catalyst for generating urban development, it was necessary to undertake a design exploration that would seek to challenge the status quo of object and setting towards a more integrated, context driven design approach.

The decision was made to investigate three separate sites around Auckland City - (1) Carlaw Park, site of a previous Rugby League stadium, (2) Eden Park, an existing stadium site and “home” to NZ Rugby, and (3) Hamlins Hill (Mutukaroa), a site that I believed had many good features and existing conditions that could offer potential as a regional stadium site. The investigation analysed pathways, axes, connectivity, and conditions that exist and could exist for this stimulus to take place, and, at the suggestion of Dr Peter Wood (Victoria University) “see what other issues might be thrown up”

As a starting point, I looked for phenomena that illustrated different patterns of movement that might occur around a central object, and came across the image of the spiral galaxy. Acting as an initial concept driver, the form suggests “arms” that spread out from a nucleus, pulling other planets in, only then to be sent flying out into other “arms” - circulation patterns around a “point”.



Fig. 3 Spiral Galaxy



Fig. 4 Movement sketch

The objective was to develop a concept diagram and “apply” it to the 3 sites to see how it related to a particular setting, what might happen around the edge, and how accessible this could be. I took this concept through various stages of exploration and developed the concept of the 3 and 4 arm diagram. The primary idea centered around, multiple access points, or arms, with various activities located in them, and proposing patterns of movement and interaction that could occur between them.

The first move was to take the form and apply it into the site at **(1) Carlaw Park**; the old home of Auckland Rugby League, looking for potential connections to established activities in the surrounding community, and setting up points of access with which to connect new activities embedded into the stadium.

The ideal: new activities to assist in creating an “active edge” with and around the stadium, and various levels of interaction would occur, centred around: Public Amenity (Human factor), Accessibility (Physical factor), and potential Economic factors:

New Activities:

At Carlaw Park, there is potential for:

- a new train station, as the trunk line ran past the rear of the site
- a connection to University with possible associated office space
- an Art Gallery, an important attraction working off existing galleries in neighbouring Parnell
- Café spaces
- a Recreation Centre, linking to users of the Stanley St Tennis Centre

Public Amenity:

- The provision of multi point access along a dynamic path (curve of the arms), would provide an experiential journey for users
- Certain activities located within the arms created a platform for a more complex dialogue of interconnectivity of users between the arms - controlled and uncontrolled
- “Arms” that allowed landscaping to penetrate in between and up to outer edges
- Train station: hub for transient users (Uni students), access to Parnell shops, and the Museum, offering chance occasions of meeting

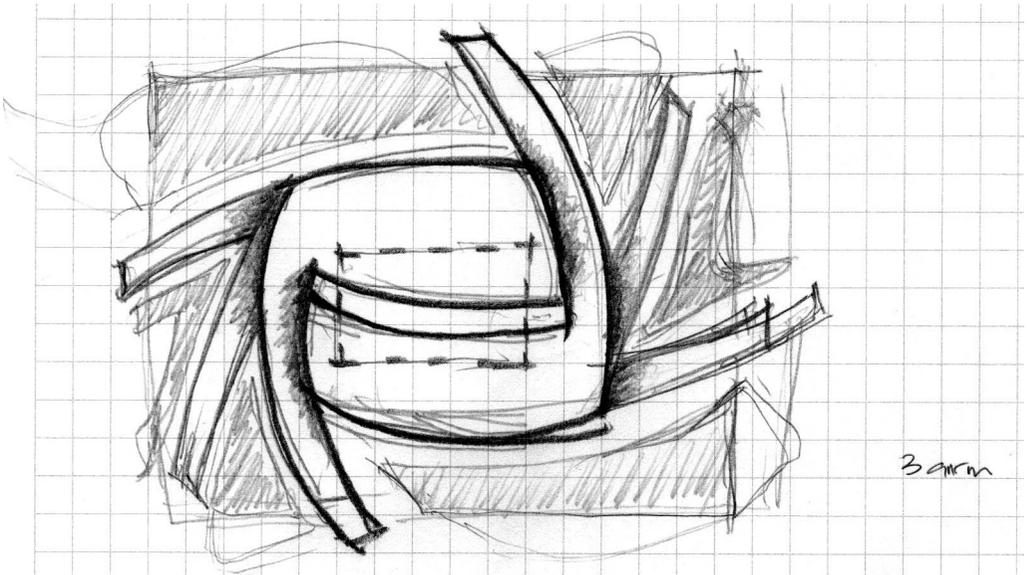
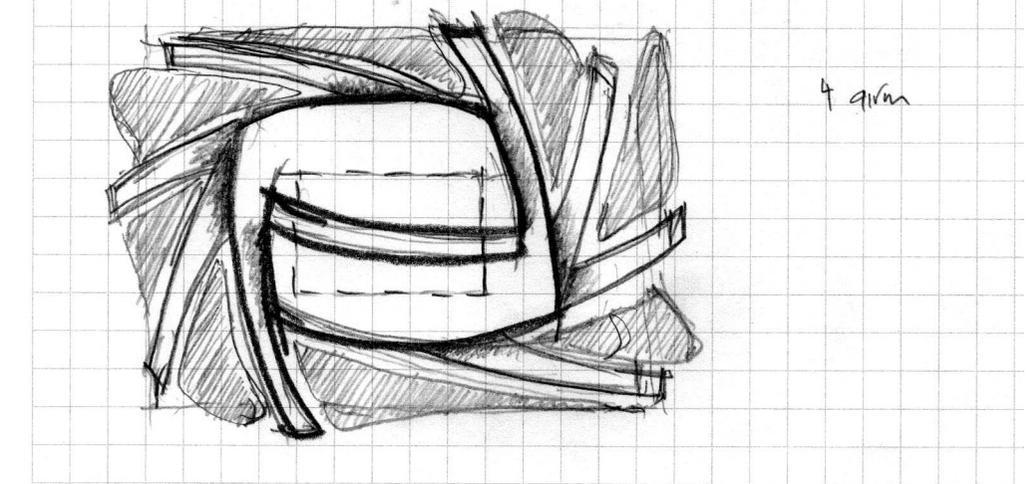


Fig. 5 Three/Four Arm Concept diagram



### Accessibility:

- Train Station: provides the closest rail link to University and Parnell
- Vehicle access: provide limited parking spaces with access from underground turnpike off side of road
- Stretching of arms into community beyond site provided easier connectivity for pedestrian users
- New park provision: linked via overhead landscaped bridge, to existing park - psychological spreading of the site

### Economic:

- Location of certain activities/facilities within the surrounding neighbourhood allow for economic functions i.e.
- Stanley St Tennis Centre works off Rec. Centre / Gym as training centre for tennis players
- University and event users linked with Train station
- Parnell shops linked with Café / Art Gallery facility

### Summary:

Public rail provides a good opportunity to create a hub, particularly given the close proximity to Auckland University.

Art Galleries – existing positive contribution to community allows for further expansion.

Activities in arms allow for cross fertilisation between the various activities.

Limited potential for urban generation due to the existing density of urban development.

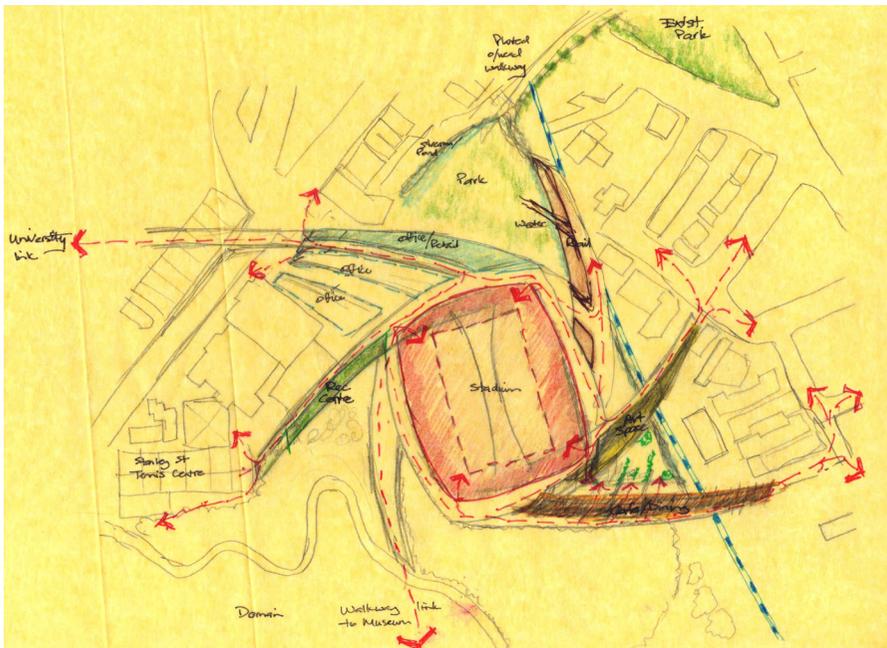


Fig. 6 Carlaw Park Explorative Three arm sketch diagram

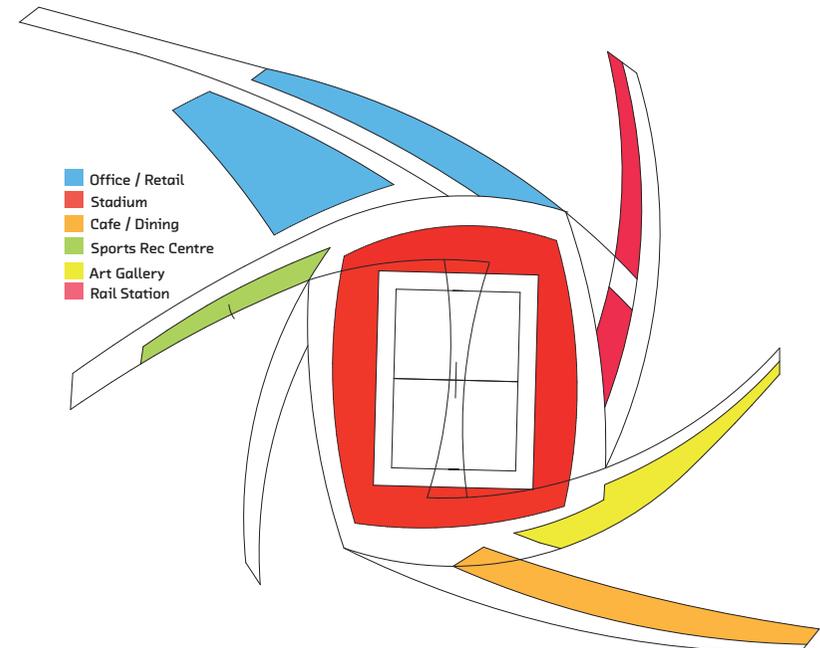


Fig. 7 Carlaw Park Explorative Three arm model

The next move was to apply the four arm diagram form into the site of **(2) Eden Park**, and identify potential connections into the surrounding setting, points of access, and areas to connect activities to. As one existing stadium currently operational, Eden Park has a high level of impact upon the surrounding residents and community when there are rugby or cricket events; the application of the four arm diagram should seek to minimise this.

#### New Activities:

In observing the surrounding residential community, existing shops and various facilities around Eden Park within a radius of .5km, I identified that there is potential for:

- a connection to an existing train station with a potential for an extended platform
- a community centre
- Café spaces
- Recreation Centre / Gym

#### Public Amenity:

- A landscaped environment encompassing the stadium edge would provide a medium with which to engage the surrounding residents - various pathways and park activities - playground, skate park, 1/2 court basketball.
- Community centre and associated facilities would encourage community use on a daily basis, and the potential for start-up farmers or cultural markets
- Linkway to the Kingsland shops via the rail arm

#### Accessibility:

- Train Station: close proximity to existing rail station.
- Vehicle access: limited parking spaces, accessed from underground turnpike (located on site of existing Gas station).
- Stretching of arms into landscaped environment and site edge provide easier connectivity for pedestrian users.
- Main arterial route for bus service - as parking restrictions are enforced on game days.

#### Economic:

- Recreation Centre and Gym facility for resident team and community use
- Café arm to the north side that breaks out into the landscape
- Encourages increased use by patrons with the Kingsland shops

Summary:

Public rail provides good access to the site (as existing), and increased capacity as double tracking comes on stream.

The make up of the surrounding environment, which is 75% residential, requires a marked move in the way of landscaping around the perimeter of the stadium in order to draw residents in and around to encourage an active edge.

Restricted parking enforced on game days limits ease of access to the stadium.

Limited potential for urban renewal due to high level of residential occupancy.

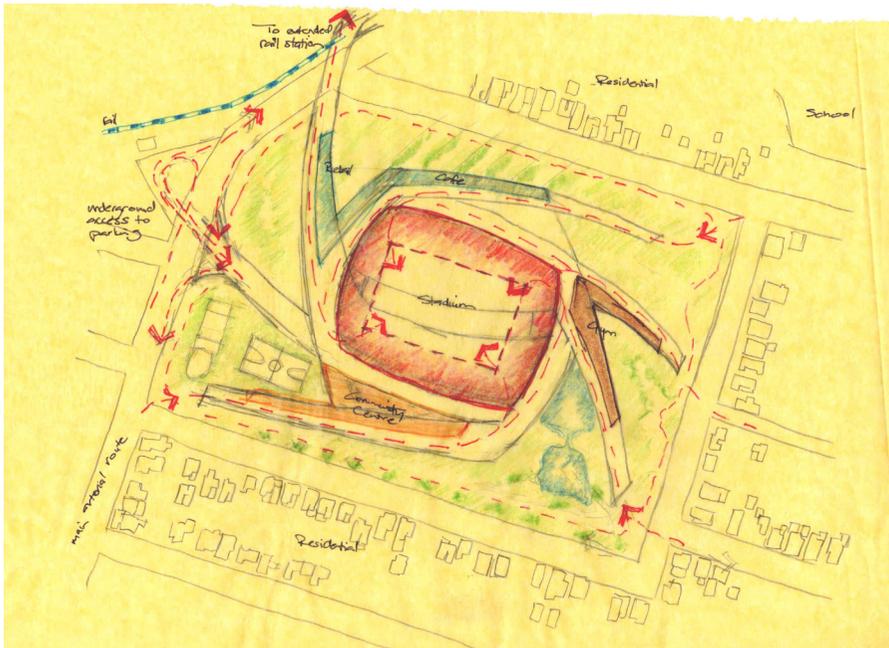


Fig. 8 Eden Park Explorative Four arm sketch diagram

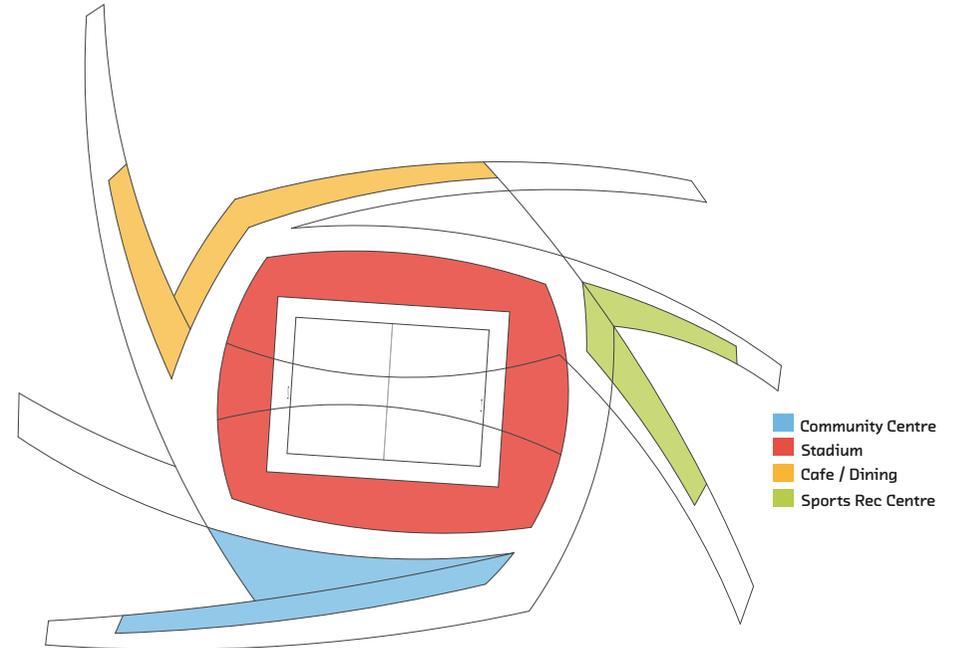


Fig. 9 Eden Park Explorative Four arm model

My final move was to take this process and apply it to my selected (preferred) site – **(3) Hamlins Hill (Mutukaroa)**  
Identifying potential connections into the surrounding setting, points of access, and areas to connect activities to.

