INTEGRATION OF OPEN SPACES TOWARDS ENSURING A SUSTAINABLE BUILT ENVIRONMENT CASE APPLICATION: NEWTOWN, KOLKATA

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ABSTRACT

In Current Scenario of Open Spaces and their integrated connection is sparse. People in neighbourhoods struggle to find continuous green spaces and lack of civic amenities in them. This thesis is an attempt to highlight such a neighbourhood and connect the green spaces in and around it. After researching about the Hierarchy of Open Spaces and how sustainability is achieved at different levels, this thesis attempts to select the best possible method and apply it in order to do the same in the chosen Case Application neighbourhood. Sustainability is achieved in the neighbourhood through applying overlapping sustainability goals and parameters found through survey.

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INTRODUCTION

OPEN SPACES

Open space is a broad term that can be used to describe all land that does not contain buildings and structures. It can include public and private land. However when we discuss about open space in design and planning we basically use the term 'open space' as 'urban open space'. (*Terminology of Urban Open and Green Spaces; Mehdi, Afsi, Yusof*)

It is believed that the term open space was first applied in 1833 by a committee in a "public trail" in London. (Maruani and Amit-Cohen, 2007). Then another definition appears in "Metropolitan Open Space Act" made in London in Britain in 1877 and then in 1906, defined the open space as any land, less than 5% of which is occupied with buildings (Wang & Gao, 2012).

One broad definition could be argued that any area within the urban envelope not occupied by buildings constitutes open space. This lead to comparing different definition by other countries. For example the London Plan defined open space as: "All land use in London that is predominantly undeveloped other than by buildings or structures that are ancillary to the open space use. The definition covers the broad range of open space types within London, whether in public or private ownership and whether public access is unrestricted, partially restricted or restricted". In city of Melbourne, Australia, open space is defined as: "publicly owned land that is set aside primarily for recreation, nature conservation, passive outdoor enjoyment and public gatherings. This includes public parks, gardens, and reserves, waterways, publicly owned forecourts and squares". (Terminology of Urban Open and Green Spaces; Mehdi. Afsi, Yusof)

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Another definition that emphasizes the greenery aspects indicates: It is usually publicly owned land that is set aside primarily for, nature conservation, agriculture, forest, green buffers, passive outdoor enjoyment, recreation, public gatherings, and. This includes public parks, publicly owned forecourts, gardens, waterways, reserves, and squares. This term includes any open area that is owned by an agency or organization dedicated to conservation and vacant lots and brownfields that can be redeveloped into recreation areas. On the other hand open space including not only land but also water bodies such as: lakes, canals, reservoirs and rivers which improves visual amenities beside opportunities for recreation and sport (Doyle, 2012; Patrick, 2008).



(Source: Urban Land Institute)



(Source: Latz+Partner)



(Source:Savannah Park/Wikipedia)



(Source:Cambridgema/CDD)

Open space is a necessary component of housing developments, but poor design of open space can lead to unused areas, undesirable behavior, strain on management, and other difficulties. In the following sections, we will attempt to outline methods of creating successful open spaces that are attractive, comfortable, and useful for a variety of residents, appropriate to the scale of the space. In particular, we support what we consider a sustainable version of recreational open space, which includes open space that:

1. is reasonable to manage and upkeep;

- 2. adds to the value of the development;
- 3. is flexible in use and therefore adaptable;

4. fosters a sense of ownership so that residents become involved in maintaining the space;

5. and has a positive impact on the surrounding natural resource

Our quality of life significantly depends on open spaces. They offer facility provision for a wide range of social interactions and provide habitats for flora and fauna. A classification of spaces would be useful in preparing public open space policies and fulfilling structure plan.

The rapid growth of towns and cities in the nineteenth century led to calls for parks to be provided for the health of factory workers and consequently it benefited society as well. This could be seen as an early precedent to highlight the role of open spaces in supporting what we now call sustainable development. (Khalid Al-Hagla, 2014)

SUSTAINABILITY

The Brundtland definition states that "sustainable development is development that meets the needs of present without compromising the ability of future generations to meet their own needs(Bruntland Report,1987)



(Source: Think Pipe Think PVC)

SUSTAINABLE NEIGHBOURHOOD

There are different approaches that tackle the application of sustainability to neighbourhoods. Among these approaches, stands both social and ecological as two different but integrated perspectives. Regarding the social perspective, the overlapping area of both the terms 'neighborhood' and 'community' could be used to understand the definition that the Egan Review (2004) report 'Skills for Sustainable Communities', develops. It highlights sustainable communities as those which "meet the diverse needs of existing and future residents, their children and other users, contribute to a high quality of life and provide opportunity and choice. They achieve this in ways that make effective use of natural resources, enhance the environment, promote social cohesion and inclusion and strengthen economic prosperity". (Review, 2004:1)

It concludes that there are seven components of sustainable communities drawn from this definition; governance; transport and connectivity; services; environment; economy; housing and the built environment; sociology and culture.

From another stand point, Hugh Barton (1996) gives a different approach based on the 'Ecological Perspective'. He asserts that "One way of approaching the problem of sustainable design is to see each development as an organism or a mini ecosystem in its own right". (Barton et al, 1996) Regarding this point of view, a neighbourhood is an ecosystem in the sense that it provides the essential local habitat for humans, creating its own microclimatic conditions, and should provide as far as possible for their comfort and sustenance. (Khalid Al-Hagla, 2014)

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as an organism or a mini ecosystem in its own right". (Barton et al, 1996) Regarding this point of view, a neighbourhood is an ecosystem in the sense that it provides the essential local habitat for humans, creating its own microclimatic conditions, and should provide as far as possible for their comfort and sustenance.



(Source: Barton et al, 1996, Khalid Al-Hagla, 2009)

SUSTAINABILITY DIMENSIONS GOALS AND OBJECTIVES APPLIED TO A NEIGHBOURHOOD

The application of wide-scope conceptual sustainability dimensions to neighbourhoods needs them to be interpreted practically into goals and objectives. However, the following table sets the sustainability goals and objectives that have to be achieved at neighbourhood level. They are driven from the sustainability dimensions applied to the neighbourhoods.



(Source: Khalid Al-Hagla, 2009)



(Source:Attelborogh Proposal JTP Architects)

MACRO LEVEL APPROACH TOWARDS OPENSPACES

A COMPREHENSIVE PUBLIC OPEN SPACE CATEGORIZATION USING CLASSIFICATION SYSTEM FOR SUSTAINABLE DEVELOPMENT OF PUBLIC OPEN SPACES

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COMPREHENSIVE CATEGORIZATION OF OPEN SPACE BASED ON CLASSIFICATION METHOD

The classification method in classifying open spaces generally covers three approaches included

i) the catchment hierarchy (who will use the open space),

- ii) function (the role of the open space) and
- iii) landscape/environmental character (what the open space looks like) .

CATCHMENT HIERARCHY

This term in some sources is simply so-called hierarchy. Hierarchy is basically determined by the:

- •Geographical area being serviced(catchment)
- •Size
- •Level of use
- •Significance

Typical size and how far a user might travel to visit the site. Catchment hierarchy reflect the distance people would be prepared to travel to use open spaces or the sphere of influence and origins of users.

