Chicago Lakeside – Measures to Achieve a Step Change

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1. INTRODUCTION

The Chicago Lakeside Development (CLD) is a major regeneration project in South Chicago on the site of the former U.S. Steel Southworks steelworks. The overall project is intended to regenerate the 500 acre steelworks site and re-invigorate the wider South Chicago community. The vision is for a 'smart-city' style development that maximises sustainability in terms of energy, infrastructure, transportation and operations – applying the principles of Designing Streets.

The former steelworks is located 10 miles (16 km) south of downtown Chicago adjacent to the Chicago South Side neighbourhood. McCaffery Interests, in partnership with U.S. Steel, is planning to redevelop the former site into an exciting lakeside community. The U.S. Steel Southworks mill originally began producing steel in 1901 but shut down in 1992 due to the declining steel industry – the site has remained derelict and vacant since.

The colossal scale of the site, proximity to downtown and its lakeside location make it potentially one of the most desirable pieces of undeveloped real estate in the City of Chicago. The plan calls for:

- 13,575 new homes,
- 17,500,000 square feet (1,630,000 m2) of retail and other commercial space,
- a new high school,
- 1,500-slip marina,
- 125 acres of public land,
- lakefront access,
- new bike paths, and
- commuter rail and bus services.

The CLD Master Plan will take an estimated 25 – 45 years to build out and will cost more than $4 billion in both public and private funds. On completion the development will house some 150,000 people.

WSP was commissioned to develop a transport strategy to reflect the vision for the development, which is nothing unusual. In this case, however, and uniquely, this had to be achieved without any significant transportation modelling. The strategy had to demonstrably contribute to the overall vision and this contribution had to be quantified, benchmarked against best practice and monitored against targets and key performance indicators to show how the transport strategy supported the vision.

2. ISSUES

As with any development of this scale, in an industrial/urban setting, there are some significant issues. This is a major development that will impact on movement across the whole south side of Chicago. The key objectives for the CLD in transportation terms are to connect quickly and conveniently to:

- Downtown,
- the airports and
- the community

2.1 Policy Context

The Regional Vision for GO TO 2040 describes a future multimodal transportation system that is “safe, accessible, easy to navigate, affordable, and coordinated with nearby land use,” reduces congestion and improves regional mobility, and supports “reinvestment in our existing communities…leading to environmentally sensitive and fiscally efficient outcomes.”

To achieve this, GO TO 2040 seeks to maintain existing infrastructure of all types and gain operational efficiencies from it, make additional investments in transit and freight, use innovative and sustainable finance and system management ideas, link transportation investments with housing and land use, and encourage choices that result in livable, walkable, transit-supportive communities.

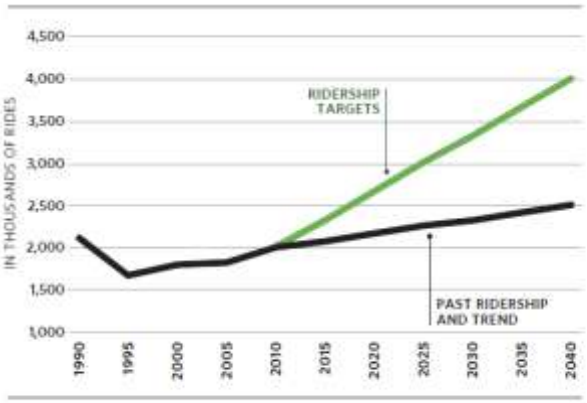
GO TO 2040 also contains some key recommendations for changing how transportation is funded:

- Creating cost and investment efficiencies
- Implementing congestion pricing
- Implementing pricing for parking
- Increasing motor fuel taxes (and indexing them to inflation) in the short term
- Instituting a replacement for motor fuel taxes in the long term
- Pursuing public-private partnerships as appropriate

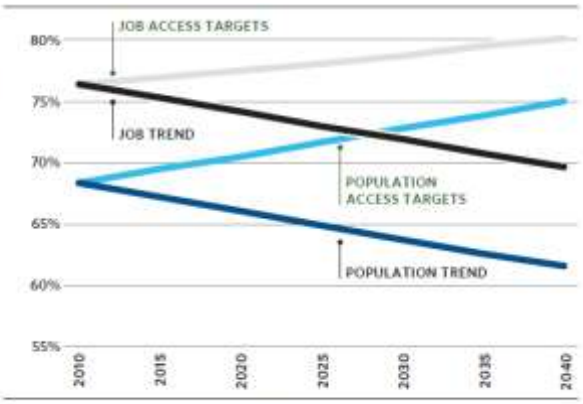
The following recommendations are made within the strategy to improve the Region's Public Transit system:

- Improve the fiscal health of transit by increasing investment levels and addressing cost increases.
- Improve the operations of the region's transit system, focusing investments on maintenance and modernization.
- Pursue a limited number of high-priority major capital expansion projects.
- Conduct supportive land use planning, make small-scale infrastructure investments, and provide other local support to make transit work better.