What became immediately apparent, was that scale of the site was significantly larger than the previous ones, but had much potential to offer. Bordered by the Southern and South-Eastern Motorways<sup>(Append. A - Fig. 50)</sup>; as well as North/South trunk rail line and an additional branch to Glen Innes/Auckland Waterfront<sup>(Append. A - Fig. 51)</sup>, there was a myriad of connectivity on hand; even with two physical barriers (motorway, and Gt South Rd industrial strip).

#### New Activities:

There is potential for:

- a connection across the motorway linking the rear of the western residential area of Mt Wellington
- a Swimming/Recreation complex for local residents and employees of surrounding industry
- an Indoor Mountain bike facility – linked to the park, which, under Auckland City Council, is proposed as the regions first Mountain Bike park
- a Café / Dining arm
- an associated Hotel to house guests and visiting teams

#### Public Amenity:

- Utilising the potential of the existing ARC park environment, and developing it to double as a mountain bike park – with direct access to residential users from Mt Wellington.
- Swimming and Recreation complex that plays off users of the mountainbike park, resident team and residential connection
- Connection to a potential Residential Area site (existing Inland Port) via new integrated rail station (the derelict Southdown Freezing Works facility) and overhead connection over Gt South Rd.

#### Accessibility:

- Main North/South trunk line with Glenn Innes/Waterfront line connection provides good access via train – an opportunity to design an integrated rail station as a result of the stadium – although the line proximity is not as good as Carlaw Park or Eden Park.
- Easy access from motorway networks – Southern Motorway / South Eastern Highway / Church St to South Western Motorway – with underground carpark facility modeled on the Museum.
- “Arm” over the motorway provides good access for residents
- Developing access to the Potential Residential area could be problematic due to the distance (1km approx.)

#### Economic:

- Mountainbike Bike shop, hireage facility, and all-weather indoor track for users of the Mountainbike park
- Swimming pool Recreation complex
- Potential for restaurant to be located within the 2 old water tanks on top of Hamlins Hill with great views of Auckland
- Hotel acts as a general accommodation facility for tourists and stadium users – conference centre
- Potential for urban renewal – derelict Southdown Freezing works, Inland Port, and disused Microlite Airstrip

Summary:

The Stadium location could be too “distant” from potential sites of interest in order for the design to act as a catalyst for urban generation.

Some facilities in the active edge function more as a destination location for users as opposed to the way in which they potentially would operate as a hub at the likes of Carlaw Park

The idea of using “arms” in which facilities are located allows the landscape to penetrate between them, and users to move out of them, but they don’t necessarily function as Multi access points given the expanse of the site, which questions the relevance of the “Spiral form” in this location

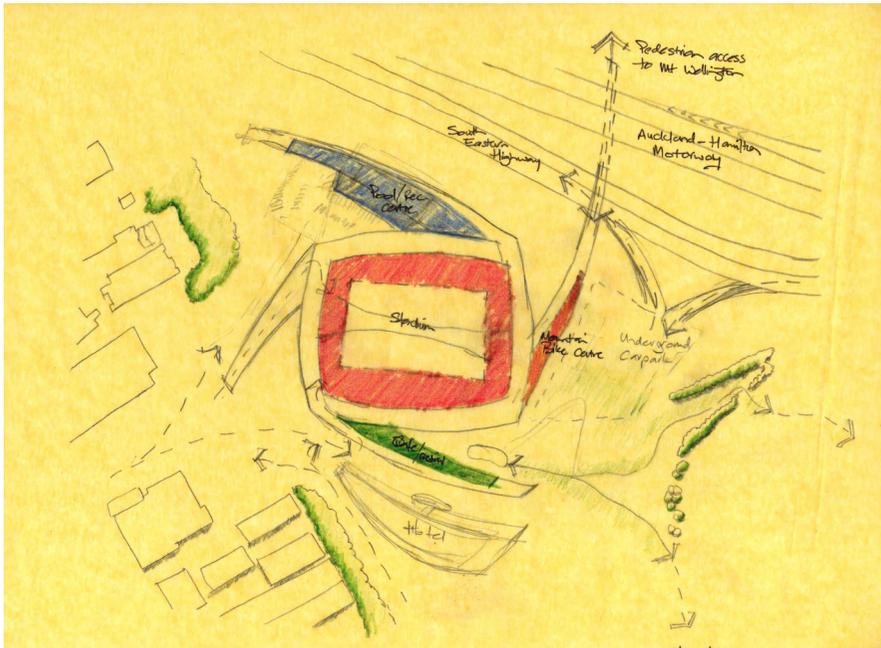


Fig. 10 Hamlins Hill Explorative Four arm sketch diagram

- Hotel
- Stadium
- Cafe / Dining
- Swimming Rec Centre
- Mountain Bike Facility

Fig. 11 Hamlins Hill Explorative Four arm model

The site at Carlaw Park had provided good opportunities for a Stadium that contained an “active edge” and acted as a hub, Eden Park threw up different challenges given the nature of activities related to it’s context, and the facilities that might possibly encourage an “active edge”; Hamlins hill offers opportunities for potential urban generation, the proposed location relative to potential sites of urban generation may need to be reassessed, owing to the increased site area.

Looking into the surrounding community, urban or suburban, and assessing what the relevant activities should be to initiate interaction with the facility is one of the key discoveries to come out of this - activities successful in an urban environment, are not necessarily translatable into the suburban context, and vice versa.

# Design Phase 2 - fold

After designing a number of stadiums in Europe, Austrian Architect, Albert Wimmer, proposed the 4 stages of stadium architecture in his book, '*Stadiums - Market Places of the Future*'<sup>11</sup>:

1. The emptiness: - the stirring; the anticipation latently present
2. The gradual filling: - arrival of the crowd; waiting and anticipation gives rise to inner suspense and outer tension
3. The game: - discharge of energy, temporary balance in the crowd, with unity between the bodies of the mass and the body of the building
4. The emptying: - dissolving of the equality of the mass; salvation or defeat.

These stages of stadium architecture, describing the changing dynamic of crowd movement, reminded me of water:

1. The flow: - continuous motion when poured
2. The fold: - elastic nature of water; surface tension, visible in the containment of a droplet, stretched then enlarged when droplets fold into each other to form a larger body
3. The form: - response to context; the ability to take on the shape of the vessel
4. The fluidity: - ability to move seamlessly over and around surfaces unhindered while filling.

I was intrigued by these characteristics, this notion of a surface that is continuous and not necessarily defined by different planes, and wondered if they could inform my investigation of a potential stadium design.

Initially, the idea was to use a computer modelling technique, Freeflow (used for film animation), to render crowd movement as a fluid entering from different vantage points and observe what, if any, interactions may occur that could inform the design process. A lack of software knowledge shifted my efforts to plastilina, a product employed by Pixar<sup>(Append. B - Fig. 52)</sup> and Dreamworks to develop initial models for animation purposes, for a more hands-on modelling technique. BMW<sup>(Append. B - Fig. 54)</sup> also use plastilina to develop new prototypes of vehicles because it can be molded and reformed, never solidifying, thus allowing designers to perform intuitive measures and render immediate creative responses to the model via hand-eye coordination.

Exploration of the notion of the 'fold' through hand manipulation and experimentation with heat revealed other properties of plastilina. For example, heating it in a pot caused it to melt to a liquid form and become sticky. The plastilina returned to its original state once cooled.

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<sup>11</sup> Albert Wimmer, Doris Rothauer, and Friedrich von Borries. *Stadien : Marktplatze Der Zukunft = Stadiums : Market Places of the Future*. Wien; (New York: Springer, 2008), 131-142.

Ted Kafa, in his essay 'Deleuze's Aesthetics: Curvature and Perspectivism'<sup>12</sup>, says: "Following Leibniz, Deleuze affirms that curvature affects all materials (metal, paper, fabrics, water, living tissue, the brain), because it determines and materializes form. Curving materials become 'expressive matter' with different scales, speeds, and vectors of force".

"...a flexible or an elastic body still has cohering parts that form a fold, such that they are not separated into parts of parts but are rather divided to infinity into smaller and smaller folds that always retain a certain cohesion. Thus a continuous labyrinth is not a line dissolving into independent points, as flowing sand might dissolve into grains, but resembles a sheet of paper divided into infinite folds or separated into bending movements, each one determined by the consistent or conspiring surrounds. "

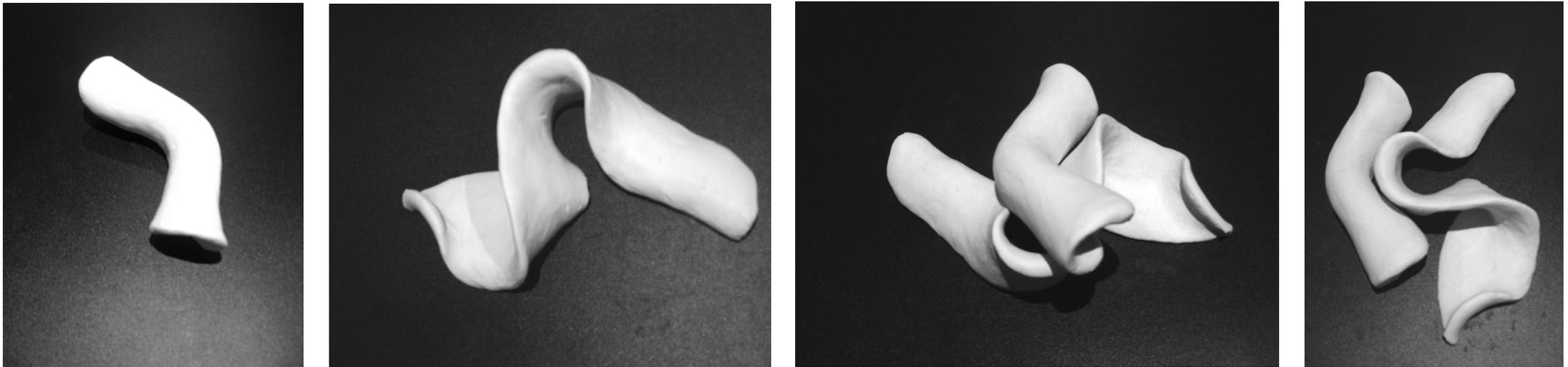


Fig. 12 Photos of fold exploration model in Plastilina

Taking the concept plan developed from the previous design phase, I proceeded to work with the plastilina, folding and forming by hand and heat, considering what form the stadium might take on.

12 Ted Kafa. "Deleuze's Aesthetics: Curvature and Perspectivism." *Enculturation*, Vol 4, No. 2, (Fall 2002.) [http://enculturation.gmu.edu/4\\_2/kafa.html](http://enculturation.gmu.edu/4_2/kafa.html)

The finished plastilina model was then taken to the AUT Rapid Prototyping laboratory and digitally scanned in order to produce a 3D computer model. The model could also be “sliced” horizontally at set intervals in order to explore possible floor plans for the stadium and inform a proposed siting investigation<sup>(Append. B - Fig. 56)</sup>.

This proposition generated dialogue on the nature of the siting and raised the issue of the relationship of the model to its context. How might the stadium design challenge the symmetry of its containment?

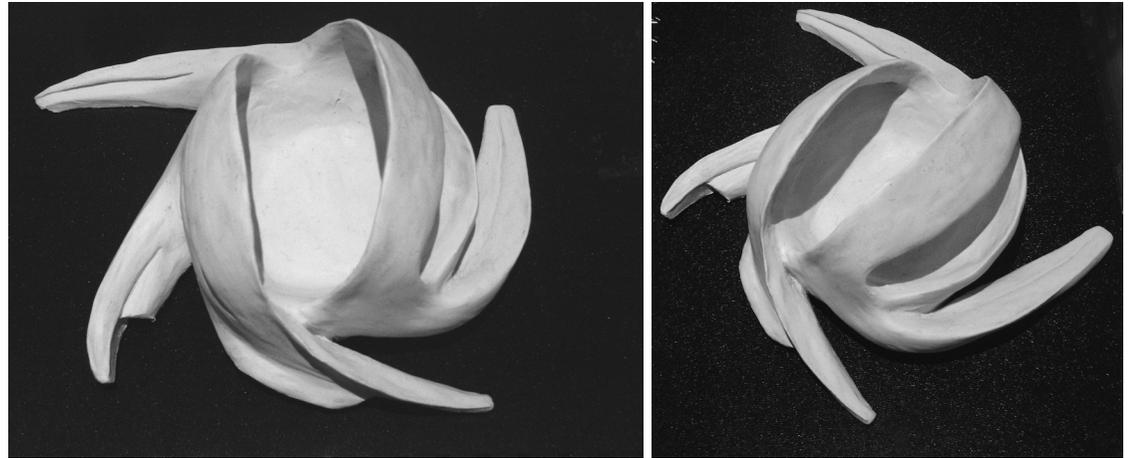
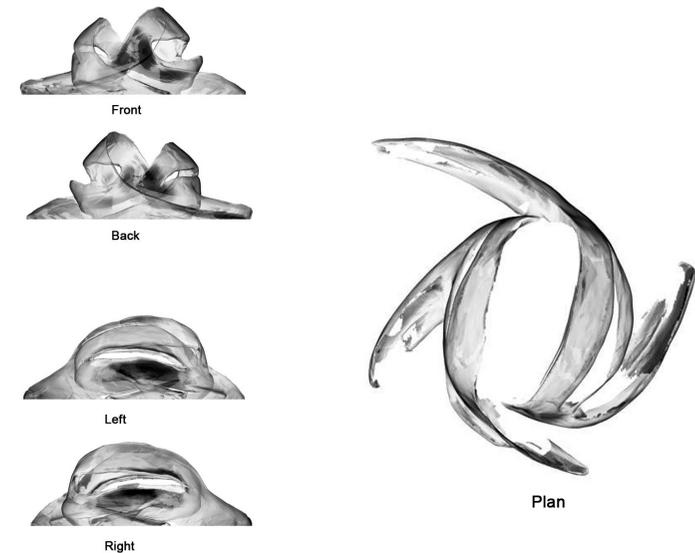


Fig. 13 Plastilina model

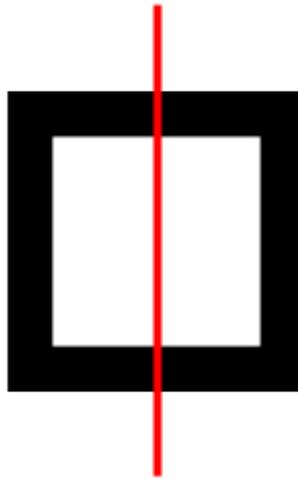
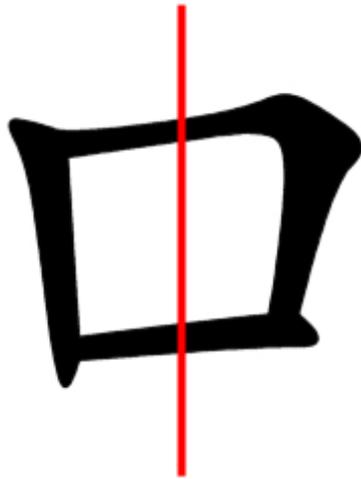
Fig. 14 Digitally scanned 3D model



Fig. 15 Digitally scanned 3D model - Elevations & Plan



# Design Phase 3 - Asymmetrical destabilisation



Asymmetrical destabilising: the ability to destabilise an object and collapse its held symmetry into a new form

At this point, a decision was made to shift away from the common symmetrical nature of the stadium using the notion of “asymmetrical destabilising”. The concept model developed so far was still bound by the symmetrical nature of the field of play and was located in a visually prominent position on the site - both of these aspects needed to be challenged.