FUNCTION

Each open space is assigned with a functional classification to reflect its primary use. It is used to define the purpose planned for a space. A functional classification, considering the primary purpose or use of the open space within the network. Primary use and expected activities identifies three primary types of open spaces]:

- Recreation spaces
- •Sport spaces
- •Nature spaces

LANDSCAPE/ENVIRONMENT SETTNG

Each open space is assigned with a landscape/environmental classification that reflects its primary physical setting . A landscape setting type classification is proposed to assist with the differentiation of sites on the basis of experiences they offer and for planning, management and marketing purposes. These would be used where the setting type may not be evident from the functional classification. Landscape character is used to define the desirable landscape and/or vegetation type of a space.

METHODOLOGY

The study will engage with a qualitative approach, analysing literature and comparing different POS classification method that has been applied in several develop and developing countries. The study considers Malaysia's POS classification in three level which include the national, state and city level. It will also observe the shortcomings that exist in Malaysian POS classification as compare to other countries.

OPEN SPACE CLASSIFICATION IN OTHER COUNTRIES AND MALAYSIA

UNITED STATES

Michigan

Classification
Mini-Parks
Neighbourhood Park
School-Park
Community Park
Large Urban Park
Natural Resource Areas
Greenways
Sports Complex
Special Use
*Private Park / Recreation Facility

*Parks and recreation facilities that are privately owned yet contribute to the public park and recreation system.

SINGAPORE

Zoning	Example of Developments
Open	1. Wooded Area
Space	2. Swamp Area
200 C 100 C 100 C	Natural Open Space
	4. Public Promenades
	Outdoor Pedestrian Malls
	6. Landscaped Plazas
Park	1. National Park
	2. Regional Park
	Community/Neighbourhood Park
	Park Connectors
	Zoological Gardens, Botanic
	Gardens,
Beach Area	Nil
Sports &	1. Sports Complex/ Indoor Stadium
Recreation	2. Swimming Complex
	3. Golf Course
	Golf Driving Range
	5. Recreation Club
	6. Campsite
	7. Chalet
	8. Marina
	9. Water Sports Centre
	10. Outward Bound School
	11. Theme Park

City Of Coon Rapids

Classification
Mini And Neighbourhood Park
Community Park
Youth Athletic Complex
Community Athletic Complex
Community Preserve
Protected Open Space
Special Use Park
Regional Park
School Site

UK

London

Open	Space Category
Regio	nal
Metro	politan
Distri	ct / Major Parks
Local	Parks
Small	Local Parks
Pocke	et Parks
Linea	r Open Spaces

AUSTRALIA

City of Marion

User Catchment Level
Local Level Distributed
Neighbourhood Level
Precinct Level
Regional Level
State Level Land

User Catchment levels and classifications, Open Space & Recreation Strategy 2006 – 2016, City of Marion, 2006

Functional Classifications	
Recreation - Structured, Physically Active	
Recreation -Unstructured, Physically Active	
Recreation - Structured, Passive	
Recreation - Unstructured, Passive	
Physical Activity / Linkage	
Cultural / Heritage	
Tourism	
Visual Amenity / Environmental	
Unclassified	

Functional classifications, Open Space & Recreation Strategy 2006 – 2016, City of Marion, 2006

Landscape/Environmental Classifications
Formal / Landscaped
Turf / Lawn
Watercourse
Natural Area
Undeveloped Area
Wetland
Drainage / Stormwater
Buffer
Hard Surface
Coastal
Unclassified

Landscape/Environmental classifications, Open Space & Recreation Strategy 2006 – 2016, City of Marion, 2006

Hume City Council

Level of Hierarchy	
Neighbourhood	
Sub-Regional	
Regional	

Hierarchical classifications, Hume City Open Space Classification System, Hume City Council, 2003

Function Name	
Access Way / Linkage / Bicycle Or Walking Tra	ail
Community Horticulture / Vegetable Growing /	
Conservation of Flora & Fauna	_
Crematoria / Remembrance Garden / Cemeter	y
*Cultural / Community Gathering / Event	ill.vo
Drainage / Storm Water Management	
Environmental/Visual Amenity	
Family/Social Recreation	
Historic/Cultural Protection	
Indoor Community Activity Centre	
Outdoor Sports	
Play Space	
Relaxation / Contemplation / Urban Escape	
Water Based Recreation	_

Functional classifications, Hume City Open Space Classification System, Hume City Council, 200

Landscape Character
Bushland
Creek/River Corridor
Formal Ornamental Garden
Lake
Lawn or Managed Turf
Narrow Grass Or Paved Corridor
Native Grassland
Open Grassy Area
Open Parkland
Outdoor Sports Facilities
Road Side Plantation / Tree Reserve
Rough Unmanicured Area
Vegetable Garden /Pasture / Agriculture
Wetland

Landscape character classification, Hume City Open Space Classification System, Hume City Council, 2003

City Of Maroondah

Function
Play
Social Family / Recreation
Community Horticulture
Cemetery / Memorial / Remembrance
Ornamental / Botanic Garden
Access Way / Trail
Sport
Flora / Fauna Conservation
Drainage / Stormwater Management / Floodway
Visual Amenity
Community Facility Forecourt
No Identified Function
Conservation of Cultural Heritage
Relaxation / Contemplation / Escape
Lookout / Ridgeline Reserve
Water Based Recreation
School / Educational Institute

Contextual or catchment classification, An Open Space Strategy for the City of Maroondah, 2005

Function
Play
Social Family / Recreation
Community Horticulture
Cemetery / Memorial / Remembrance
Ornamental / Botanic Garden
Access Way / Trail
Sport
Flora / Fauna Conservation
Drainage / Stormwater Management / Floodway
Visual Amenity
Community Facility Forecourt
No Identified Function
Conservation of Cultural Heritage
Relaxation / Contemplation / Escape
Lookout / Ridgeline Reserve
Water Based Recreation
School / Educational Institute

Functional classification, An Open Space Strategy for the City of Maroondah, 2005

Landscape Setting Types
Bushland / Forest
Exotic, Ornamental or Specimen Plantings
Open Grassland
Specialised Sports Surfaces (e.g. Synthetic or
Enclosed)
Lawn or Managed Turf
Open Parkland
Creek Corridor
Lake / Waterbody
Rough Natural Area
Paved Area
Crop or Plantation
Tree Plantation
Wetland
House Built on Reserve

Landscape classification, An Open Space Strategy for the City of Maroondah, 2005

City of Melbourne

Hierarchy
Capital City
State
Regional
Municipal
Neighbourhood
Local
Small Local
Small Local Link

Hierarchy of open space, City of Melbourne Open Space Strategy Technical Report, 2012

Character Classification
Botanical
Civic Space
Events
Formal
Heritage
Informal Use
Linear
Linking Space
Nature Conservation
Play
Railway Easement/Siding
Recreation
Restricted Sporting / Recreation
Seating / Viewing
Service Easement
Significant Road Reservation
Sporting
Square
Undeveloped
Urban Plaza
Water Feature
Waterway