GO TO 2040 proposes two significant target indicators designed to measure the success of the proposed policies and strategies. These are transit ridership and transit access. The following graphs demonstrate these:



Sources: Regional Transportation Asset Management System, Chicago Metropolitan Agency for Planning analysis, 2010



Source: Chicago Metropolitan Agency for Planning analysis, 2010

2.2 TRAVEL PATTERNS

Analysis work within the South Lakefront Corridor Study has indicated the following factors related to travel demand in the area affected by the CLD:

- In South Chicago there are 3,767 households with no cars (31% of the total);
- Employment within the South Chicago area is 678 jobs per square mile – this compares with 20,220 jobs per square mile in the highest area of employment in South Lakefront, Hyde Park;
- The work trip mode share for car is 67% in South Chicago, which compares with 58% in the South Lakefront area and 65% in the City of Chicago Destinations for work trips from the South Lakefront in general are shown below;
- Analysis of work and non-work trip destinations from South Lakefront clearly demonstrates that public transport trips made are predominantly towards the Downtown area of Chicago;
- Available statistics point to a large preponderance of trips being along the north-south corridor, with east-west trips being far more dissipated in nature; and
- Major attractors are the Hyde Park/University of Chicago area, the CBD and Downtown in general.

2.3 CURRENT TRANSIT SYSTEMS

Chicago has a long and distinguished history of pioneering a wide variety of transit systems, but the only current systems used are heavy rail/metro and bus services (local and semi-express). Brief system descriptions are described over.

Metra – Heavy Rail/commuter

The Metra Electric District comprises 40.6 miles of route with 49 stations. The South Chicago branch has 8 unique stations. Daily boarding figures for 2006 show:

- 2,345 for the South Chicago Branch
- 868 for the Blue Island Branch
- 36,993 for the Main Line

Operational frequency on the South Chicago Branch is approximately every 20 minutes in the peak and hourly in the off-peak.

Current rolling stock consists of a fleet of bi-level electric multiple units, the oldest dating back to the early 1970s. These are scheduled for replacement

by 160 new cars to be built by the Sumitomo Corporation of America between 2012 and 2015 at a new facility at Rochelle, Illinois.

CTA 'L' – Heavy Rail/Metro

This is the second longest rapid transit system in the USA, and the third busiest. The Red Line is CTA's busiest route, is 23.4 miles long and has 33 stations (Howard Street to 95th/Dan Ryan).

Service frequency is 3-8 minutes in the peak, reducing to 7-9 minutes in the off-peak.

Current rolling stock consists primarily of cars built in the 1980s, usually operating in 8 car units. The Red Line runs approximately 4.5 miles west of the Lakeside location.

CTA Local and Semi-Express Services

CTA operates approximately 1,800 buses on some 140 routes, with a total route mileage of 2,230 miles.

Buses provide about 1 million passenger trips per day, and serve more than 12,000 bus stops.

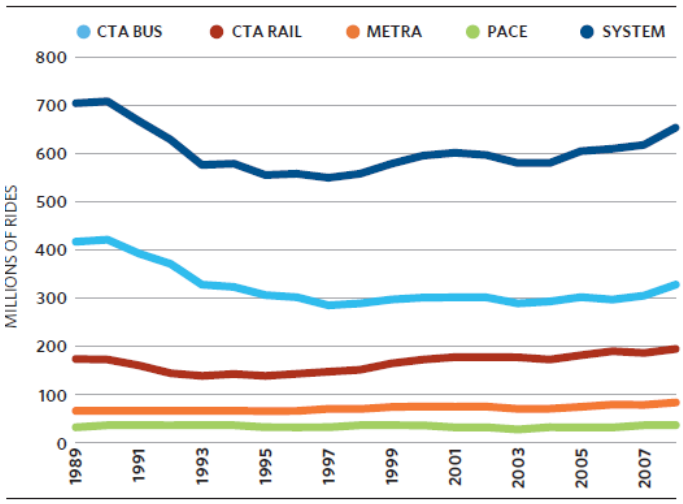
Of the 1,800 strong fleet, some 228 are diesel-electric hybrid vehicles, and of these 208 are articulated 60' long buses. The majority of buses are 40' long single deck vehicles with 39 seats and standing facilities.