Since the initial stimulus for a stadium design was to accommodate rugby, it made sense to “look into the game” to see where this “asymmetrical destabilising” could occur and how this might inform the design.

Rugby, as a game, has a number of forms of symmetry that occur in the set up of play:

1. Symmetrical field of play – rectangular field, equally divided mirrored areas of play within defined boundaries
2. Player positioning takes on symmetry – set positions denoted by numbering
3. Symmetrical positions of play – scrum, lineout, at the kickoff
4. Rules of play – denote a type of symmetry within which the game is to take place

Where does asymmetry occur or the destabilising of symmetry begin?

1. A player traverses a boundary line on the field of play
2. A player holds territory within the boundaries of the oppositions side
3. The collapse of the scrum – the symmetry of the position of play destabilises
4. One side is always dominant in the field of play - possession of territory

Outcome: When boundaries collapse and one form merges into another, the symmetry and “order” of the game destabilises. A sense of tension occurs in the play and the game becomes exciting; a similar result in the design of the stadium might generate a similar result, aesthetically and functionally.

The first move was to pull apart the design of the existing form, yet still retain the various activities related to the facility. A further site investigation yielded the potential of a new position on site - a natural amphitheater located to the south-western corner of the site between highest point on Hamblins Hill and the existing location. In response to the natural contours that formed the amphitheater, there was opportunity to reshape the design of the stadium.

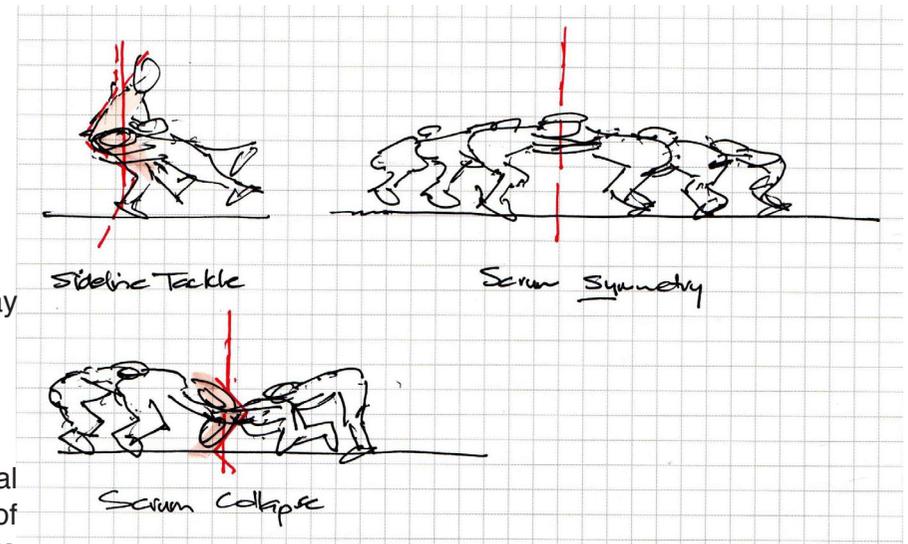


Fig. 16 Rugby - collapse of symmetry

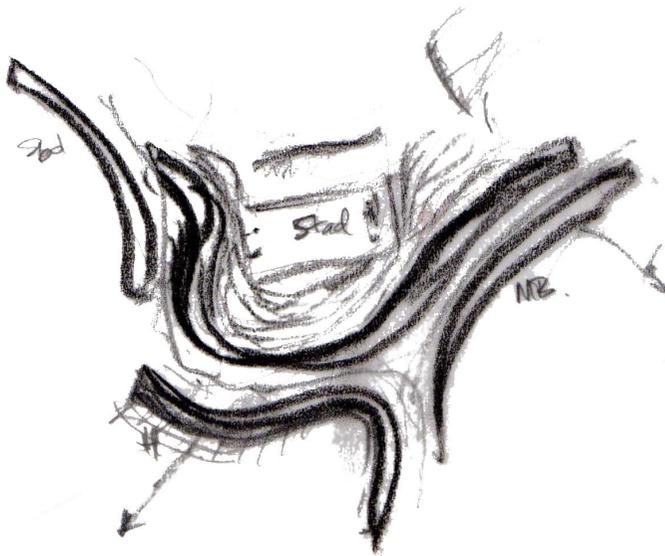


Fig. 17 Stadium asymmetry sketch

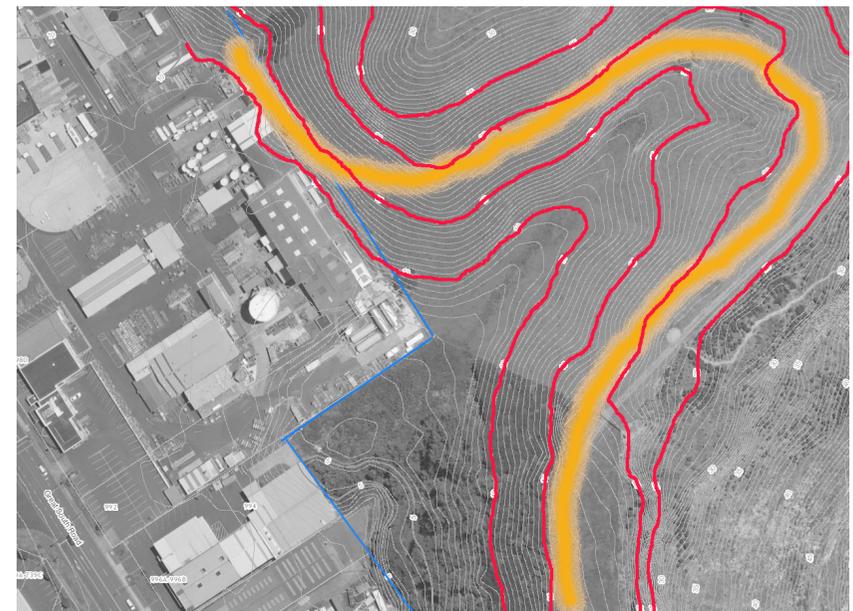


Fig. 18 Topographical Site exploration



Fig. 19 Top of the natural amphitheater - view westward

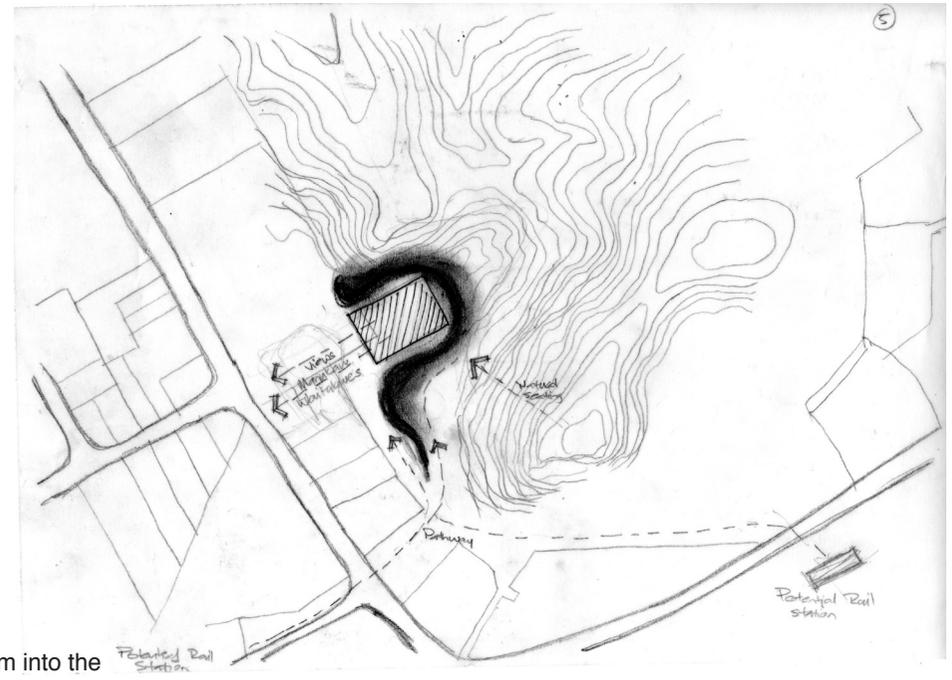


Fig. 20 Exploration of form into the contour of the amphitheater

The stadium was re-designed peeling apart the symmetrical form and folding into the contour of the surrounding site. In line with the original ideal to provide a stadium that functioned beyond the event, it was important to retain the connection of activities within the arms between each other and to the surrounding context.

Bill Hillier, in the paper 'The Architecture of Community: Some New Proposals on the Social Consequences of Architectural Planning'<sup>13</sup>; discusses the theory of 'structured non-correspondence' - the ability to have spatial order without hierarchy for spatial organisation and social groups. Hillier illustrates with the example of Oraibi Indians who inhabited a blended community, where the only boundaries in the system were the walls of the houses, and the 'main street' was located on the third level of the terraced houses; a system of open space was everywhere continuous and permeable, without any tendency to create pockets of enclosed space from the main theatres of life. Thus, "transpatial relations were used to widen social networks, just as the category mix locally ensured that people from different clan groups encountered each other on a daily basis as a result of their spatial groupings, that is, everyday life mitigated any tendency to make local groups exclusive". In seeking to maintain the spatial arrangement of the stadium and life beyond the event, it was important to move away from the relationship of external activities to a stadium and allow a merging of the activity territories into the fabric of the stadium in order for users to engage and participate in and between them - the notion of collapsed boundaries as part of a single entity.

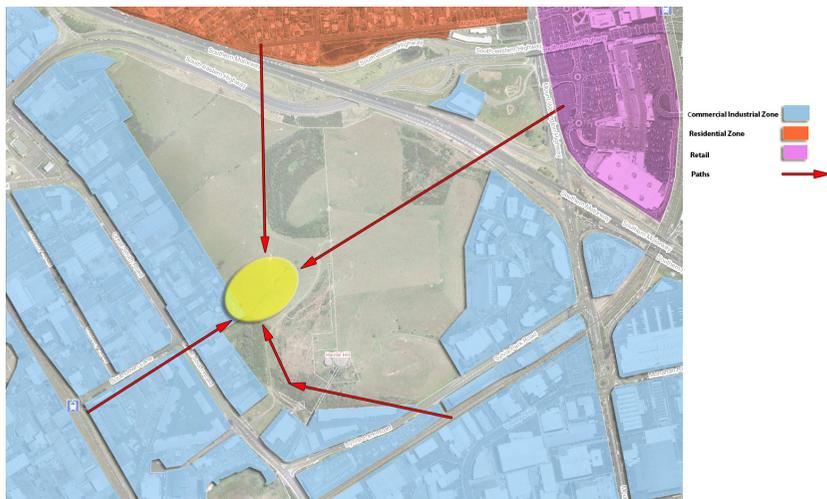


Fig. 21 Surrounding community zones & connection potential

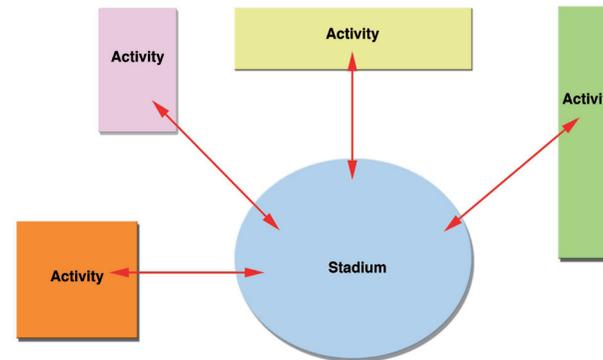


Fig. 22 Typical Stadium relationship to activities external to the stadium

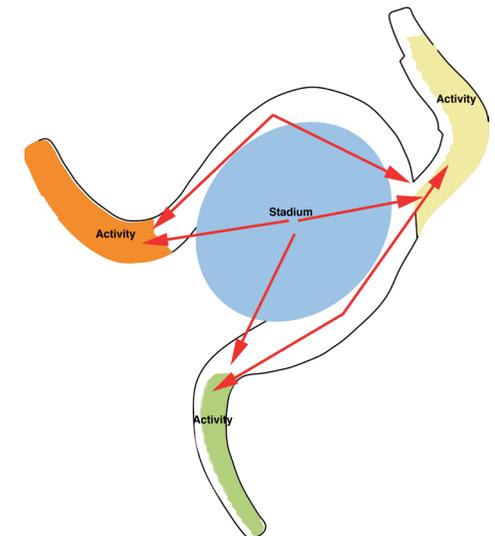


Fig. 23 Proposed Stadium relationship to activities

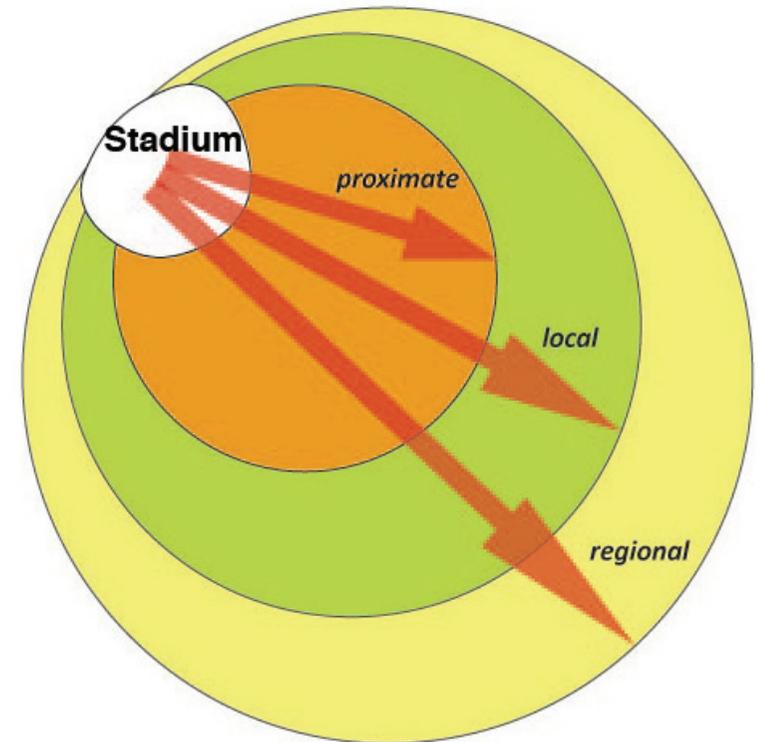
13 Bill Hillier & Julienne Hanson, "The Architecture of Community: Some New Proposals on the Social consequences of Architectural and Planning Decisions," *Arch & Comport/Arch. Behav.*, (1987) Vol. 3, p. 251-273

As asymmetrical destabilising of the stadium design provides a platform for relationships to occur, in, around and between activities; it was necessary to assess the basis on which these relationships were formed, as they play a pivotal role in the “life beyond” the stadium event.