Open space character classification, City of Melbourne Open Space Strategy Technical Report, 2012

MALASIA

National Level: Department of Town and Country Planning, Malaysia

Hierarchy	Size (ha.)	Population Catchment
National	Unlimited	National
Regional	100	Regional
Urban	40	> 50,000
Local	8	12,000 - 50,000
Neighbourhood	2	3,000 - 12,000
Playing Field	0 - 0.6	1,000 - 3,000
Playground	0 - 0.2	300 - 1,000
Roof Garden	Varies	Target Group

Catchment hierarchy classification, Hierarchy of Open Spaces, Town and Country Planning Department Peninsular Malaysia (2002)

State Level: State of Selangor

Hierarchy	Size (ha.)	Service Distance
Urban	40-100	Within 5km
Local	8-40	Within 3km
Neighbourhood	2-8	Within 1.5km
Playground	0.6-2	Within 1km
Playing Lot	0.2-0.6	Within 0.5km

Catchment hierarchy classification, Guidelines on hierarchy of open space, Manual Planning Standard and Guidelines Selangor, 2nd ed., 2010.

City Level: Kuala Lumpur

Hierarchy	Minimum Size	Population
District Park	40 ha	200,000
Neighbourhood Park	10 ha	50,000
Local Park	2 ha	20,000
Local Play Area	0.5 ha	5,000
Sport Complex	2.5 ha	50,000

Catchment hierarchy classification, Open Spaces, Recreational and Sports Facilities, Kuala Lumpur Structure Plan 2020, (2004)

ANALYSIS OF COMPARISON

The analysis of each city in several countries reveals that Australia comprehensive POS classification could inspired in development of a similar classification system for Malaysia. Therefore the POS classification provided by the cities of Australia could be adopted and adapted to affectively assist in proposing a comprehensive POS classification system for Malaysian context. In addition to Australia, the items used in the cities of the US, Singapore and London open space classification will also apply.

RESULT AND DISCUSSION

In following table a cumulative of items in all list three approaches included 'catchment hierarchy', 'function'. and 'landscape/environmental character' proposed as a new 'comprehensive POS classification' for Malaysia .

CONCLUSION



This study presented three level of classification in Malaysia. The investigation in all three levels revealed that the open space classifications are mainly based on 'catchment hierarchy' approach. In other words, there is a lack of comprehensive open space classification in Malaysia. Therefore a comprehensive classification as a framework would be a useful tools for sustainable development and management of public open spaces.

NEIGHBOURHOOD LEVEL APPROACH TOWARDS OPEN SPACES

TOWARDS A SUSTAINABLE NEIGHBORHOOD: THE ROLE OF OPEN SPACES Author: Khalid Al-Hagla

OPEN SPACE MORPHOLOGY OF NEIGHBOURHOODS

Open spaces in neighbourhoods are defined as 'any unbuilt land within the boundary or designated envelope of a neighbourhood which provides, or has the potential to provide, environmental, social and/or economic benefits to communities, whether direct or indirect.' (Campbell, 2001) They could be classified Into: -

GREENSPACE: a sub-set of open space, consisting of any vegetated land or structure, water or geological feature within urban areas.



(Source:KSMU Documentary on Olmsted)

(Source:Arch 20)

(Source:dcla.net)

GREYSPACE: (sometimes referred to as "civic space"): a sub-set of open space, consisting of urban squares, market places and other paved or hard landscaped areas with a civic function.



(Source:Pinterest)

(Source:Herskhazen)

(Source:Gillespies)

Moreover seven distinct sub-sets of publicly accessible greenspace, could be realized each with a specific and distinct primary function (Campbell, 2001):

- 1. PARKS AND PLAYGROUNDS: areas of land, normally enclosed, designed, constructed, managed and maintained as a public park or garden. Their primary function is for informal activity or relaxation, social and community purposes.
- 2. AMENITY GREENSPACE: Managed and maintained landscaped areas with no designated specific use by people, but providing visual amenity or separating different buildings or land uses for environmental, visual or safety reasons.
- 3. CHILDREN'S PLAY AREAS: The primary function of these areas is to provide safe facilities for children to play, usually close to home and under informal supervision from nearby houses.

- 4. SPORTS FACILITIES: Designed, constructed, managed and maintained large and generally (although not always) flat areas of grassland or specially-designed artificial surfaces, used primarily for designated sports. The primary function of these areas is to accommodate practice, training and competition for recognized outdoor sports.
- 5. GREEN CORRIDORS: Routes linking different areas within a town or city as part of a designated and managed network and used for walking, cycling or horse riding or linking towns and cities to their surrounding countryside or country parks. The primary function of green corridors is to allow safe, environment-friendly movement within urban areas. Moreover, they support wildlife colonization and therefore habitat creation.
- 6. NATURAL/SEMI-NATURAL GREEN SPACES: Undeveloped land with little or only limited maintenance which have been planted with wild flowers or colonized by vegetation and wildlife. They also include woodland, railway embankments, river and canal banks and derelict land, which may in some cases be thought of as temporary natural greenspace. The primary function of natural greenspaces is to promote biodiversity and nature conservation.
- 7. OTHER GREEN SPACES: Essentially allotments, the yards of religious buildings and cemeteries.

There are also various types of Greyspace (civic space), including:

- 1. CIVIC SQUARES AND PLAZAS: Often containing statues or fountains and primarily paved, sometimes providing a setting for important public buildings.
- 2. MARKET PLACES: Usually with historic connotations.
- 3. PEDESTRIAN STREETS: Usually former roads which have been paved over and provided with seats and planters.
- 4. PROMENADES AND SEA FRONTS: Usually used for recreational activities. They have special value when located at historical areas.

THE ROLE OF OPEN SPACE IN ACHIEVING SUSTAINABLE NEIGHBOURHOOD

The role that is assigned to open spaces to play within the neighborhood structure, to achieve sustainability goals and objectives, is formulated in three key issues(Campbell, 2001, Ironside, 1999, Birkeland 2004) :

SPACE MANAGEMENT

This includes:

- encouraging sustainable lifestyles, for example by providing paths and cycle routes
- making maximum use of existing features and assets

- strengthening the sense of place

- incorporating local or recycled materials

- encouraging community participation and involvement

-reducing inputs of non-renewable resources during construction and subsequent maintenance

- eliminating or reducing the use of herbicides and resources that affect other ecosystems

- encouraging habitat creation and native planting

- managing resources carefully

■ SPACE FUNCTION(Circulation of People and Permeability)

While most modern development planning uses the road network as the key structural element, a sustainable design takes the circulation of people on foot and bike and the effectiveness of public transport as starting points (Barton, 1996). "Communities can support walking and cycling if they are developed with meaningful destinations in close proximity to each other, such as shopping, school and employment". (National NeighborhoodCoalition,2005)

The objectives are to:

- reduce the level of car reliance,

- reduce the need to travel

- with the social benefits of increasing transport choice for all groups in the population

- enhancing local security and community

■ THE ROLE OF OBJECTS WITHIN SPACE(Sustainable Landscape)

Landscaping elements are the basic constituent of any open space's structure. They have to be utilized to achieve sustainability goals at the micro level. Janis Birkeland (2004) draws a framework for sustainable landscaping elements as they should:

-Return to original sources of inspiration, whether nature or culture. (Papnek, 1984).