Services operating in the vicinity of the Lakeside site consist of:

Service No	Route
6	79th/South Shore to Wacker/Columbus
14	103rd /Stony Island to Washington/Jefferson
15	103rd/Stony Island to 47th/Dan Ryan
26	106th/Mackinaw to Chicago/Fairbanks
30	Brandon/Brainard to 69th/Dan Ryan
71	112th/Torrence to 69th/Dan Ryan
75	74th/Damen to 75th/South Shore
79	79th/Western and 79th/Lakefront

Service No	Route
87	87th/Dan Ryan and 87th/Western
95E	92nd/Buffalo and 05th/Dan Ryan
N5	95th/Dan Ryan and 65th/Dan Ryan

Overall ridership on all transit modes is shown below:



Source: Regional Transportation Asset Management System

2.4 PLANNING

In terms of the transport planning work completed to date, the focus has been on traffic in general, and US41 in particular. US 41 runs north from the Indiana border beneath the Chicago Skyway on Indianapolis Boulevard to the Wisconsin border. It is the only north-south U.S. Route to travel through a significant portion of the city of Chicago, and carrys Lake Shore Drive through the central portion of the city along the lakefront.

The new route through the CLD site has been agreed, the cross section negotiated and the construction package procured. The cross section is shown below.

No modelling or analysis tools have been developed to support development of the master plan and traffic analysis has been limited to consideration of the junction layouts along US41 with existing demand, plus demand from the current Phase 1 of CLD (retail development at the northern end of the site.

3. APPROACH

The programme for this phase of work was limted – December 2011 to March 2012. This gave no time for data collection col;ection or the development of sophisticated modelling tools. We therefore developed a pragmatic approach – proportionate to both programme and data availability – based on a review of best practice and the development of an objectives-led multi-criteria appraisal framework.

We completed a review of best practice examples of sustainable transport measures integrated in urban developments to identify key lessons learned, successful measures and typical travel characteristics. The best practice review has covered developments in cities including Dubai, Malmo, Hamburg, Stockholm, Toronto, Zurich, Berlin, and Singapore, London, Houten, and Freiburg.

Several of the developments considered are included in a study entitled 'Building Low Car(bon) Communities' published by the Institute for Transportation and Development Policy (ITDP) in 2011, which sets out the principles for smart urban growth as follows:

WALK	Develop neighborhoods that promote walking
CYCLE	Prioritize bicycle networks
CONNECT	Create dense, connected networks of streets and paths
TRANSIT	Support high-quality transit
MIX	Plan for mixed use
DENSITY	Match density with transit capacity
COMPACT	Create compact regions with short commutes
SHIFT	Increase mobility by regulating parking & local road use

Furthermore, the study draws out key lessons from 8 successful communities with low car ownership rates and lower car mode share than neighbouring communities.

1. Intention is key
   The objective of all the successful developments was to reduce and minimise driving.
2. Develop neighbourhoods designed for walking and cycling
   It is essential to create high quality infrastructure for pedestrians and cyclists, and to design a dense network of streets
3. Make transit accessible, affordable and attractive
   High quality, conveniently accessible public transit it key to encouraging travel by these modes instead of by car. Ideally PT infrastructure should be established in advance of the new development
4. Create compact regions with short commutes and zone new developments for mixed uses
   New developments should be planned as closely as possible to existing job centres and other destinations. Developments should provide a mix of facilities.
5. Increase mobility by regulating parking and road use
   A reduction in parking supply combined with spatial and fiscal separation of parking can help reduce car ownership
6. Educate and inspire
   Ongoing marketing and travel awareness campaigns complement the provision of non-motorised transit infrastructure by promoting long term sustainable behaviour
7. Developments work best in places where larger policy and transportation context can support them
   Transportation policies at the city, regional, and national levels play a key role in shaping daily travel behaviour

These lessons corroborate those identified from studying the additional developments considered for the Lakeside Best Practice Review and from these we identfied a range of best practice development features to take forward within the emerging CLD master plan.