The activities designed into the stadium required different points of contact with various user groups - and these relationships set the structure for what I have termed the ‘Cluster Relationship Model’.

The model operates in 3 parts:

1. ***proximate***: an activity base to form a relationship with the immediate stadium “community” - this was achieved through the inclusion of a hotel facility; which provides a venue for visiting teams and out-of-town match visitors to stay at; and the addition of the Live/Work arm engaging with the industrial community as first point of contact with the stadium;
2. ***local***: an activity base to form a relationship with the surrounding community, whether that be residential or commercial - this was achieved with the inclusion of a Swimming/Recreation Centre, also for use as part of resident team training programme;
3. ***regional***: an activity base to form relationship with the wider city community, the focus of the activity centred around “unique destination based”. The park is set aside to be the only urban mountainbike park in the Auckland region; and inclusion of the indoor mountainbike facility provides an all-weather activity base.



## Cluster Relationship model

Fig. 24 Cluster Relationship Model

A physical land model was made to enable accurate modelling of the stadium into the contour of the land. Working in conjunction with the re-designed spatial plan, plastilina was then used to form a proposition for the 3 dimensional asymmetrical shape. The context of the stadium moves over the threshold of public and private boundaries providing opportunity (similar to current trends) for public/private partnerships.



Fig. 25 Plastilina model folding into site contour

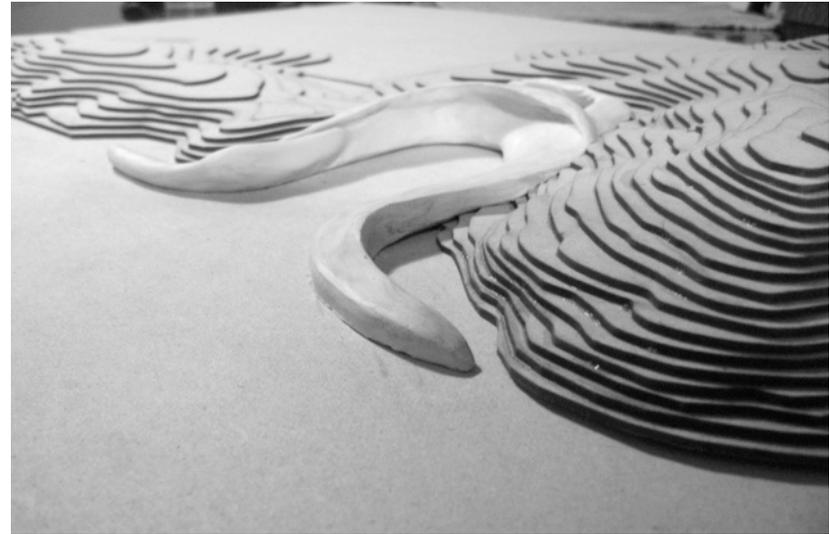


Fig. 26 Plastilina model

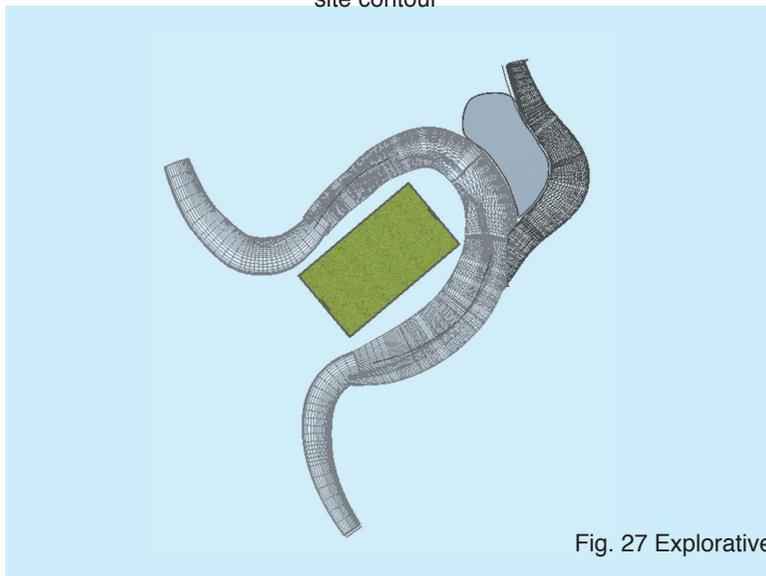


Fig. 27 Explorative computer model

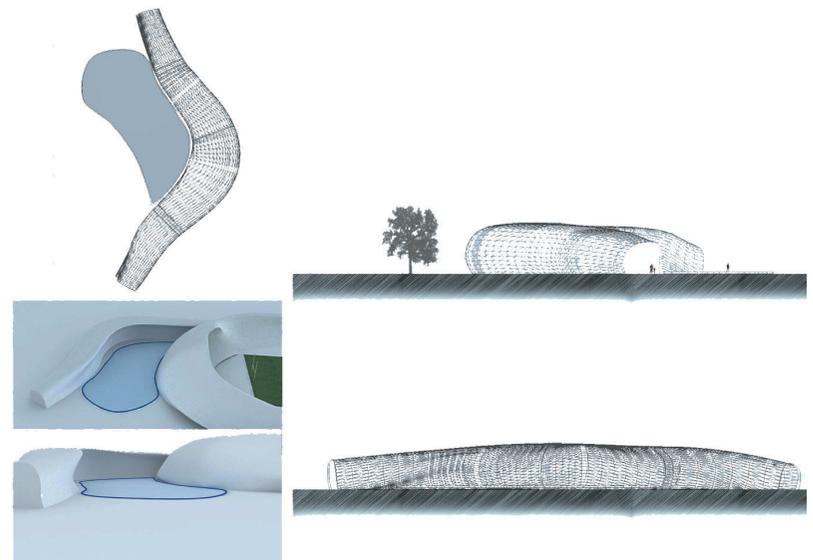


Fig. 28 Stadium Site/Plan and movement patterns around stadium



Fig. 29 Hotel complex

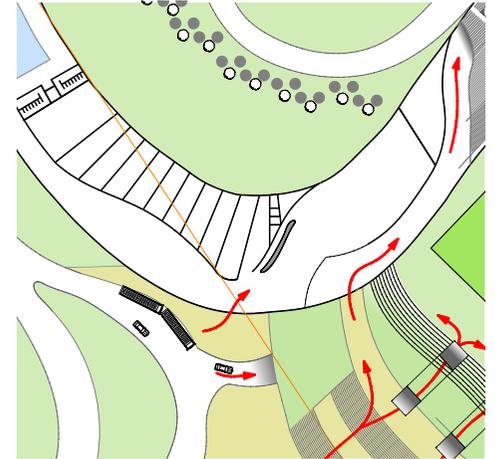


Fig. 30 Indoor Mountainbike facility & bistro

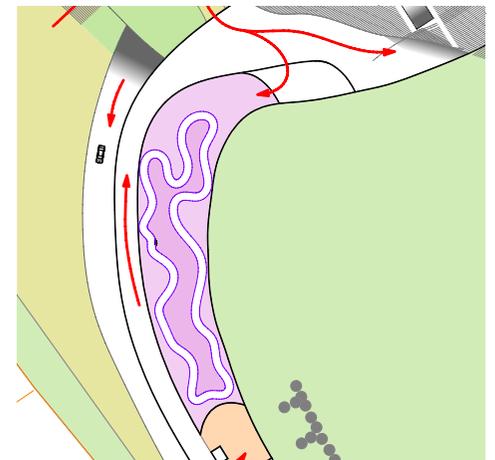
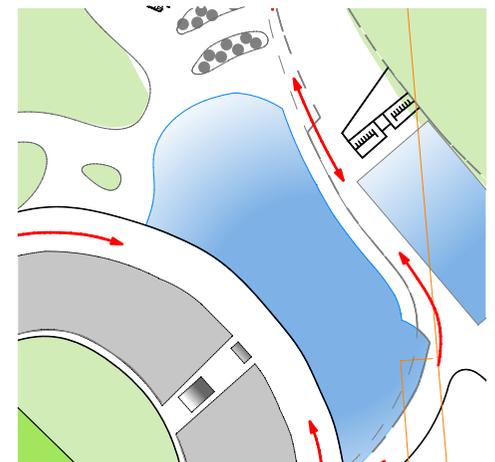


Fig. 31 Swimming/Rec Centre



The creation of a computer model provided a platform for further design investigations into more specific spatial planning of the spaces and patterns of movement between them and abutting sites. Cross-sectional analysis of the stadium form into the land, and a series of proposed outline plans (Append. C - Fig. 57-60) were designed to illustrate spaces within the various activity centres, and development into the surrounding landscape.

The form is “asymmetrised” to accommodate the various activities in the three arms and open the main approach to the stadium from Gt South Rd, completely. A public promenade provides the main entrance, with access routes entering into each of the arms; and grass terraced landscape acting as the only physical barrier to this vantage point.

A three level hotel complex provides a base for players/viewers of the game. As the form moves around the field it merges, and becomes part of the stadium; also providing public entrances at various point that allow circulation around the edge of the hotel and into the stadium. Hotel patrons can access tiered seating on the third level viewing the game from an enclosed vantage point (Append. C - Fig. 59).

An indoor mountainbike facility (Append. C - Fig. 57) acts as a base for the wider designated use of the Regional park as Auckland’s first mountainbike park. This all-weather year round training facility offers a unique region wide destination facility drawing users from all over Auckland. A Bistro/cafe area is located at the southern tip of this arm, and provides another access point into the stadium complex.

The Swimming/Recreation Centre (Append. C - Fig. 60) designed as a local point of interest activity to engage the surrounding residential community of Mt Wellington and Northern Otahuhu, as well as cross-fertilising with users of the indoor mountainbike facility.

The Stadium itself is accessible to the public with circulation routes around/between the activity centres. The form does not place any weighted attributes toward seating, but is primarily responding to the contour of the amphitheater.

Along the southern arm of the stadium, seating turns into landscaped terraces that rise up to become part of the hill, providing flexible seating to accommodate varying crowd sizes. This has potential to act as area of low cost seating available through application to the Regional Council.

One important aspect identified after the Soccer World Cup 2010 is the need for stadiums to become more versatile and adaptable in their nature of use.

# Design Phase 4 - Context Relationships

Refining the design as it responds to its context, and further exploring the role that various activities play in engaging with different users.

There are two visual aspects important to this development:

1. the “rural” aspect - appreciated in the context of the surrounding green fields when viewed from vehicles travelling along the southern motorway or Western Mt Wellington suburbs
2. the industrial aspect - how the stadium contacts the industrial setting and is engaged with as a visual entity when travelling along Great South Rd or approaching from the main trunk rail-line

Lightweight, almost cloud - like, the perception of the “rural aspect”; a stadium roof that is barely noticeable floating off the land. The transparent roof curves over the back half of the Stadium stand and open to the rear, while the main portion of the Swimming /Rec Centre behind morphs into the topography of the hill.

The industrial aspect - travelling south on Great South Rd - provides full exposure of the stadium as it bends out of the natural amphitheater/land contour to meet the industrial edge; the intersection of the public/private realm.

An option to engage with the industrial context resulted in the design of a Live/Work arm to the stadium at the road fringe; with provision to run light industrial workshops/industrial design studios or offices with attached living apartments.



Fig. 32 Revised Site Plan & Movement with Industrial Live/Work arm

Evaluation of this plan layout raised the following issues that needed to be addressed:

- the main approach to the stadium was now too narrow and confined, lacking a significant public gathering space
- the Indoor Mountainbike facility was in a fringe position as opposed to where it may be better suited; engaging with the specific purpose of the park (Auckland's only urban Mountainbike park)

The need was to have an activity based at the heart of the regional park to act as a release point, especially for the regional travellers. Relocation of the all-weather Indoor Mountainbike training track into this area, could then act as a “gateway” to the outside mountainbike tracks, along with other facilities such as bike hire and food outlets close at hand. Regional users of the Mountainbike park could then extend their plans for the day to include a picnic lunch or BBQ dinner with the intention of attending a Super 15 night game held at the Stadium.

This provided the opportunity to move and redesign the Swim/ Recreation facility into space near the main approach to the park; within easy walking distance of surrounding industrial users, and in addition, widening the promenade and gathering space before entering the stadium itself.

Limited carparking for the stadium is located beneath the main field with the intention to encourage a greater reliance on public transport.

The “street” extends throughout the facility to all areas of activity promoting the idea of “collapsed boundaries”.



Fig. 33 Revised Site Plan - redesigned Rec/Swim Centre & Indoor Mountainbike training facility

A series of cross-sections<sup>(Fig. 34)</sup> were developed at specific intervals in and around the stadium and along the activity arms, considering the function and volume within each of the spaces.

Digital files were developed for the purpose of producing laser cutting templates to be used in forming a new plastilina model (Append. D - Fig. 65); the templates acting as guides for the plastilina to be shaped and molded against.

The plastilina model was then set into a physical land model with surrounding industrial buildings<sup>(Fig. 36)</sup>.

As the form of the building moves in and out of the landscape crossing the boundary of the natural and built environment, public and private realm; it encounters areas of change; whether part of the natural physical environment, or designated legal boundaries and delineation between public and private space.

The idea is to reflect this merging in and across these areas of change with an aesthetic that references changing conditions, articulated in the surface and structure of the building - similar to a snake shedding its skin<sup>(Fig. 35)</sup>.