-Respond to the site, designing in harmony with its distinctive character to enable the unfolding of the landscape's ecological potential over time.

- Minimize inputs of materials and energy and maximize outputs of renewable and reusable resources.

- Maximize resilience and dynamic stability in the landscape in such a way that each element fulfils several functions and each function is undertaken by several elements.

- Create 'place' as distinct from merely manipulating space, in such a way that the design maximizes the potential for user interaction with the environment.

- Make systems visible, which means making environmental processes apparent and celebrating them.

- Minimize maintenance and maintain to enable full expression of design, acknowledging that ongoing management is itself an aspect of design, to ensure the continuity of sustainable outcomes.

OPEN SPACE SUSTAINABILITY PARAMETERS

A proposal of a three dimensional matrix that consists of two main parts was given:-

- 1. A two dimensional matrix that investigates the relationship between the sustainability goals and objectives, and the different types of open spaces in a neighbourhood. This matrix indicates the roles and responsibilities that each of these types has to play –divided mainly into categories of 'greenspaces' and 'greyspaces'. This answers the question about 'What' are the goals and objectives that the open spaces in a neighbourhood have to achieve.
- 2. A two dimensional matrix that correlates the assigned sustainability parameters (checklist) –driven out of three main sustainability issues, management, circulation, and sustainable landscape– with the open

spaces categories of neighbourhoods, 'greenspaces' and 'greyspaces'. This answers the question of 'How' these goals and objectives could be achieved.

The overlapping answers of these two questions draw the dimensions of the developed three dimensional matrix. (Fig.7)

However this matrix could be used to develop a further checklist for evaluating the open spaces performance in neighbourhoods. This



(Source: Khalid Al-Hagla)

could be achieved in three consequent steps as follows [numerically indicated in Fig.8]. :-

■ The first, is to determine which type of open space the study wants to investigate

 The second, is to determine the sustainability goals and objectives that are assigned to this type of open space and have to be achieved in the neighbourhood. [table 1]
 The third, is to develop a checklist of the sustainability parameters assigned to this

type of open space. [table 2]



Figure 8: Three Dimension Matrix Correlates Types of Open Space to Sustainability Attributes (Source: Khalid Al-Hagla)

					Gre	en Sp	ace				Grey	Space	
	Sustainabili	ty Parameters	Parts and gardens	Amenity greespace	Children's play areas	Sports facilities	Green corridora	Natural/semi- natural greenspaces	Const functional greenspaces	Civic squares	Market places	Pedestrian streets	Promenades
_	• encourag	ing sustainable lifestyles, for example by providing paths and cycle routes											
	 making n 	naximum use of existing features and assets											
ti	 strengthe 	ning the sense of place											
102	 incorpora 	ting local or recycled materials											
Ĩ.	 encourag 	ing community participation and involvement											
e Ma	 reducing 	inputs of non-renewable resources during construction and maintenance	•		•								
Cited I	 elimination 	ng or reducing the use of resources that affect other ecosystems	•					•		•			
N	 encourag 	ing habitat creation and native planting		•									1
	 managing 	g resources carefully					-		•				-
u i	 reduce th 	e level of car reliance					•				•	•	
	• the effect	iveness of public transport	_		_	-					_	_	1
릠	 reduce th 	e need to travel				•	-			_	•		
Č.	 social bei 	herits of increasing transport choice for all groups population	_	_			•			-			
	• enhancin	g local security and community			-		-		-		-	-	-
	Return to	original sources of inspiration		•	•		•	12.7	-		•		
	Respond to the site	 creating connections and themes within and across sites 	•			-	•		•				1
	to me she	 transforming site constraints into environmental opportunities 	•	•			•	•					
		 minimizing negative environmental impacts 	•										
on a		 maximizing positive impacts, off-site as well as internally 	•										
xcus	 Minimiza 	inputs of materials and energy and maximize outputs of renewable and reusable resources											
5	Maximize	· maximizing the diversity [landscape elements and the diversity of relationships]											
Quality	resilience	· creating opportunities for the emergence of self- sustaining and self-regulating systems											
	· Create 'pl	lace' as distinct from merely manipulating space											
	· Make sys	tems visible, which means making environmental processes apparent and celebrating them	•										
	• Minimiza	e maintenance											
	· meet the	varied recreation and leisure needs of users											
	· involve k	cal communities											

Table 1: Sustainability Matrix-A (correlating sustainable development with open space typologies (Source: Khalid Al-Hagla)

					Gre	en Sp	ace				Grey	Space	
Sustainability Goals	Su	stainability Objectives	Parks and gardens	Amenity greenspace	Children's play areas	Sports facilities	Green corridors	Natural/semi- natural greenspaces	Other functional greenspaces	Civic squares	Market places	Pedestrian streets	Promenades and sea fronts
Cutting greenhouse gas emissions	•	Reduce the need to travel								_			
Energy		Reduce car reliance											
	٠	Increase energy efficiency in buildings											
Closing local resource loops	•	Reduce demand for non-renewable resources											
	•	Reuse and recycling of resources locally											
	•	Local water sourcing, treatment and aquifer recharge											
	•	Local low-input food production	•										
Enhancing local environmental quality	•	Promote local distinctiveness and heritage	•										
	٠	Create an attractive public realm							•				
	•	Enhance local habitat diversity											
Creating a healthy environment	•	Improve local air quality								0 0			
	•	Promote an active life-style (especially walking)	•				•						
	•	Encourage consumption of fresh fruit and vegetables									_		
Increasing street safety	•	Reduce the chance of vehicle/pedestrian accidents											
	•	Reduce the fear of violence				•							
Increasing accessibility and freedom	•	Choice of transport mode for trips									-		
of choice	•	More facilities accessible locally											
Equity and social inclusion	•	Choice of facilities within easy walking distance											
	•	Viability of public transport											
Local work opportunities	•	Accessible jobs for those tied to the locality			•			_		_	•		-
	•	Reduce transport emissions				-		•		•			
value of local community	•	Facilitate accessible social networks				•	•	•	-	•	•		
	•	Promote mental health		0					•			0	
Increasing local self-determination	•	Increase user/citizen control			•					•	-		
	•	Management of decentralized systems									0		_

Table 2: Sustainability Matrix-B (correlating sustainable development with open space typologies (Source: Khalid Al-Hagla)

UTILIZING THE MATRIX IN EVALUATING OPEN SPACE SUSTAINABILITY PERFORMANCE

The study applies its findings to two different types of open spaces: 1.Beirut Pine 'Horsh Beirut' that is classified as a 'Greenspace' serving number of functions –parks and gardens, children playgrounds, and sports facilities.