Policy and design strategies

Case study developments included smart growth strategies to discourage private car use, and encourage travel by sustainable modes. Successful ‘push’ measures include limiting the parking supply, pricing parking, and separating parking from residential units to make car use more inconvenient. Successful ‘pull’ measures are predominantly the provision of high quality public transport, cycling, and walking infrastructure, as well as facilities for car sharing, and well thought out urban design features.

Public transport

High quality, cost-effective and accessible public transport facilities. All the case study developments have transit service frequencies of at least 15

minutes, and many operate 24 hours a day. Furthermore, it is recommended that walking distances to public transit are no more than 275 yds to bus stops, 550 yds to tram stops, and up to 0.6 miles to rail services. The provision of real time information, transit priority measures, and smartcard ticketing systems are all recommended. The pre-existence of a good public transit system in the area is a significant advantage.

Urban design

Urban design features considered to be successful include providing a mix of land uses, with public space including parks and green pathways, as the proximity of facilities encourages short distance trips to be made by non-motorized forms of transport.

A permeable network of direct footways helps create a walkable neighborhood.

The combination of these features has been demonstrated to result in developments with low car ownership rates, and low private vehicle mode shares.

Having presented the above to a project team workshop, it was agreed that there was a need to 'Reset the Bar for Transportation', using CLD as the main driver for change and focusing on three key areas:

- Design – best practice, promoting designing Streets approach – Lakeside LITE;
- Parking strategy – addressing origin and destination demand; and
- Multi criteria appraisal to compare options and test assumptions.

The outcome expected from this focus was agreed as a master plan that:

- Connects Lakeside to the region and the world
  - Providing new connections via rail and bus to the City, the Airports
  - Creating better routes for rail, bus, BRT, bikes, cars to all destinations
  - Connecting the neighborhood, Lakeside, the Lake
- Builds walkable neighborhoods
  - Creating a mixed-use Lakeside for compact neighborhoods

    - Ensuring 100% of homes are within a 5-minute walk to transit, retail, schools and other community amenities
    - Establishes direct links to the existing community
    - Centreing development around transit hubs
- Implement great quality mobility without the need to own a car
    - Optimising the design of US-41
    - Allowing for public transit, rail and bus, bikes, walking, transit centres
    - Incorporating bike lanes and trails throughout development
    - Implementing mode share programs - bike, car, PRT
- Plan for the next generation of vehicles and smart infrastructure
    - Smart cars, vehicle share, personal rapid transit, less reliance on parking
    - Incorporating “streets of the future” with cafes, bike lanes and parking, street trees, sidewalks, and stormwater bioswales

3.1 Design

We therefore developed a strategy Lakeside Intelligent Transport Environment (LITE). A new vision for transport in Chicago based around 4 key themes:

A place for walking and cycling

- A place structured around the walkable neighborhood
- Density and phasing to follow this strategy
- Great, connected streets
- US-41 as ‘Main Street Lakeside’ mixed use and transit heart to the development
- Innovations in cycling; Copenhagen wheel and electric bicycles to be trialed in phase 1 for private ownership and cycle hire
- Personal carbon accounting to get people walking
- Design at a human scale; not house building but town building

Terrific transit

- 100% of residents within a 5 minute walk to transit
- Connect the existing community to Lakeside and the waterfront through extend bus services
- Establish BRT routes connecting Lakeside to Metra, the Red Line, surrounding community and downtown
- Create US-41 as ‘Main Street Lakeside’ with high density hubs for transit and interchange
- Utilize the US-41 easements as a high quality transit boulevard
- Zero CO2 vehicles (electric, hydrogen etc.)
- Future tram (LRT) loop through the site connects to downtown with Metra upgrade. Long term connections over Calumet River

- Implement a seasonal water transit along the Chicago shoreline • Develop branding for a culture of walking, cycling and transit

The ‘intelligent’ bit

- Fully integrated systems; travel information and alerts, car hire, car share, medical connections, shopping deliveries, intelligent travel for the school run and peak hours, seat reservations on the BRT/LRT (why not like a plane?) and no travel required in the first place (smart conferencing, telepresencing etc.)
- Green concierge service
- Personal carbon accounting
- People who come and live here buy into a particular lifestyle and commit to certain ‘rules’

‘PRT+’: personal mobility for the future

- Remote access, no guide-ways, not elevated, driverless (if desired), intelligent, rubber tire based, stackable,billed each month (like Zipcar)
- As parking provisions are reduced over the development timeframe, parking spaces are used for PRT+ or returned to open space
- It’s cool, therefore I want one

3.2 Parking

Provision and management of parking supply through the build-out of CLD became a fundamental part of the overall transport strategy to complement the measures, options and choices promoted in the LITE vision. Graduated Parking reduction is therefore proposed, reflecting the development phasing and generating an increasingly sustainable community as the development is built out.