Fig. 35 Snake shedding skin

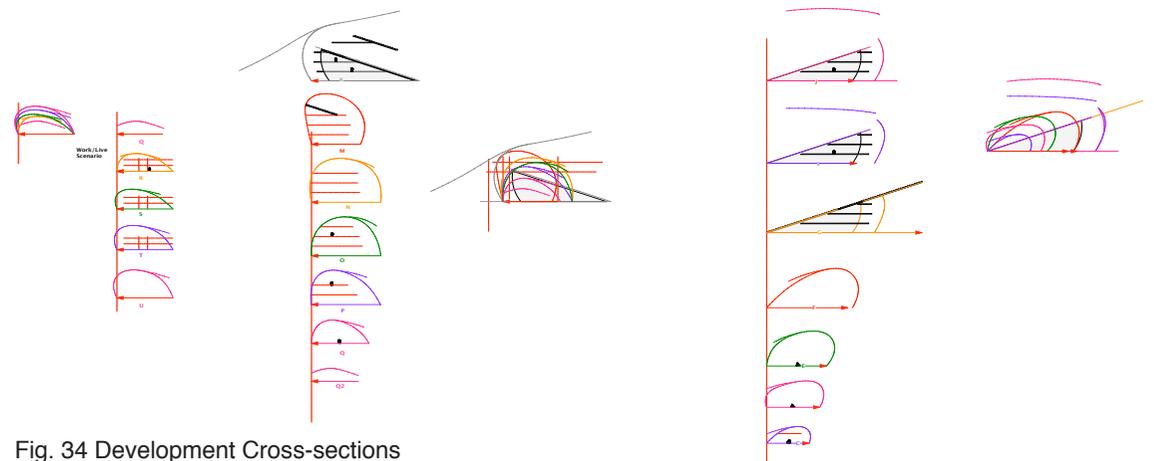


Fig. 34 Development Cross-sections



Fig. 36 Plastilina Stadium model & scale land model

Finally, this involved identifying pathways<sup>(Append. D - Fig. 69)</sup> linking the stadium to key locations.

This would provide indicative movement patterns to and from the site, in conjunction with mapping areas<sup>(Fig. 37)</sup> that held potential for urban generation/regeneration - areas where the stadium design could directly impact. These were identified as the Southdown Freezing works (now derelict) adjacent to the main north/south trunk line; a vacant land plot at the junction of the trunk line and Glen Innes line; and the Microlite airstrip, no longer in use located on the edge of the Manukau Harbour.

The specific location of activities around the stadium and relative to the site took on increasing importance, as it began to suggest not only where people would go to use a particular activity, but what they may seek to engage with afterwards.

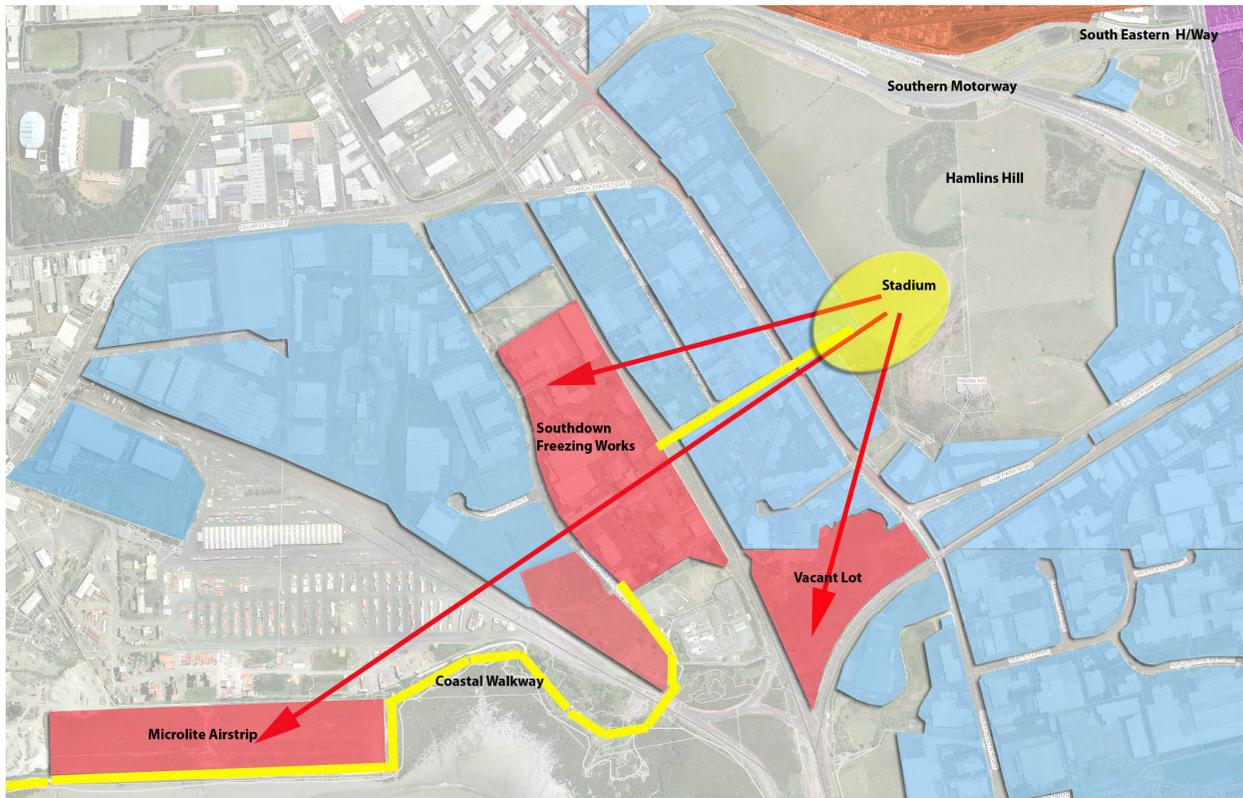


Fig. 37 Context relationship of stadium to potential sites for urban re/generation



Fig. 38 Vacant Lot



Fig. 39 Southdown Freezing Works



Fig. 40 Microlite Airstrip

# R e f l e c t i o n / C o n c l u s i o n

A key issue that arises at the end of this project is how could the proposed design be measured as “successful”?

Chapin’s research had an assumed method of measurement, centred around gauging urban regeneration that has happened in actual life, and focused solely on economic regeneration with post-construction assumptions and measures.

In contrast, the method presented in this research prescribes pre-construction design assumptions, and the design-led model has the ability to be applied to areas looking for generation as well as revitalisation and regeneration. My purpose was not to propose a model that could measure urban generation, but a method of design that is likely to trigger urban generation - a model that has the potential to catalyse. If the stadium was built and then monitored for 5 - 10yrs, it would still require another research project to assess whether it was successful as a catalyst of urban generation.

In practice, ‘asymmetrically destabilising’ the conventional stadium form would require rigorous cost-benefit analysis to investigate whether a “24/7” stadium life would result in a better long-term economic outcome for the surrounding community than one focused on one off events catering for maximum capacity for maximum gain at minimal cost.

It could also be argued that the majority of stadium designs are located in prominent positions, asserting themselves as landmarks by their sheer size and by consciously being in contrast to their surroundings. This approach has sought to respond contextually to the landform and urban setting. Equally different contextual settings, in the functional sense, will require different responses.

In order to take the design of stadiums beyond their current inability to act as catalysts for urban generation, the following strategy is put forward in key steps:

Asymmetrical destabilisation - collapsing the formal composition that usually dictates the symmetrical design of stadiums and forming a contextual response to the surrounding topography and any other important conditions of the site. The stadium can adopt a position of “openness” with a certain welcoming of the arriving crowd, freeing itself from the constraint of symmetry. The destabilisation allows other complementary activities to be more easily integrated into the form of the stadium where boundaries merge and blend across.

Extrovertness - the integration of complementary activities within the fabric of the complex in order to engage with different user groups at a local and regional level over a wide spectrum of interests; to encourage movement and interaction between them. The stadium's edge, instead of being firm impenetrable boundaries, can serve as circulation zones.

Time responsiveness and adaptability - movement and interaction between activities and events provide experiences over a day and into the evening which allow the facility to be adaptable. Flexibility can be designed into the stadium to respond to differing crowd sizes related to different events; a landscape approach, with the inclusion of terraced seating formed into the natural topography of the hillside, provides the option to accommodate increased crowd sizes without the appearance of emptiness when not in use.

As Rod Sheard stated, "*stadia are not 'stand alone' buildings; they should be seen as dynamic cells implanted into the urban fabric of a city, stimulating growth and inspiring regeneration*"<sup>14</sup>

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14 Sheard, Powell, and Bingham-Hall, *Stadium*, 161.

# B i b l i o g r a p h y

Hillier, Bill & Julienne Hanson, *"The Architecture of Community: Some New Proposals on the Social consequences of Architectural and Planning Decisions,"* Arch & Comport/Arch. Behav., Vol. 3, (1987): p. 251-273

Chapin, Timothy S. "Sports Facilities as Urban Redevelopment Catalysts." *Journal of the American Planning Association* 70, no. 2 (2004): 193-209.

Gratton, Chris, Simon Shibli, and Richard Coleman. "Sport and Economic Regeneration in Cities." *Urban Studies* 42, no. 5/6 (2005): 985-99.

Kafla, Ted. "Deleuze's Aesthetics: Curvature and Perspectivism." *Enculturation*, Vol 4, No. 2, (Fall 2002.) [http://enculturation.gmu.edu/4\\_2/kafla.html](http://enculturation.gmu.edu/4_2/kafla.html)

Kafla, Ted. "Yoshiro Kawaguchi's Mutation and Cell: A study of Form in 3D Computer Animation." *Enculturation*, Vol. 3, No. 1, (Fall 2000.) [http://enculturation.gmu.edu/3\\_1/kafla.html](http://enculturation.gmu.edu/3_1/kafla.html)

Koolhaas, Rem, Bruce Mau, Jennifer Sigler, Hans Werlemann, and Office for Metropolitan Architecture. *Small, Medium, Large, Extra-Large*. New York, N.Y.: Monacelli Press, 1995.

Kostof, Spiro. *The City Assembled : The Elements of Urban Form through History*. 1st North American ed. Boston: Little, Brown, 1992.

Robertson, A., Lycouris, S., & Johnson, J. (2007), "An approach to the design of interactive environments, with reference to choreography, architecture, the science of complex systems and 4D design." *International journal of Performance Arts & Digital Media* 3: 2&3, p.p. 281-294, doi: 10.1386/padm.3.2&3.281/1

Rogers, Richard George, and Philip Gumuchdjian. *Cities for a Small Planet*. London: Faber and Faber, 1997.

Sheard, Rod, Robert Powell, and Patrick Bingham-Hall. *The Stadium : Architecture for the New Global Culture*. Singapore: Periplus, 2005.

Wimmer, Albert, Doris Rothauer, and Friedrich von Borries. *Stadien : Marktplatze Der Zukunft = Stadiums : Market Places of the Future*. Wien ; New York: Springer, 2008.