2. The pedestrian open spaces at Byblos. They are classified as 'Greyspaces', however they function as: market places and pedestrian streets.

To determine the priorities of sustainability goals and objectives that have to be achieved through this multi functionalgreenspace, the paper assigns a relative weight equivalent to the type of influence that each space typology affects sustainability performance (2 to direct influence, 1 to indirect influence, and 0 to no influence). Reading table (3), and according to the shown relative scale, sustainability goals and objectives, could be rearranged regarding their importance (indicated at the last column-right).

BEIRUT PINE 'HORSH BEIRUT'

		Bei	rut Pi Bei	ne 'Ho irut'	rsh
Sustainability Goals	Sustainability Objectives	Parks and gardens	Children's pluy areas	Scorts facilities	Assigned
Cutting greenhouse gas emissions Energy	Reduce the need to travel Reduce car reliance				2
	 Increase energy efficiency in buildings 				0
Closing local resource	Reduce demand for non-renewable resources				3
loops	 Reuse and recycling of resources locally 				1
	 Local water sourcing, treatment and aquifer recharge 				- 1
and the second of the second	 Local low-input food production 				1
Enhancing local	 Promote local distinctiveness and heritage 				3
environmental quality	 Create an attractive public realm 		•	•	6
	Enhance local habitat diversity			-	2
Creating a healthy	 Improve local air quality 		12.00	•	3
environiaene	 Promote an active life-style (especially walking) Encourage consumption of flesh fruit and vegetables 	•			4
Increasing street safety	Reduce the chance of vehicle/pedestrian accidents				0
	 Reduce the fear of violence 				3
Increasing accessibility and	 Choice of transport mode for trips 				0
freedom of choice	 More facilities accessible locally 				- 4
Equity and social inclusion	 Choice of facilities within easy walking distance 		•	•	3
	 Viability of public transport 				0
Local work opportunities	 Accessible jobs for those tied to the locality 				1
	Reduce transport emissions	3 . - 1			2
Value of local community	 Facilitate accessible social networks 				5
	Promote mental health		-		6
Increasing local self-	Increase uscricitizen control				1
Generalization	 Management of decentralized systems 	_		-	0

The matrix correlates different sustainability goals and objectives to the composite typology of the Beirut Pine 'Horsh Beirut' greenspace.

Table (3) shows that: for BeirutPine 'Horsh Beirut' —in itscompositegreenspacetypology-, the sustainabilitygoals that have the first priorityto be achieved are to:Enhance local environmental

quality and To increase the value of local community.



Figure 9: Different Activities Performed in the Beirut Pine 'Horsh Beirut', [park and gardens, children's play area, and sports Facilities] *(Source: Khalid Al-Hagla)*

Moreover, the sustainability objectives are: to create an attractive public realm, to promote mental health, and to facilitate

accessible social networks. Table (4) shows that: the most important sustainability indicators are as follows: - Does the Beirut Pine 'Horsh Beirut'? - Strengthening the sense of place? - Encourage community participation and involvement? - Meet the varied recreation and leisure needs of users? - Reduce the need to travel?

			Grey	Space	
	Sustainability Parameters	Parks and gardens	Children's play areas	Sports facilities	Assigned
	· encouraging sustainable lifestyles, for example by providing paths and cycle routes	•		•	2
	 making maximum use of existing features and assets 				2
nên	 strengthening the sense of place 				- 4
Lago	 incorporating local or recycled materials 				1
ana	 encouraging community participation and involvement 	120			4
× N	 reducing inputs of non-renewable resources during construction and maintenance 				2
har	 eliminating or reducing the use of resources that affect other ecosystems 	•	•		2
	 encouraging habitat creation and native planting 				2
	managing resources carefully				1
-	reduce the level of car reliance				
lion	the effectiveness of public transport	-	-	-	0
culta	reduce the need to travel			•	3
5	 social benefits of increasing transport choice for all groups population 				0
	enhancing local security and community	•			3
	 Return to original sources of inspiration 	•	•		3
	 creating connections and themes within and across sites 				1
	 transforming site constraints into environmental opportunities 				2
					1
	 maximizing positive impacts, off-site as well as internally 				2
space	 Minimize inputs of materials and energy and maximize outputs of renewable and reusable resources 	•			1
Green	.8 g • maximizing the diversity [landscape elements and the diversity of relationships]	•			2
Quality	S Z + creating opportunities for the emergence of self- sustaining and self- regulating systems				1
-	 Create 'place' as distinct from merely manipulating space 	•			3
	 Make systems visible, which means making environmental processes apparent and celebrating them 	•			1
	Minimize maintenance				2
	 meet the varied recreation and leisure needs of users 				-4
	 involve local communities 				4

Table 4: Applying Sustainability Matrix to the Beirut Pine 'Horsh Beirut' Greenspace

- Enhance local security and community?
- Return to original sources of inspiration?
- Create 'place' as distinct from merely manipulating space?

PEDESTRIAN STREETS AND HISTORICAL MARKETPLACE BYBLOS



Table (5) shows that: for the pedestrian open spaces at Byblos, the sustainability goals that have the first priority to be achieved are to: enhancing local environmental quality, increasing both the value of local community and street safety. The sustainability objectives are to: Promote local distinctiveness and heritage, Facilitate accessible social networks,

		Mar a'	ket sp Byble	aces 28
Sustainability Goals	Sustainability Objectives	Market	Pedestrian streets	Assigned
Cutting greenhouse gas	Reduce the need to travel			2
emissions Energy	Reduce car reliance	•		3
	 Increase energy efficiency in buildings 			0
Closing local resource	 Reduce demand for non-renewable resources 			1
loops	 Reuse and recycling of resources locally 			0
	 Local water sourcing, treatment and aquifer recharge 			0
	 Local low-input food production 			0
Enhancing local	 Promote local distinctiveness and heritage 			4
environmental quality	 Create an attractive public realm 			3
	 Enhance local habitat diversity 			1
Creating a healthy	 Improve local air quality 			1
environment	 Promote an active life-style (especially walking) 		•	3
	 Encourage consumption of fresh fruit and vegetables 			0
Increasing street safety	 Reduce the chance of vchicle/pcdestrian accidents 			2
	 Reduce the fear of violence 			2
Increasing accessibility and	 Choice of transport mode for trips 			0
freedom of choice	 More facilities accessible locally 			1
Equity and social inclusion	 Choice of facilities within easy walking distance 			2
	 Viability of public transport 			0
Local work opportunities	 Accessible jobs for those tied to the locality 			1
	 Reduce transport emissions 		-	2
Value of local community	 Facilitate accessible social networks 			4
	 Promote mental health 		0	1
Increasing local self-	 Increase user/citizen control 			2
determination	 Management of decentralized systems 			1

Reduce car reliance, Create an attractive public realm, Reduce the fear of violence, and Promote an active lifestyle (especially walking).

The matrix correlates different sustainability goals and objectives to the composite typology of the Byblos greyspaces.