Control of parking supply as a means of travel demand management is accepted worldwide as a key component in successful, transit-oriented development. Whilst residential parking at source is required, the expectation on the level of parking provision is reducing, many examples can be cited where 0.5 spaces per residential unit (or less) are provided.

Management of trip-end supply influences trip making and mode choice. Controlling destination parking availability is therefore as important as controlling the origin end of the trip. The availability of private, non-residential parking (PNR) at destinations (e.g. large office and retail car parks) promotes car as mode choice and car use. The combination of controlling the number of residential and PNR parking spaces is critical to demand management, and focuses demand management on car use, rather than car ownership.

Current good practice is to provide for likely use (e.g. apply maximum rather than minimum parking standards), however, the direct application of parking standards (e.g. the City of Chicago Zoning Standards) by use tends to over-provide. This results from no account being taken of different use profi les (e.g. residential demand is overnight, offi ce is through the day) and is demonstrated in the table over, which compares Chicago Standards, initial CLD proposals and best practice.

	City of Chicago Zoning Standards (Min)	Lakeside Proposals	Good Practice
Residential	1-2 per unit	1 per unit	0.22 to 0.8 per unit
Office	0 to 4,000 sq. ft, then 2/1,000 sq. ft. 0 to 10,000 sq. ft, then 2/1,000 sq. ft. 0 to 35,000 sq. ft, then 1.33/1,000 sq. ft.	As per CCZS	1/1500 sq. ft up to 5,400 sq. ft, or 1/3200 sq. ft for larger
Retail	0 to 4,000 sq. ft, then 2.5/1,000 sq. ft. 0 to 10,000 sq. ft, then 2.5/1,000 sq. ft. 0 to 35,000 sq. ft, then 1.33/1,000 sq. ft.	As per CCZS	1/500 sq. ft. up to 10000 sq. ft. or 1/3200 sq. ft for larger
Hotel	1/3 Lodging rooms 1/3 Lodging rooms 0 to 35,000 sq. ft, then 1.33/1,000 sq. ft.	As per CCZS	1/5 Lodging rooms
Total No. of Spaces*	72,000	63,000	30,000

Promoting shared parking areas can also make significant savings on the area required for parking within developments. There are areas within the CLD master plan – particularly residential: retail/ commercial, residential: office - that are suited to provision of well-designed, shared-parking (remote from residential units) in mixed-use locations. It is not possible to prescribe standards for mixed-use areas, as demand will vary from scheme to scheme, however, provision of shared parking could reduce the number of parking spaces provided by up to 25%.

Parking provision is one - key - part of an overall demand management strategy for transport. As part of this, information and enforcement are also critical to efficient use of parking, particularly in an environment where parking is limited. Provision must be made for alternatives – cycle, m/cycle, transit, PRT+ etc. and this was all catered for within the overall Lakeside Intelligent Transport Environment – for example variable message signs, use of internet for information, effective management and enforcement.

3.3 Multi-Criteria Appraisal Framework (MCAF)

As can be seen from the above, we developed a layered strategy, with progressively more challenging targets. The key issue was then how to test the strategy at each phase and challenge the progressive targets. We achieved this by bringing together our observations, the objectives for the project and best practice from elsewhere, as they related to the site.

Our initial step was to identify potential levels of demand generated by the development. Trip generation and distribution rates were agreed based on traffic analysis work undertaken over the past decade, updated based on workshop discussion to try and capture changes in existing patterns in the recent past and the addition of the development gemnerated demand. Trip rates and distribution are summarised below.

Trip Rates (Based on ITE 8ed)				
	weekday	AM Peak	PM Peak	Notes
Residential	6.65	0.51	0.62	Apartment 220 – per dwelling unit
Retail	42.94	*1*	*3.73*	*Shopping Centre 820 (Trip= per KSF^2)*
Office	11.01	*1.55*	*1.49*	*General Office 710 (Trip= per KSF2)*
Institutional	27.08	*2.86*	*3.28*	*Average over selection of Inst. (Trip= per KSF2)*
Hotel	8.92	*0.67*	*0.7*	*Hotel 310 - per room (Trip est = floorspace/2/200)*

AM Trips by Period					
	To 2020	To 2025	To 2030	To 2040	Total
Residential	530	2,705	3,168	3,066	9,469
Retail	2,200	2,300	1,300	4,700	10,500
Office	5,425	2,015	1,860	6,665	15,965
Institutional	3,718	0	0	4,004	7,722
Hotel	201	134	201	134	670
TOTALS	12,074	7,154	6,529	18,569	44,326

Summary Trip distribution figure:

These overall figure were then broken down to reflect the phasing of the master plan, which we developed specifically to reflect points in trip generation that would support each step change in transport provision and anticipated mode share target. The final transportation phasing diagram is shown below.