# A p p e n d i x A

## D e s i g n P h a s e 1 - S p i r a l a r m



Fig. 41 Eden Park Aerial View



Fig. 43 Carlaw Park Aerial View



Fig. 45 Hamlins Hill Aerial View

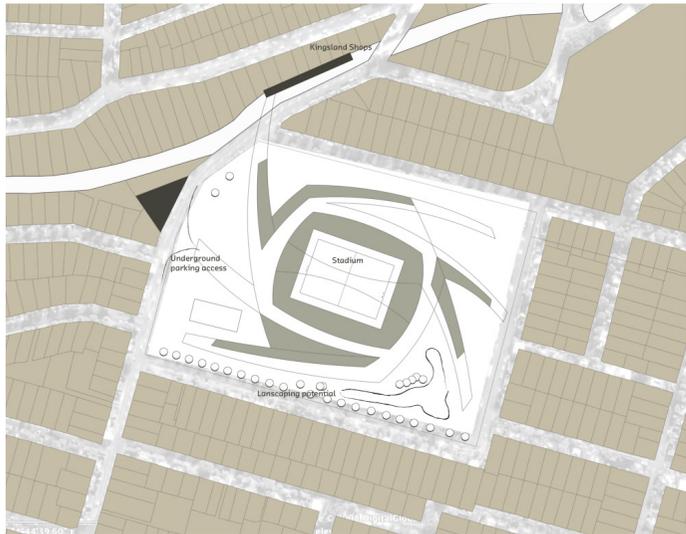


Fig. 42 Eden Park - 3 Arm Model sited



Fig. 44 Carlaw Park - 4 Arm model sited

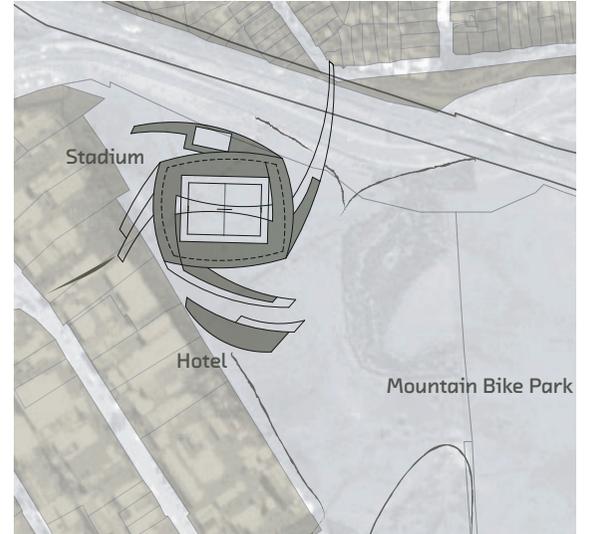


Fig. 46 Hamlins Hill - 4 Arm model sited



Fig. 47 Main trunk line splits  
Glen Innes - Waterfront Line



Fig. 48 Hamlins Hill/Southern  
Motorway & Mt Wellington



Fig. 49 Hamlins Hill & border  
of industrial zone

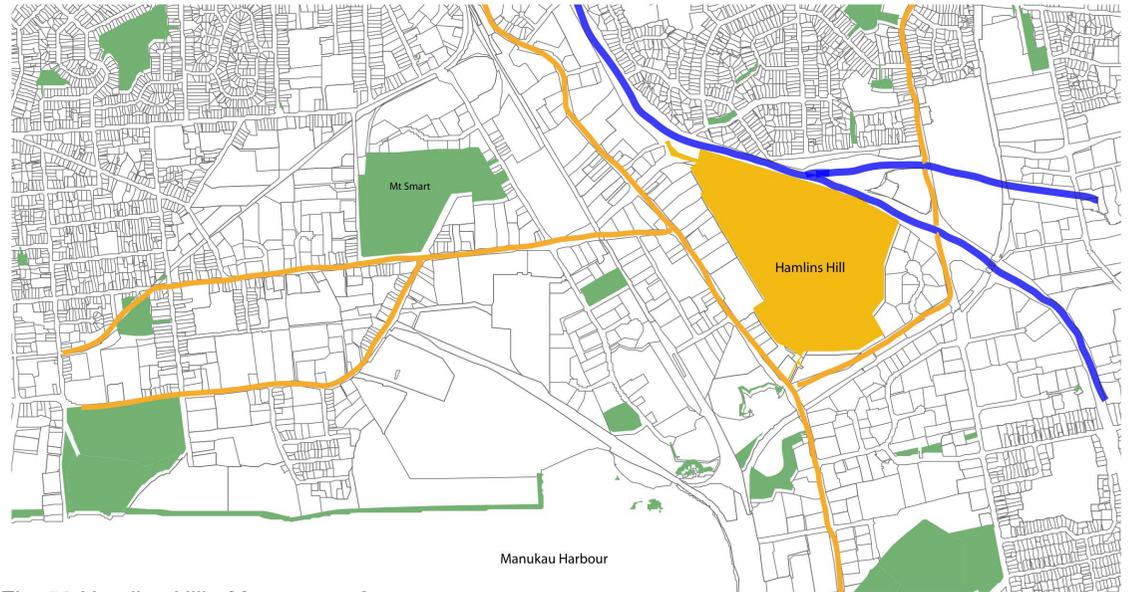


Fig. 50 Hamlins Hill - Motorways &  
Major Arterial routes

**Arterial Routes**

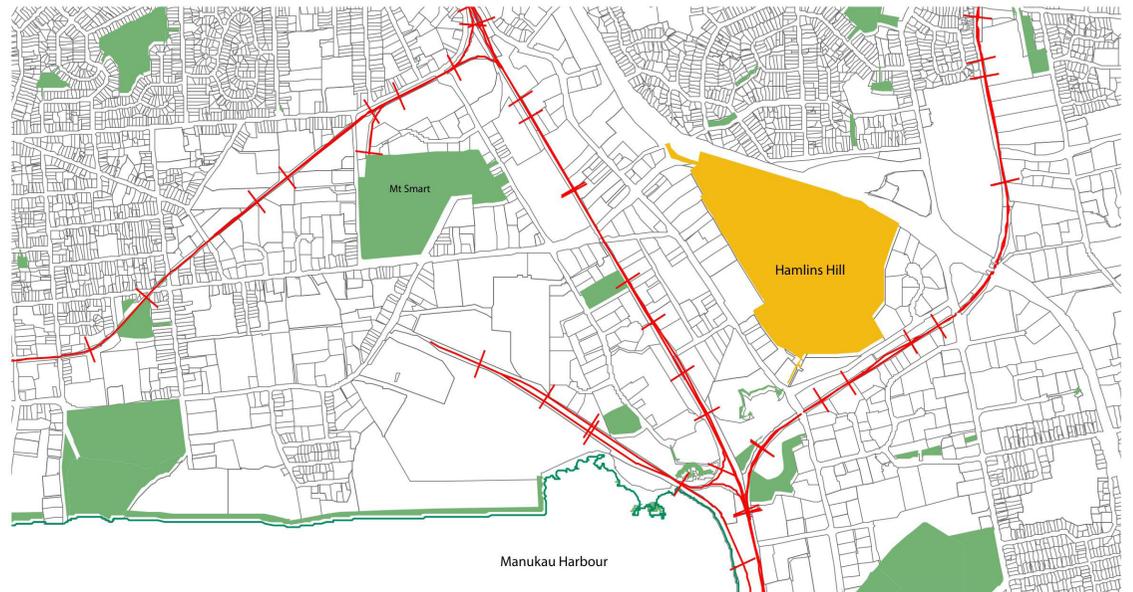


Fig.51 Hamlins Hill - Rail Corridor

**Railway Corridors**

**A p p e n d i x B**

**D e s i g n P h a s e 2 - F o l d**



Fig. 52 Pixar Clay Model - 'Toy Story'

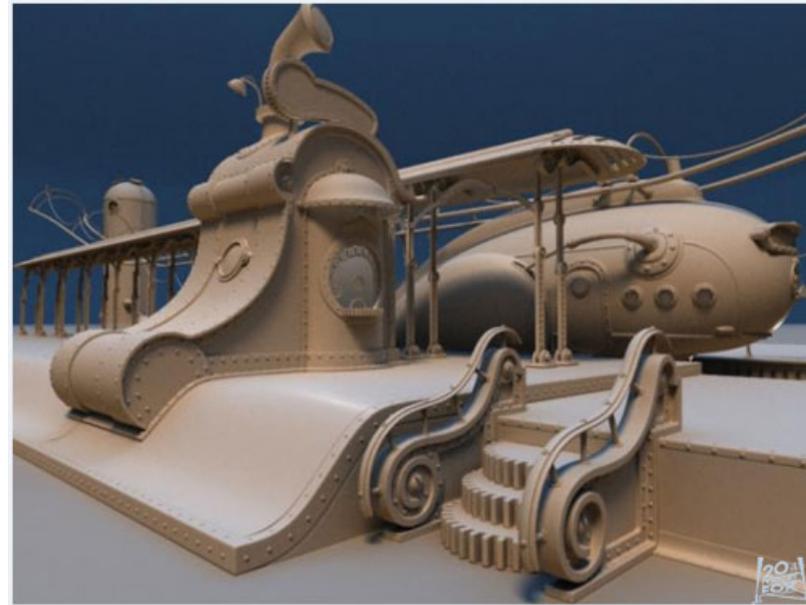


Fig. 53 20th Century Fox - Clay Model - 'Robots'