Table 5: Sustainability Goals, Byblos

		Mar	ket sp t Bybl	aces os
	Sustainability Strategies	Market places	Pedestrian	Assigned
	· encouraging sustainable lifestyles, for example by providing paths and cycle routes			2
1	 making maximum use of existing features and assets 	Areau	•	-1
nen	 strengthening the sense of place 	•		3
1	Sustainability Strategies • encouraging sustainable lifestyles, for example by providing paths and cycle routes • making maximum use of existing features and assets • strengthening the sense of place • incorporating local or recycled materials • encouraging community participation and involvement • reducing inputs of non-creativable resources during construction and maintenance • eliminating or reducing the use of resources that affect other ecosystems • encouraging hubitat creation and native planting • managing resources carefully • reduce the level of car reliance • the effectiveness of public transport. • reduce the need to travel • actuar to original sources of inspiration • extening local security and community • Roturn to original sources of inspiration • maximizing negative environmental impacts • maximizing positive impacts, off-site as well as internally • Minimize inputs of materials and energy and maximize outputs of renewable and reasable resources • evaluationshipa] • evaluating rystems • creating contenties for the emergence of self- sustaining and self-regulating rystems • evaluating rystems • evaluating rystems • evaluating regulation from merely manipulating spac			2
1	 encouraging community participation and involvement 		-	1
8	 reducing inputs of non-renewable resources during construction and maintenance 	100		3
5	entrumating or reducing the use of resources that affect other ecosystems anapurpaire habitat amonian and mating planting			
	credulaging namial creation and narve planning mananing researces correfully		100	
	reduce the level of car reliance			3
e i	 the effectiveness of public transport. 			1
latio -	 reduce the need to travel 			3
ILCIII.	 social benefits of increasing transport choice for all groups population 			1
e .	· enhancing local security and community			4
	Return to original sources of inspiration	•		3
	- or exating connections and themes within and across sites			Ú
	8 * transforming site constraints into environmental opportunities			2
	a = minimizing negative environmental impacts			0
	 maximizing positive impacts, off-site as well as internally 			
space	 Minimize inputs of materials and energy and maximize outputs of renewable and reusable resources 	•		2
Green	a solution of the diversity [landscape elements and the diversity of relationships]	•		1
Quality	ustainability Strategies encouraging sustainable lifestyles, for example by providing paths and cycle routes making maximum use of existing features and assets strengthening the sense of place incorpornting local or recycled materials encouraging community participation and involvement reducing inputs of non-renewable resources during construction and maintenance eliminating or reducing the use of resources that affect other ecosystems encouraging habitat creation and native planting managing resources carefully reduce the level of car reliance the effectiveness of public transport. reduce the need to travel social benefits of increasing transport choice for all groups population enhancing local sources of inspiration age creating commentions and themes within and across sites intrusforming site constraints into environmental opportunities intrusforming site constraints into environmental opportunities intrusforming the diversity [landscape clements and the diversity of relationships] retating opportunities for the emergence of self- sustaining and self- regulating systems Create 'place' as distinct from merely manipulating space Mate systems wishib, which means making environmental processes apparent and celebrating them. Minimize maintenance meet the varied recreation and leisure needs of users involve local communities			1
	 Create 'place' as distinct from merely manipulating space 			4
	 Make systems visible, which means making environmental processes apparent and celebrating them 	-	110	0
	Minimize maintenance			4
	 meet the varied recreation and leisure needs of users 			0
	Involve local communities	-	1	1

Table 5: Sustainability Parameters, Byblos

The matrix correlates different sustainability 'Parameters' to the composite typology of the Byblos greyspaces.

Table (6) shows that: themostimportantsustainabilityindicatorsare as follows:

Do the greyspaces at Byblos?

- Enhance local security and community?

- Create 'place' as distinct from merely manipulating space?

Return to original sources of inspiration?Strengthen the sense of

place?

- Reducing inputs of non-renewable resources during construction and maintenance?

- Reduce the level of car reliance and need to travel?

CONCLUSION

This paper proposed an approach based on the intersecting area of both social and ecological approaches to investigate the potential of open space to achieve sustainability goals and objectives in neighborhoods. Such an approach is chiefly based on the dual role that open spaces play in articulating the character of neighborhoods. They are the domain for different social interactions and shared community activities, and the field of micro-ecological features to express their personality. The application comes to determine the priorities of both sustainability goals and objectives, and sustainability parameters that have to be evaluated at each area.

MICRO LEVEL APPROACH TOWARDS OPEN SPACES

Vanke Vision: Sustainable Residential Development in Shanghai Urban Planning and Design Handbook Vol. 1. Research Seminar and Field Survey/February2006

Massachusetts Institute of Technology Department of Urban Studies and Planning City Design and Development Group

DIVISION OF OPEN SPACES IN TERMS OF SCALE

In terms of scale, open space is divided into :-

Urban Public Open Space

SIZE: 40 feet- 450 feet or 70-100 M (Maximum distance for being able to 20-25 facial expressions: see m) feet Service area: 900 or 4minute walk LOCATION: Corner location, mid-block location, a widened sidewalk. Mixed use, closed to retail stores & restaurants. Connect to pedestrian system USES AND ACTIVITIES: Almost all, group and individual use Main

features: Central, equal access, variety of elements.

Community Public Open Space

SIZE: various 2 FACTORS THAT AFFECT THE DESIGN: the overall surrounding housing density & income USES AND ACTIVITIES: Smaller gatherings and play spaces, multipurpose but for fewer uses MAIN FEATURES: Supplements to public spaces, smaller, quieter, closer to home.

Semi-Private Open Space

SIZE: One house lot wide

LOCATION: Corner lots, mid-block lots, through-the-block lots SITE SELECTION: four-block radius walking without major streets USES AND ACTIVITIES: Gardens, visual enjoyment only, circulation MAIN FEATURES: Near/between buildings, number and location of building entrances determines type and frequency of use. Often separated with fences or landscaping.

OVERVIEW OF OPEN SPACE DESIGN

In the following section we will analyze the design of open space according to different categories, including:

- 1. Use
- 2. Comfort
- 3. Visual Quality
- 4.Safety
- 5. Convenience/Access

USE

Parks can designed to accommodate a number of uses. Use can be based on age and activities. Children of various age groups have different needs. Same goes for Teenagers, Adults and Senior Citizens. Attention to use can prevent conflicts between intended use and actual use, and between adjacent or overlapping uses.

COMFORT

Open space is enjoyed more and used more often when it is designed to be a comfortable place for people. Whether the space is to be used for exercise, seating and relaxation, gathering, or play, its design should take into account whether it is a comfortable space. This includes psychological as well as physical comfort. The aspects of Comfort are:-

1.Microclimate

Temperature, water, sun/shading, and wind are all aspects of microclimate that need to be taken into consideration when designing open space. At temperatures above 55 degrees Fahrenheit, the number of people waking, standing, and sitting outdoors in urban malls and plazas typically increases, but at temperatures above 75 degrees Fahrenheit, shading options should usually be included in order to keep stationary users comfortable.