Fig. 54 BMW - Clay model of prototype cars

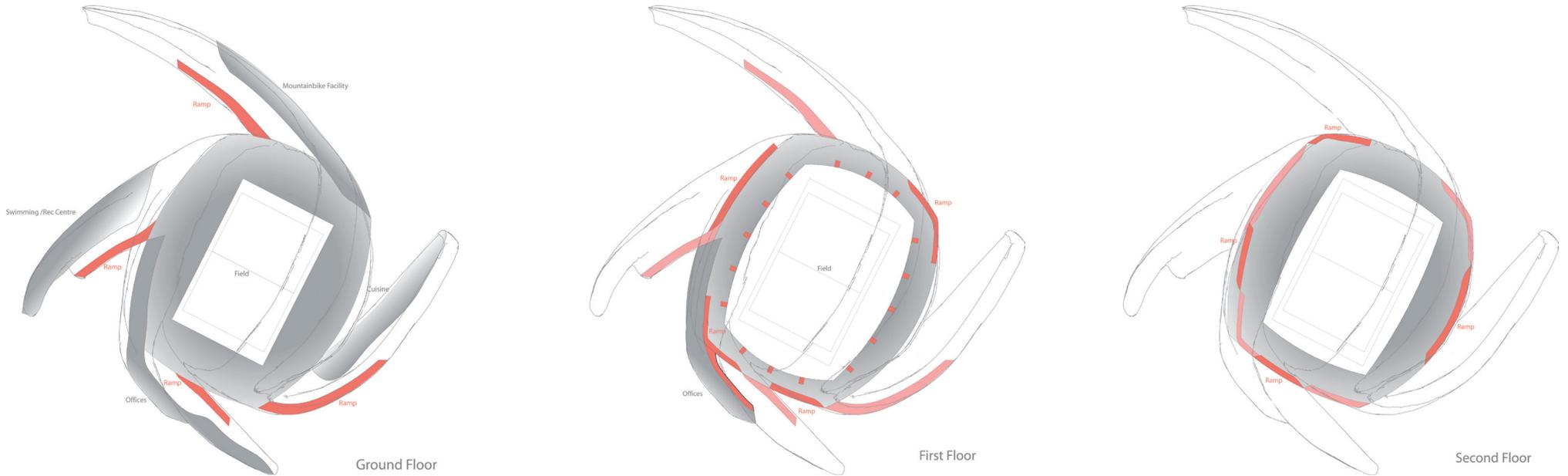


Fig. 55 Concept Plans developed from Plastilina model

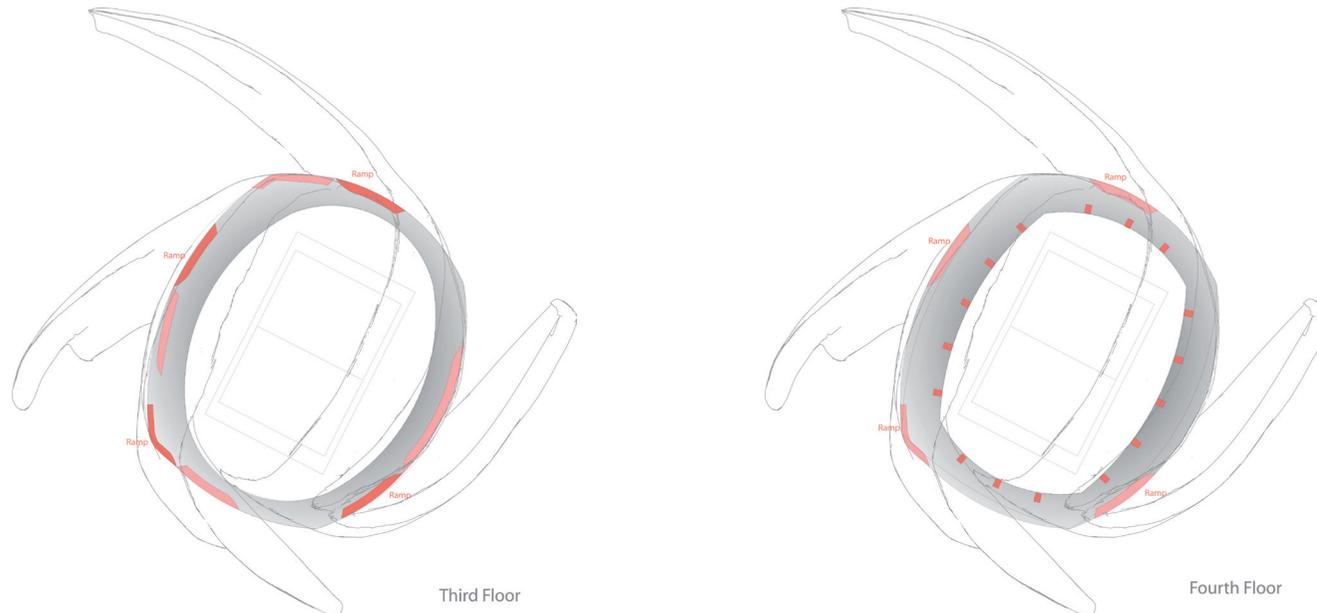




Fig. 56 Concept Plan with Key link pathways & transport routes

## A p p e n d i x C

### D e s i g n P h a s e 3 - A s y m m e t r i c a l d e s t a b i l i s a t i o n

Fig. 57 Ground Level - Hotel/Stadium seating/  
Indoor Mountain Bike facility

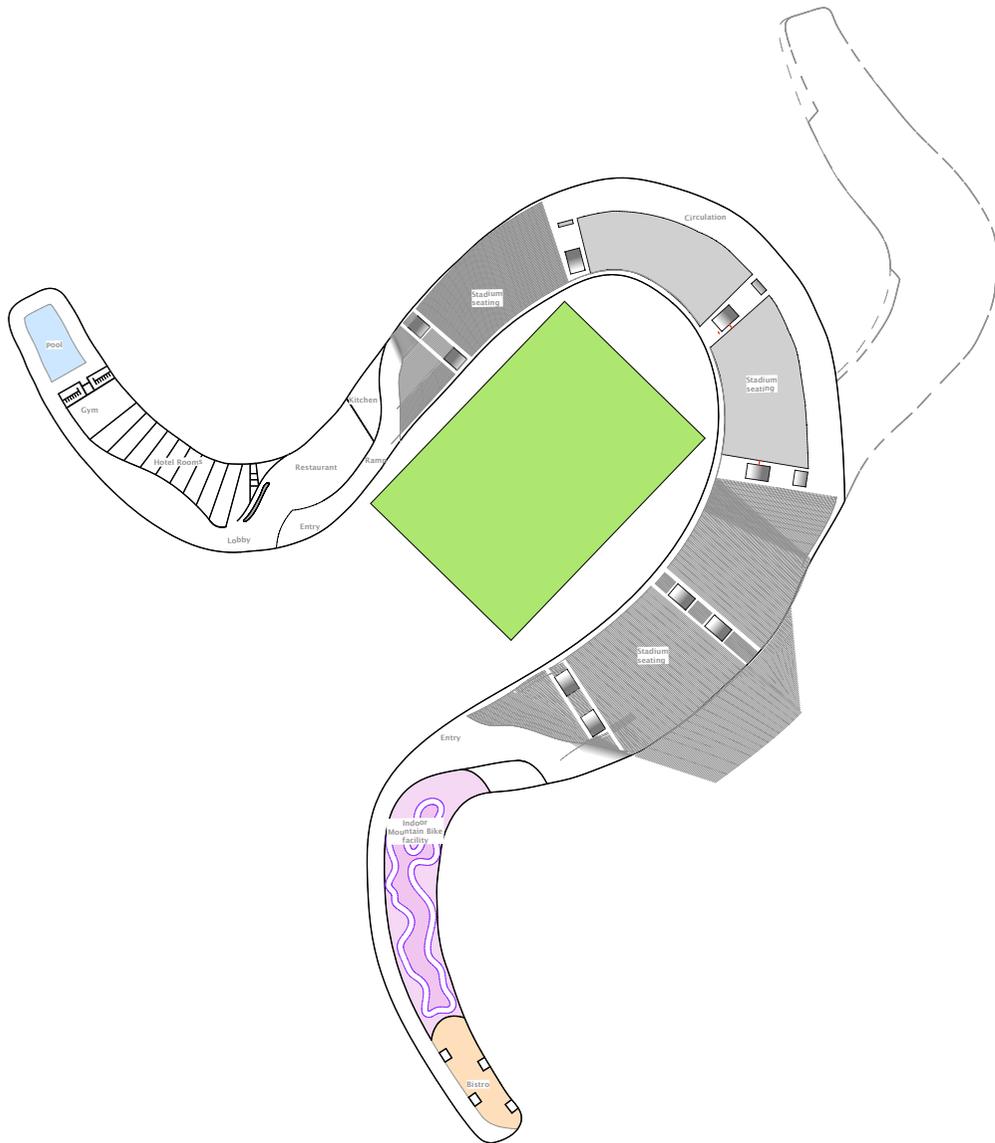


Fig. 58 First Level - Hotel/Stadium seating/  
Indoor Mountain Bike arena

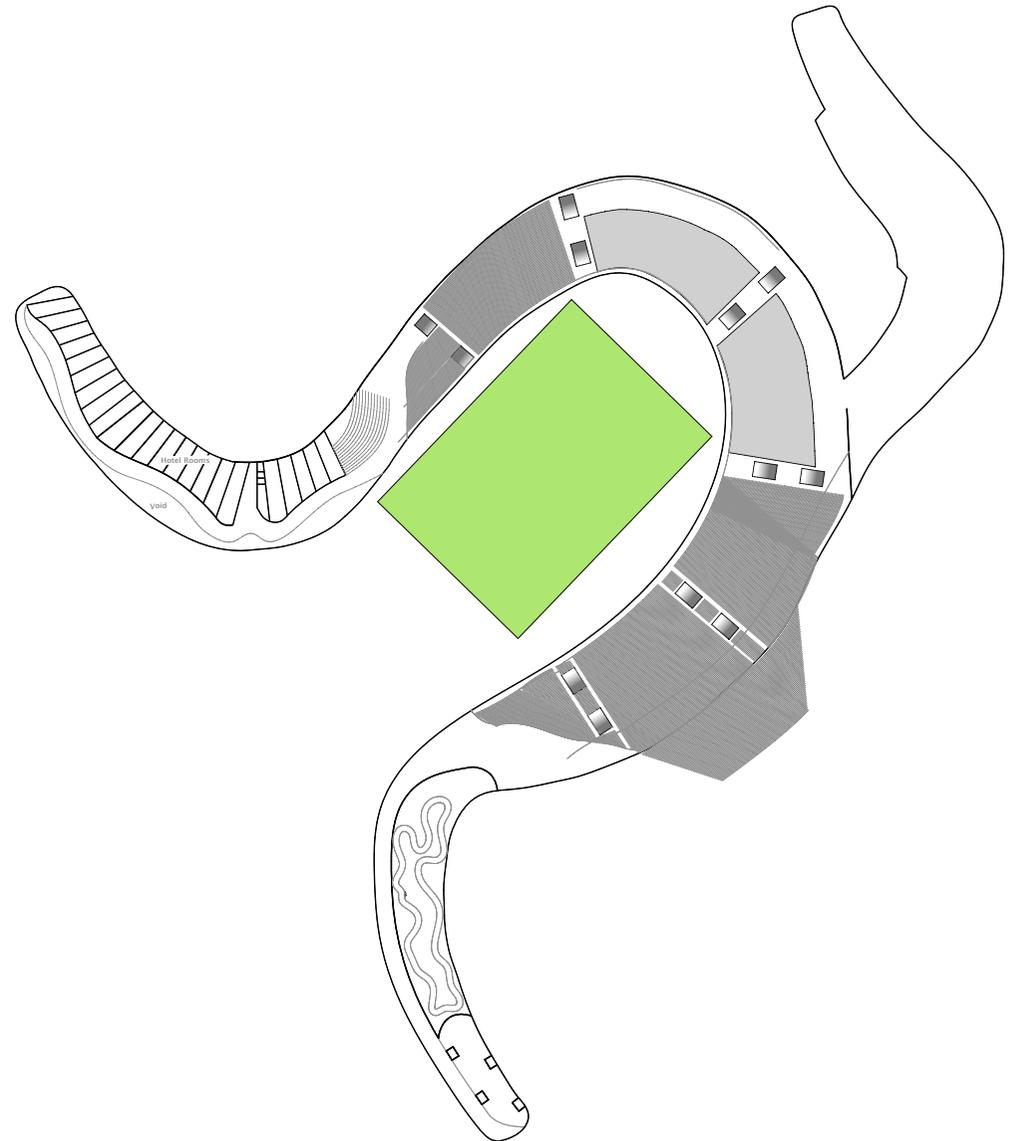


Fig. 59 Second Level - Hotel Centre/  
Stadium seating

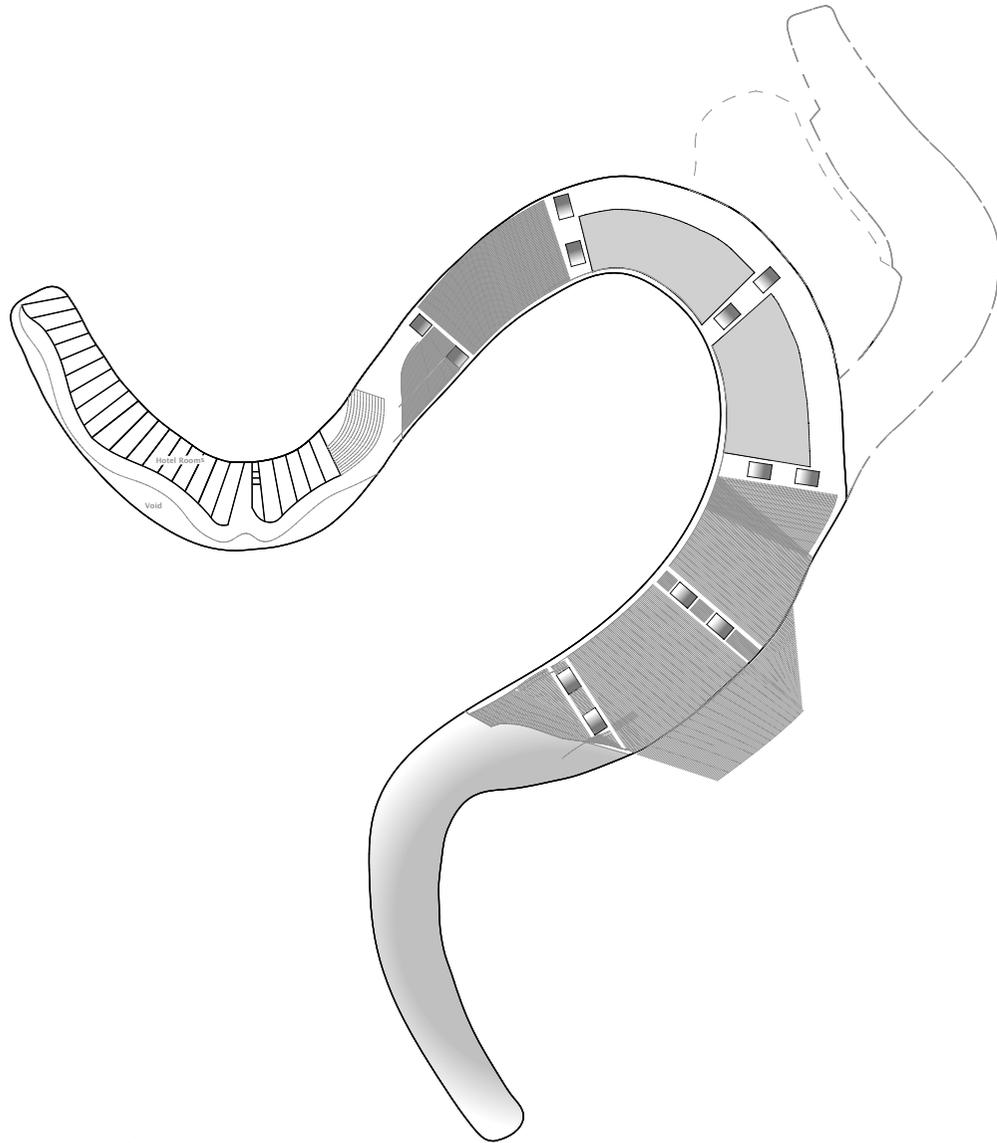
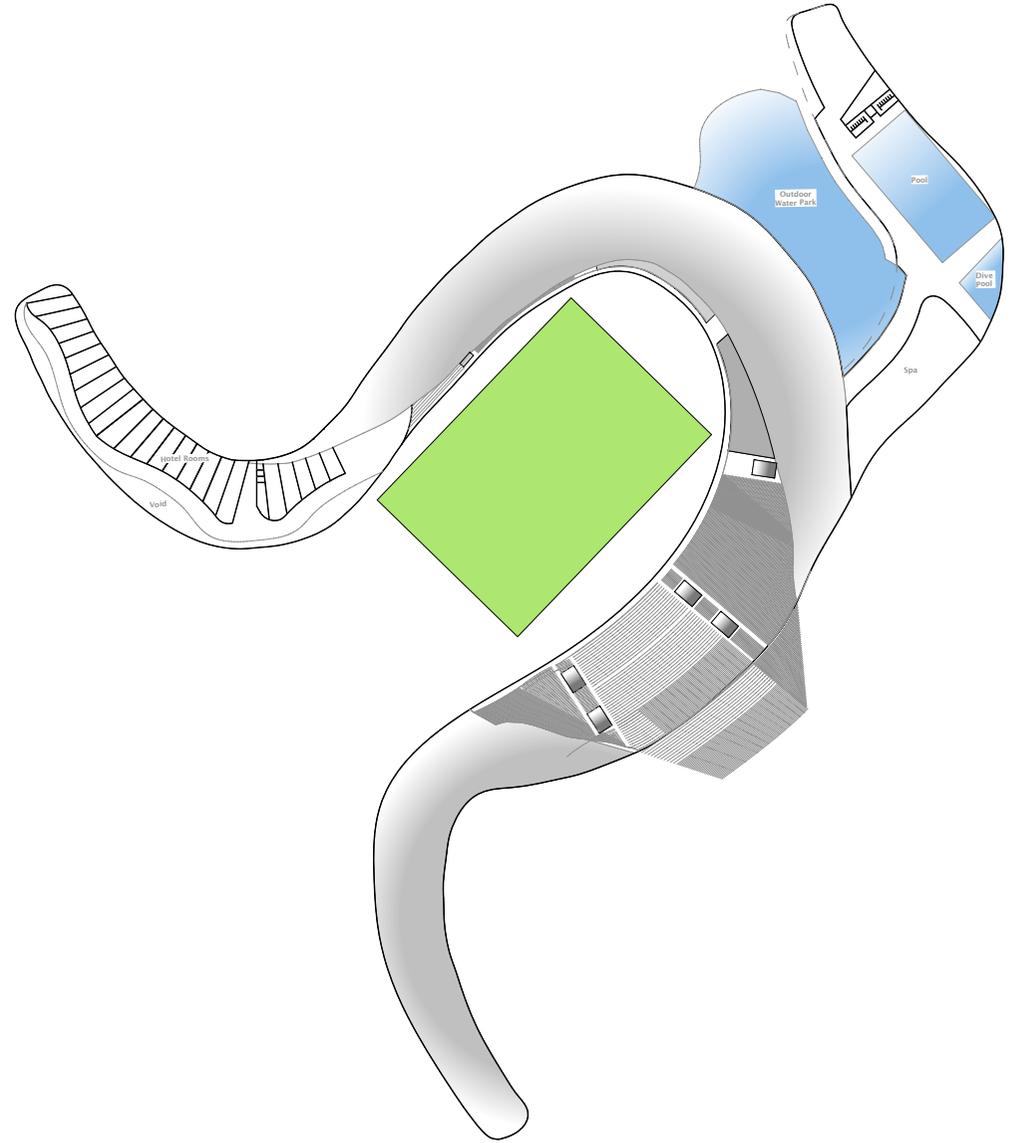


Fig. 60 Third Level - Pool/Recreation Centre



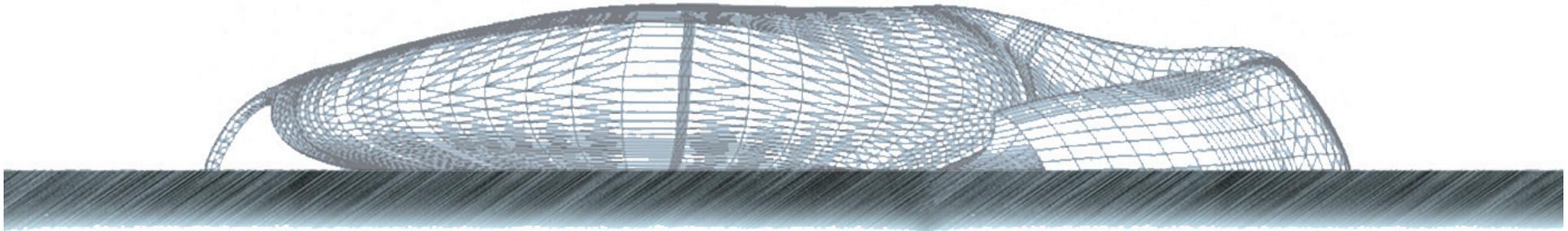
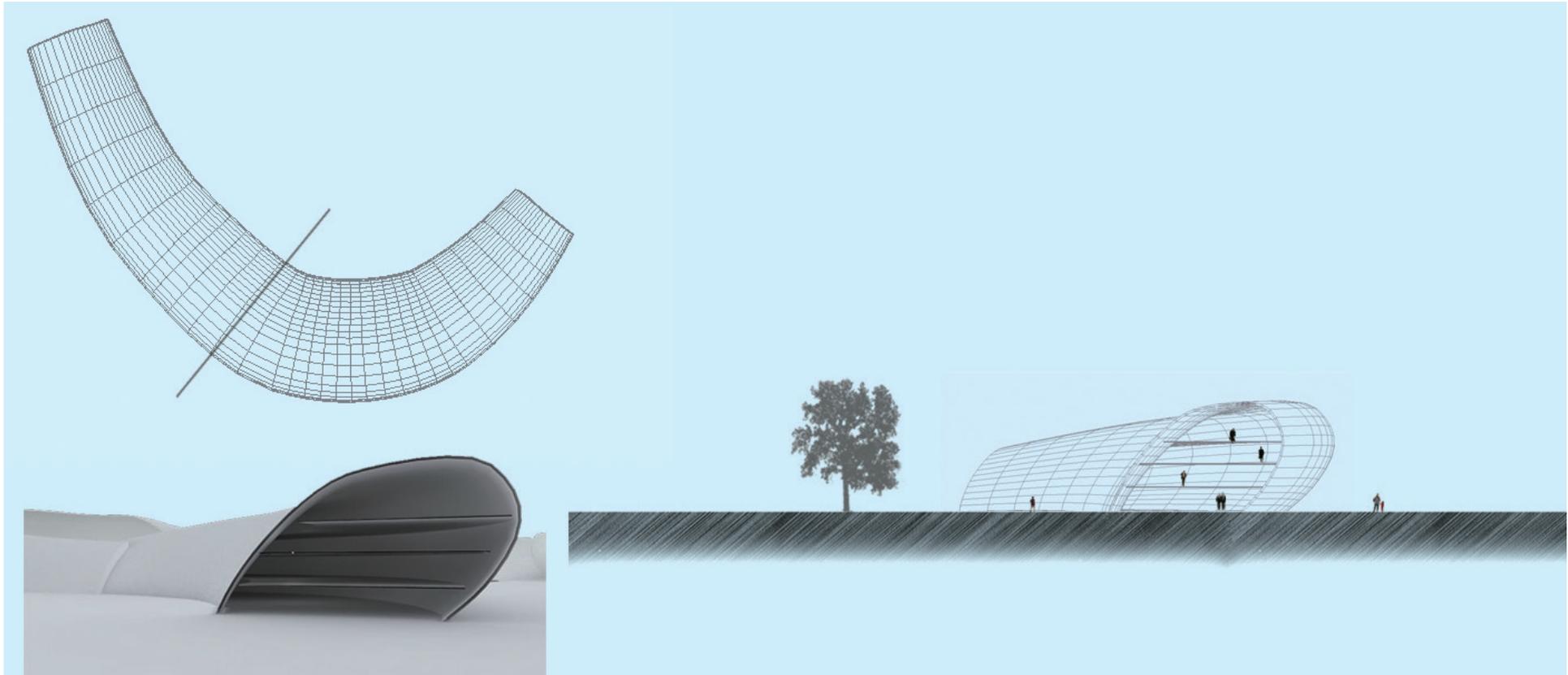


Fig. 61 Exploratory Cross-Sections



# A p p e n d i x D

## D e s i g n P h a s e 4 - C o n t e x t R e l a t i o n s h i p s



Fig. 62 Progressive 3D model

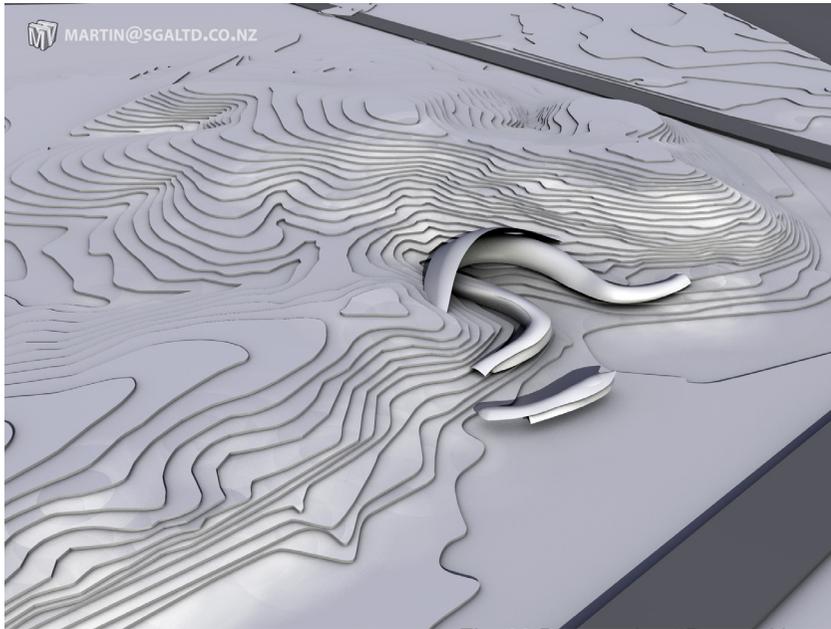


Fig. 63 Progressive 3D model in site context

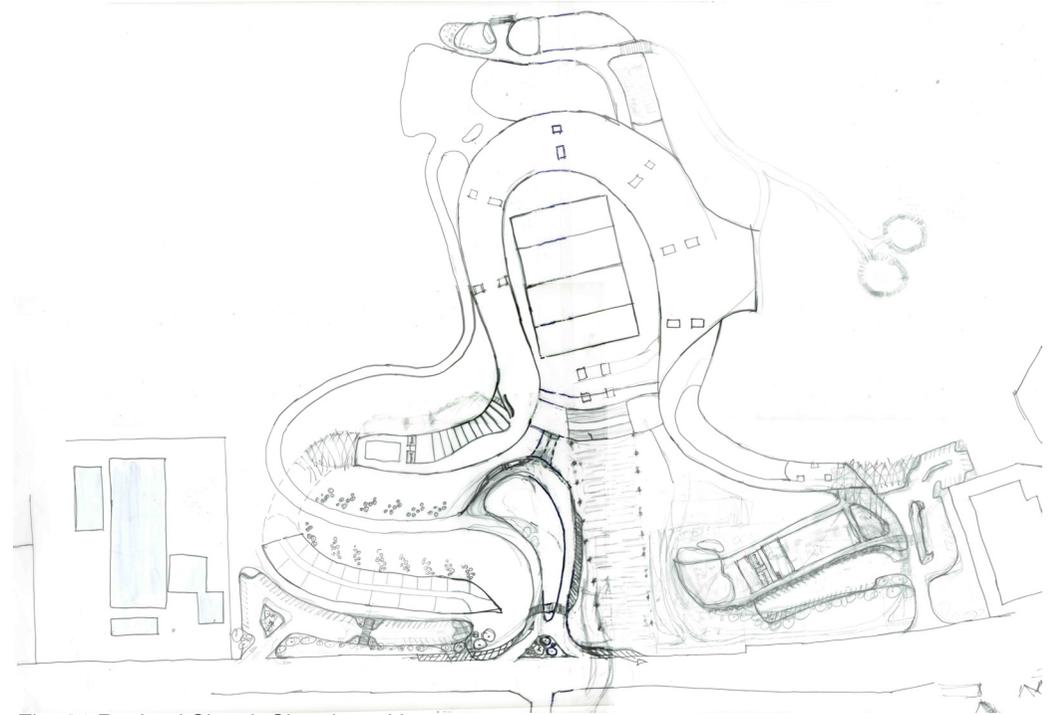


Fig. 64 Revised Sketch Site plan with relocated Rec Centre & Mountainbike facility

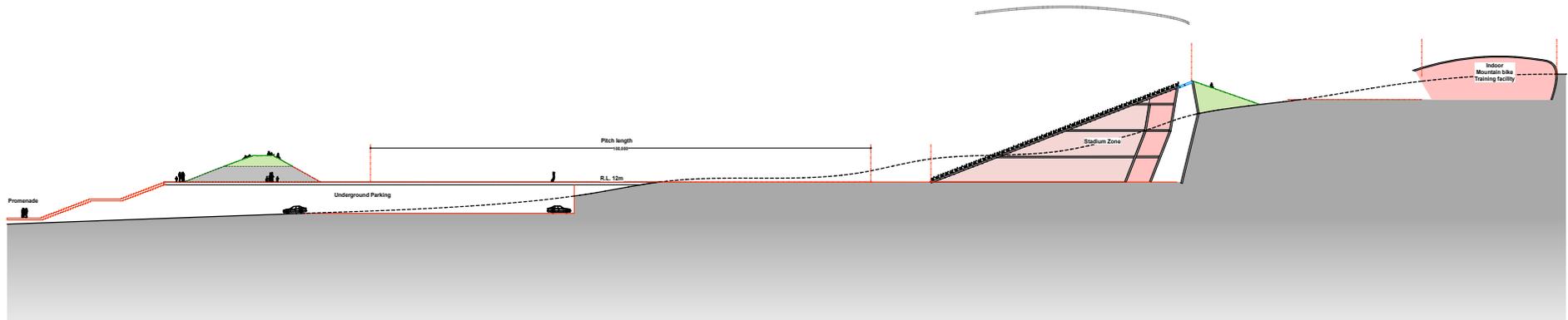


Fig. 65 Cross Section through Stadium

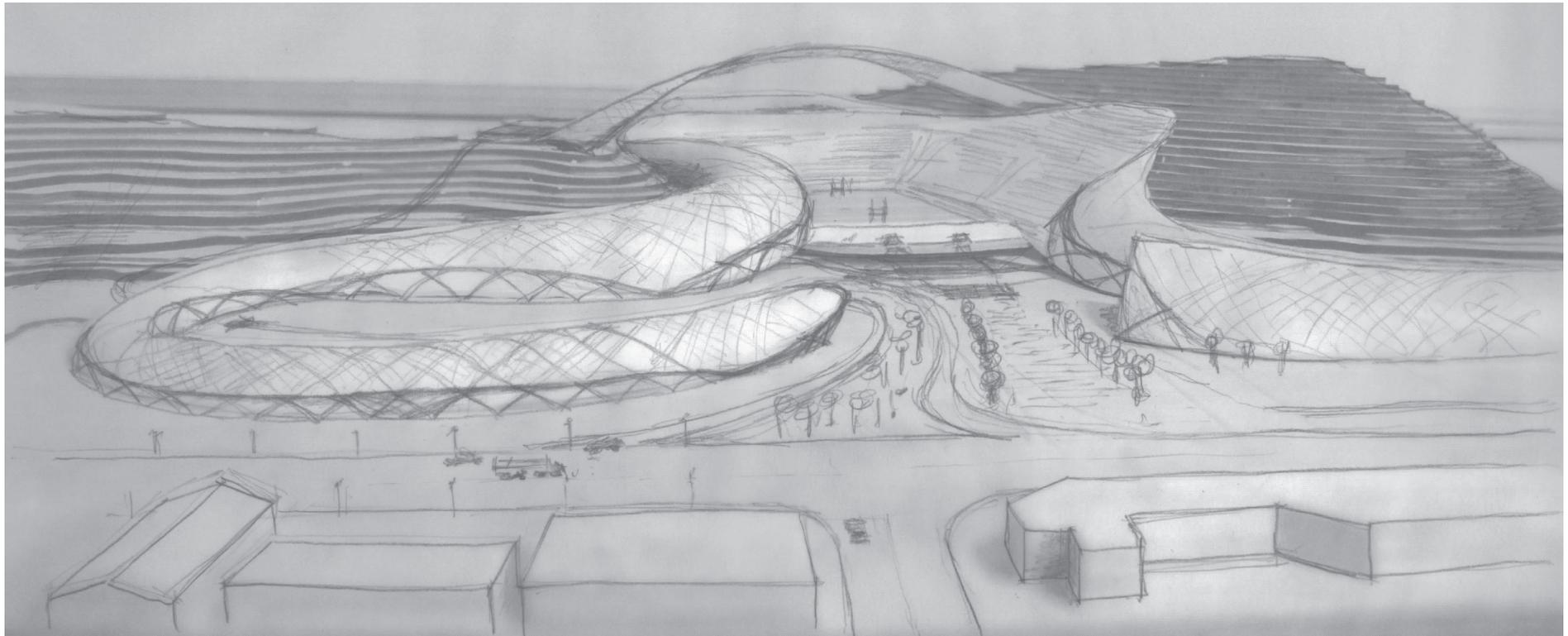


Fig. 66 Sketch of Main Approach to Stadium

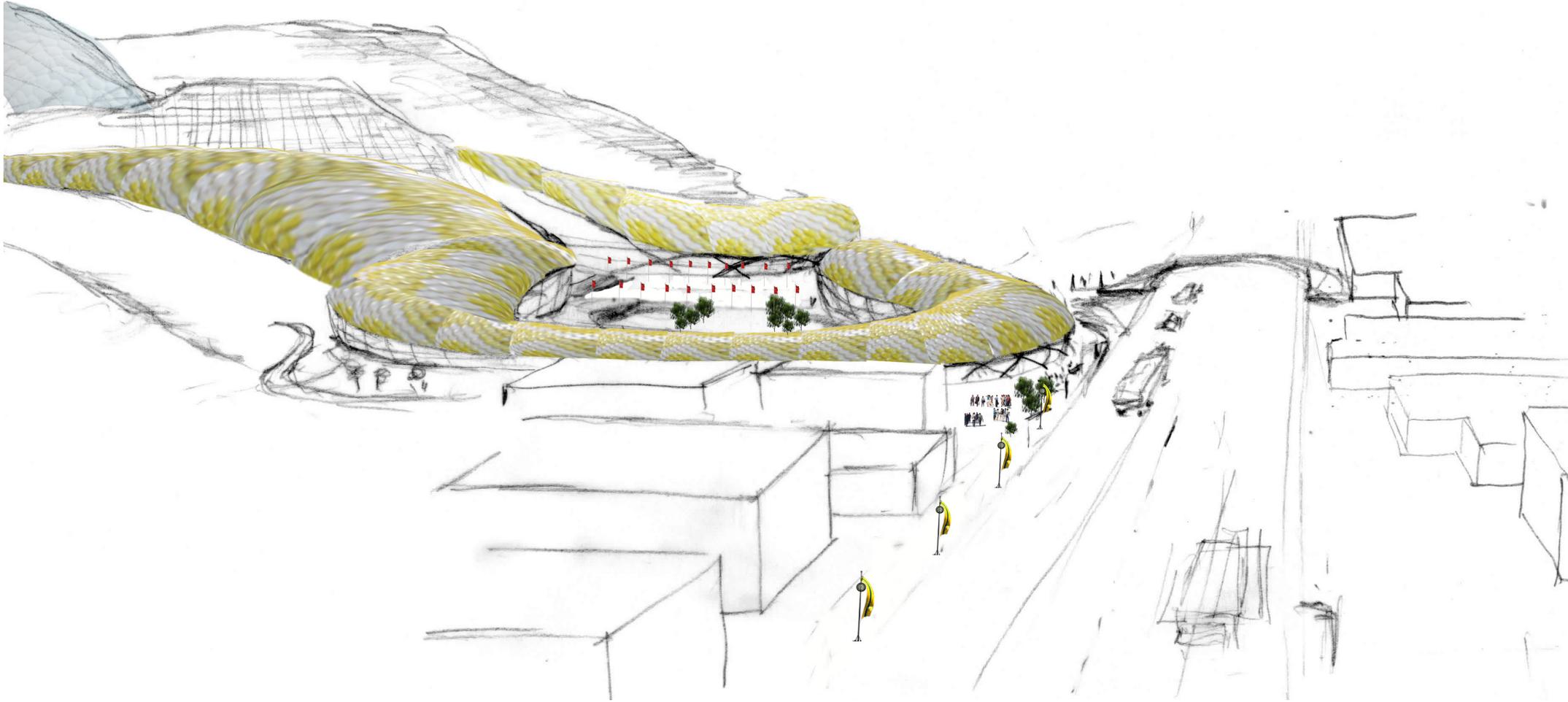


Fig. 67 Preliminary Perspective - travelling south on Great South Rd



Fig. 68 3D Stadium Plastilina model & urban context



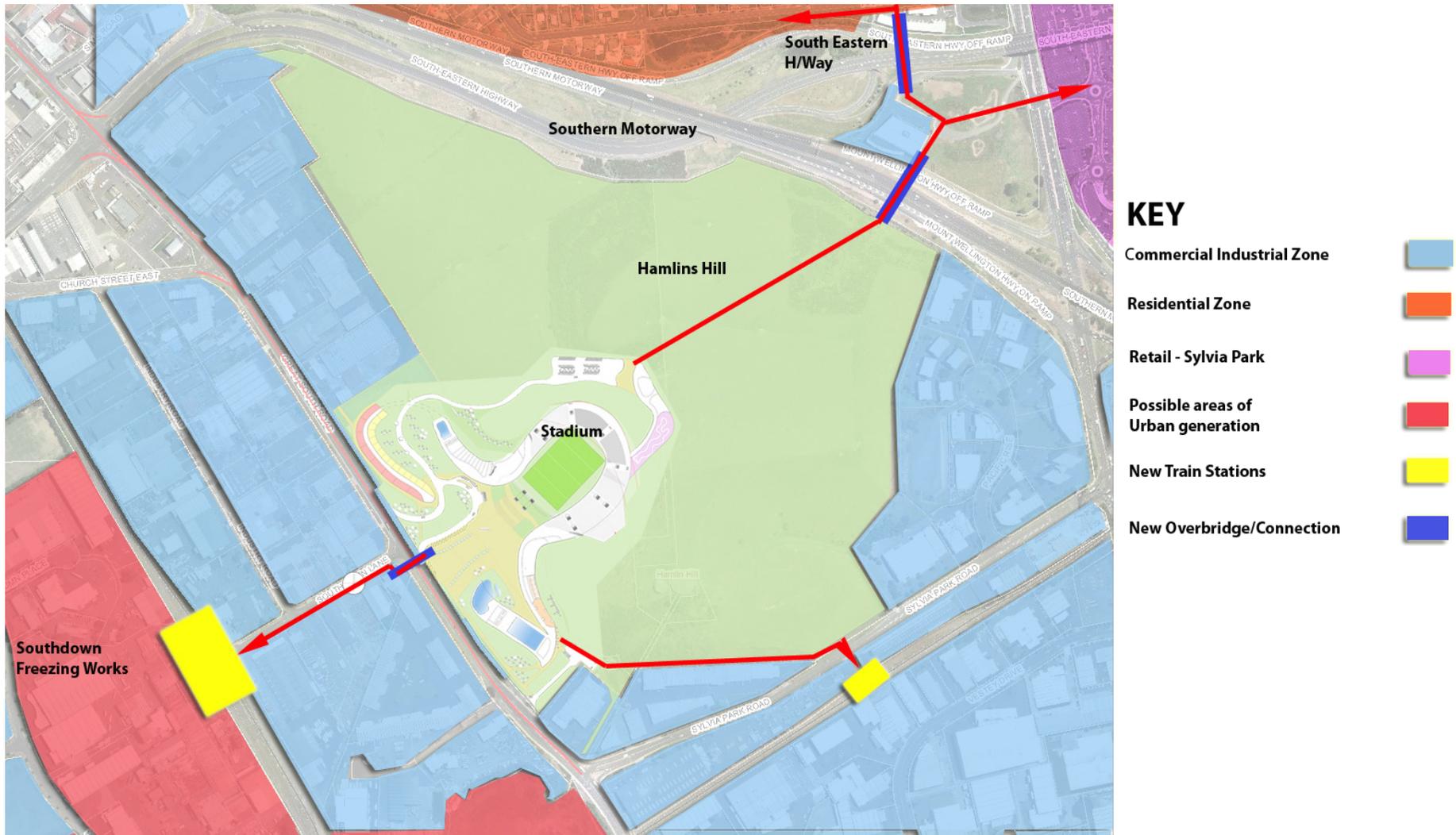


Fig. 69 External pathways to key locations



Fig. 70 Perspective - Approach from Southdown Freezing works & Main Trunk Rail line

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