2.StreetFurniture/Seating

Types of Seating:

- 1. Street furniture benches
- 2. Tables and chairs
- 3. Large rocks
- 4. Low walls and planters
- 5. Bleachers
- 6.Steps

3.Boundaries

Designers of open space should not only consider the bodily comfort of users but also their psychological comfort. This includes understanding the

relationship of open space to its surroundings-buildings, streets, and sidewalks-as well as scale.

VISUAL QUALITY

The visual quality of open space is an extremely important part of design. While people do frequently use unattractive open spaces that meet a need or provide a use (such as specialized fields or playgrounds), open spaces that are visually appealing and provide a variety of things to explore and see will typically be more successful. Visual quality is impacted by-

- Surface Material
- Landscaping
- Public art
- Maintenance

SAFETY

Safety is a key consideration for designers of open space, as people will not spend time in a space where they feel threatened or insecure. Some of the key aspects of open spaces that influence an individual's feeling of safety include defensible space, visibility, management, and the consideration of physical hazards. Safety can be maintained by having:

- Defensible Space
- Visibility
- Management
- Consideration Of Physical Hazards

CONVENIENCE/ACCESS

Why consider circulation and access?

o Encourage use of public space

o Location of open space within a neighbourhood or community or development

o Location of uses within open space

o Access to a variety of users, including disabled users
CASE APPLICATION



NEWTOWN, is a fast growing planned satellite city in the neibourhood of Kolkata(earlier, Calcutta), located partly in the North 24 parganas district

and South 24 Parganas district of the Indian State of West bengal. This new information tecnology and the residential hub is being developed on the north eastern fringes of Kolkata. It consists of areas of two erstwhile villages Rajarhat and bhangar, which is now a statutory planned development under the KMDA. The area mainly consists of huge acres of cultivable lands and waterbodies, which have been acquired and developed in a planned manner.

DEMOGRAPHICS- As of April 2018, the residential population of Newtown is estimated to be more than 1 million with 0.5 million additional floating population.

Why Newtown is an ideal Location for living in Kolkata?

- Affordable
- Excellent Transport and connectivity
- Superior Infrastructure
- Entertainment Facilities
- Green City Gold Certificate by IGBC



AREA ANALYSIS



ACCESS AND CONNECTIONS

The area is located at the 6th intersection and situated on the end of Newtown. The site is well connected and accessible with Major Arterial roads passing through and the area and upcoming metro stations will increase the connectivity further. An interstate Bus terminus is located on one end of the area. The figure below shows the connections with yellow roads depicting Major Arterial Roads and the Red ones being Sub-Arterial Roads



SUNPATH



CURRENT SITE CONDITIONS



(Source:Author)



(Source:Author)



(Source:Author)



(Source:Author)



(Source:Author)



(Source:Author)

INTEGRATION OF OPEN SPACES TOWARDS ENSURING A SUSTAINABLE BUILT ENVIRONMENT







(Source:Author)



MARKET

CUREENT OPEN SPACE AXES



MORPHOLOGY OF OPEN SPACES IN THE AREA

GREEN SPACES:

- Parks and gardens
- Amenity Green Space
- Children's Play Area
- Sports Facilities
- Green Corridor
- Natural/ semi- natural greenspaces

GREY SPACES:

- Market Place
- Pedestrian Streets

This shows the area lacks Civic Squares and plazas and Promenades.

PROBLEMS

- 1. A Major Arterial road 59 m wide, divides the whole area in two parts thereby cutting of pedestrian circulation and connectivity of the area as a whole.
- 2. Vehicles passing at high speed create huge amount of Noise Pollution.

The MAR extension is going to serve as a National Highway Connector in the future, thereby will result in a significant increase in Traffic, Noise and Air Pollution

- 3. The area is further divided into 6 neighbourhoods, 3 on each side of the MAR Extension. The neighbourhoods on the Western side is well connected to each other with the help of an array of Green Spaces essentially serving as a Green Corridor. However, a lack of the same is noticed on the eastern side. The Inter connections of the whole area is also lost due to the MAR passing through this predominantly residential area.
- 4. The balance of green Space distribution is missing.
- 5. Predominantly the open spaces available are Green Spaces. The lack of grey spaces is evident. Pedestrian Walkways, Cycle tracks Civic Squares and Plazas are missing.
- 6. The whole area is serviced by two local markets. The Northern End lacks service as the Markets are out far stretched.

NEIGHBOURHOOD ANALYSIS





STREET ACCESS



PROBLEMS

- Amount of Green and Open spaces account for 12% of the total site area which has to be 33%
- The Site is marked on one side by a Major Arterial road and a Collector Streets which goes on to join a Sub arterial road. Thus vehicles passes through this road in order to avoid traffic on the MAR.
- The Green Corridor is not defined and lacks major supervision due to smaller plots sizes.
- The plots are planned in such a manner that the internal roadways are very straight which helps in speeding up traffic and thus making it unsafe for the residents.
- The interconnectivity with the other neighbourhoods is lacking resulting in social isolation

APPLYING SUSTAINABILITY MATRIX TO NEIGHBOURHOOD

SUSTAINABILITY GOALS MATRIX

SUSTAINABILITY GOALS	SUSTAINABILITY OBJECTIVES		GREEN	SPACE		GREY	SPACE	
		Parks	Amenity Greenspace	Children's Play Areas	Green Corridors	Market Places	Pedestrian Streets	Assigned Weight
	Reduce need to travel		÷		-	-		3
Cutting Green House Gas Emmissions	Reduce car reliance							
	Reduce energy efficiency in buildings							
	Reduce demand for non renewable resources					F		÷
Clocked and Becomes I acres	Reuse & recyling of local resources							
viosing Local Kesource Loops	Local Water Sourcing Treatment and Aquifer Recharge							
	Local Low Input food production							
	Promote local distinctiveness and resources	2	*					4
Enhancing Local Environment	Create attractive Public realm	F		2	-		2	9
	Enhance Local Habitat Diversity	÷			-		F	3
	Improve Local air quality	-	-	۴	2			5
Creating a Healthy environment	Promote an active lifestyle especially walking	۰		÷	2		÷	2
	Encourage consumption of fresh fruits and veg							
Increasing Street Safety	Reduce the chance of vehicles/pedestrian accidents	÷			-	2	÷	9
	Reduce fear of violence	-			-	2	-	5
Increasing Accessibility and Freedom	Choice of Transport mode for trips							
of Choice	More facilities accesible locally	٣	-		-			3
Equity and Social Inclusion	Choice of facilities within easy walking distance	٠						9
	Viability of Public transport							
Local Work Opportunities	Accesible jobs for those tied to the locality	-	-					4
	Reduce transport emmisions							
Value of I and Community.	Facilitate accessible social networks	÷			F			3
Agine of Focal Community	Promote mental health	-			-		-	3
Contraction and Cold Determination	Increasing user/citizen control	-	-				-	9
Increasing Local Self Determination	Management of Decentralized systems	2		-				3

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Space Management service de conception autoritation autoritation and assets 2 1 1 miking maximum use of oxisting features and assets miking maximum use of oxisting features and assets 1 1 1 miking maximum use of oxisting features and assets trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 1 1 incorporating locat or recycled materials trompatienticity 1 </td <td>Speze Management 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Table 1 shows that: for given neighbourhood –the sustainability goals that have the first priority to be achieved are to: Enhance Local environmental quality and to increase street safety Moreover, the sustainability objectives are: to create an attractive public realm, reduce the chance of vehicles and pedestrian accidents and reduce fear of violence. The second priority to be taken into consideration is to Create a Healthy Environment with the sustainability objectives being improve local air quality and promote active lifestyle especially walking.

Table 2 shows that the most important sustainability indicators pose the following questions:

- Does the neighbourhood Enhance Local Security and community?
- Does it respond to the site by creating connections and themes and maximize positive impacts off-site as well?
- -Does the neighbourhood make it's systems visible?

AIM

To create a Sustainable Open Spaces in and around a neighbourhood unit.

GOALS AND OBJECTIVES

- Create attractive Public realm
- Reduce the chance of vehicles/pedestrian accidents
- Improve Local air quality
- Promote an active lifestyle especially walking
- Reduce fear of violence

SCOPE

- To establish inter and intra connected of open spaces in the area.
- To provide noise buffers in the area.
- To increase street safety for pedestrians and establish cycle paths.
- To concentrate on greening of the neighbourhood.

LIMITATIONS

- Design will cater to Functional and Aesthetic requirements for Open Spaces.
- Detailed Structural Engineering may not be delved into.
- Economy will not be delved into.

PARAMETERS

- Enhancing local security and community
- Creating connections and themes
- Maximizing positive impacts, off-site as well as internally
- Make systems visible
- Encouraging sustainable lifestyles, for example by providing paths and cycle routes
- Meet the varied recreation and leisure needs of users

METHODOLOGY

- STEP 1: Literature and Concept Study
- STEP 2: Establishing the Relevance of the Thesis
- STEP 3: Identifying the Parameters of the Thesis
- STEP 4: Establishing Tentavi Scale of Application of Thesis
- STEP 5: Case Study Examples: Study and analyze how the Parameters have been applied
- STEP 6: Study and Analyze overall Case Application area
- STEP 7: Selection of Scale of Site from overall Case Application Area
- STEP 8: Giving Area and Site Level Proposals
- STEP 9: Design process and Implementation
- STEP 10: Future Scope

CASE STUDY EXAMPLES

- Hamburg Autobahn A7
- Highline, New York
- Chandigarh Leisure Valley

POSSIBLE POINTS OF INTERCEPTIONS



The red circles show us the possible points of Interception where connections can be introduced in the form of Elevated bridges, crossovers, etc.



The green circles show us the possible points of Interception where connections can be introduced inside the neighbourhood.

CASE STUDY EXAMPLES

HAMBURG AUTOBAHN A7



Source: Streets without cars, Wordpress)



Source: Streets without cars, Wordpress)

INTEGRATION OF OPEN SPACES TOWARDS ENSURING A SUSTAINABLE BUILT ENVIRONMENT



Source: Streets without cars, Wordpress)



Source: Streets without cars, Wordpress)



Source:Citymetric)



Source: Dossier Let-Wessen)



Source: Citymetric A7 Autobahn)



Source: Citymetric A7 Autobahn)







(Source: Card_1)



(Source: Hamburg.de)



(Source: Card_1)

ANALYSIS

- 1. Stretch of Underground tunnel is 900 m long (Equivalent to site)
- 2. Tunnels act as noise buffers.
- 3. Space on the ground can be used as Green and Grey Spaces.
- 4. Emergency routes and services need to be worked out.
- 5. 6 ft-10ft caps can support the Ground level open space.

HIGHLINE NEW YORK



(Source: Places Journal)



(Source:Urban Green Blue Grids)

INTEGRATION OF OPEN SPACES TOWARDS ENSURING A SUSTAINABLE BUILT ENVIRONMENT



(Source:Researchgate)



(Source: Friends Of The Highline, Wordpress)



(Source:Sunset Boulevard)



(Source:e-Architect)



(Source:Great Museums)



(Source:Archdaily)



(Source: Friends Of The Highline, Wordpress)



(Source:American Society Of Landscape Architects)



(Source:American Society Of Landscape Architects)



(Source:American Society Of Landscape Architects)



(Source: American Society Of Landscape Architects)



(Source:Pinterest)

ANALYSIS

- 1. Elevated corridors can serve the purpose of connecting spaces.
- 2. Access needs to be Barrier free and frequently placed.
- 3. Landscaping needs to be Vibrant and cater to various user Groups.

LEISURE VALLEY CHANDIGARH



(Source:Research Images)



(Source:Apnitricity)



(Source: Chandigarh Urban Lab)



(Source:Justdial)



(Source: The Oscar Shorts)



(Source: Chandigarh Medical Tourism)



(Source:ChandigarhMetro)

ANALYSIS

- 1. Existing Ecological Features need to be utilised and enhanced.
- 2. Variation in landscape helps to create interest.
- 3. Routes need to be rerouted wherever possible.
- 4. Cycle Tracks and wide pedestrian roads along side helps to maintan and create boundaries in order to define spaces

INTEGRATION OF OPEN SPACES TOWARDS ENSURING A SUSTAINABLE BUILT ENVIRONMENT

DESIGN GUIDELINES

AREA LEVEL PROPOSALS

Area Marked In Yellow Is The Target Area





Establishing a Connection through Green and Grey Space In the Form of Ground Level Or Elevated corridor Or a mixture of Both

MARKET



The two existing markets places in the area do not cater to Northern end of the area. The new Market place will help in covering the two remaining neighbourhoods north of the Sub-Arterial street.



NEIGHBOURHOOD



Creating 3 new axes along the existing greens and Area level axis by modifying it helps for a better understanding of the greens present in the neighbourhood. Thereby, working along the axes but in swinging curvilinear ways to create more open spaces. This helps in reducing the amount of straight roads inside the neighbourhood which will result in slowing down vehicles.





OVERALL INITIAL PROPOSAL



- 1. Introduce a Green-Grey Corridor through a Span of 850m.
- 2. Corridor with Civic Spaces, Seating arrangements, Kiosks, Cycle Tracks, and Greenery and Landscaping with either of the following arrangements-

a. Preferably at Ground Level MAR Extension to be sunk down underground;

b. Elevated Corridor with various access points;c. Corridor Slightly raised to a height of 4-6 feet and MAR sunk down as well.

- 3. Creating Noise Buffer by Walls/Tunnels. Raised Tunnels and Walls to have Green Elements.
- 4. Create similar scope for future possible interceptions, hence connecting the overall area through linked Open Spaces.
- 5. Introducing a New Local Market Place.
- 6. Increase the overall amount of Open Space in the selected Neighbourhood by strengthening the Green Corridor through creation of new spaces and connection along the axes.
- 7. Shorten the amount of Straight roads inside the neighbourhood for making it more pedestrian friendly and safe.

DESIGN

STAGE1





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