The mode share targets are exceptional, however take account of current levels of mode share in accessible areas of Chicago, supplemented by assessment of what can be achieved in 'best practice' new developments and our assessment of the impact of technology and policy over the 45 to 50 year build out of the development.

To test options, packages and phasing as objectively as possible a spreadsheet tool was developed. The tool was based on our wide experience of multi-criteria analysis and its foundations can be traced back to our early STAG appraisals on corridor studies in West Lothian, for management of the Forth Road Bridge and the Heartlands development, and which has been developed through funding applications in the UK, policy development in the Middle East and transport scenario testing in Jordan.

As with STAG, our first step in developing the actual framework was to define our evaluation criteria. These were drawn from the master plan objectives, with the intention of capturing as fully as possible the costs and benefits arising from each option or package of measures – to test their fit with the vision and master plan objectives. These objectives are summarised over.

System Evaluation

ENVIRONMENTAL

- Reduce carbon emissions
- Minimize impact on non-sustainable use of primary resources
- Reduce consumption of scarce energy resources
- Reduce consumption of potable water
- Minimize impact on the natural environment, land and water

SOCIAL

- Provide benefits to the larger neighborhood
- Minimize impact on social diversity
- Provide access to services, transit
- Human comfort: minimize negative impact to air, water, soil quality
- Create jobs, educational opportunities, sustainability awareness

ECONOMIC

- Up-front cost
- Operational cost
- Return on Investment
- Access to funding sources

THE DEVELOPMENT

Physical impact to the development plan, area required
Visual impact to the development
Increase property asset values
Visible and marketable identity of a sustainable development
Branding

IMPLEMENTATION

Feasible to construct on the site
Durability of the system
Ability to phase-in over time, scale-able
Can accommodate future changes in technology
Proven technology
Can interface with and capitalize on other existing systems

REGULATORY/OPERATIONAL

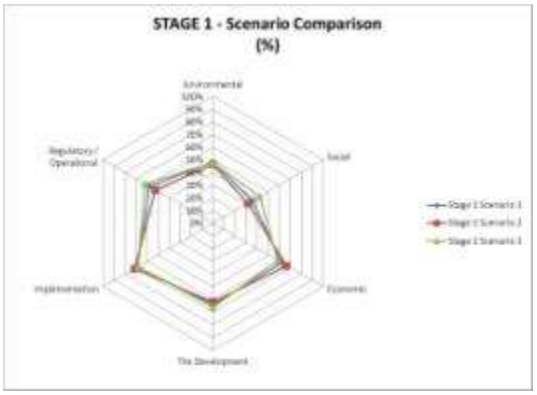
Regulatory hurdles
Feasible models of ownership/operations
Business models that benefit the development
Alignment with current City initiatives

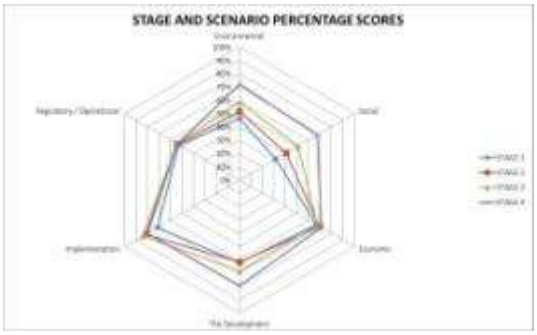
Options and scenarios were developed and tested iteratively to assess and compare packages of measures and their relative fit against the objective criteria. The information on each option was assessed and summarised on the basis of a simple scoring (0-10) relative to other options, variants and measure. The weighting of each development criteria and their sub-components were varied to provide sensitivity testing and to test the sensitivity of the overall strategy against specific measures. Example of package definition, scenarion scoring and comparison are shown below.

TRANSPORT OPTIONS			
Stage 1	**Stage 2**	**Stage 3**	**Stage 4**
Dedicated BRT Infrastructure	Additional New Bus lines	Expand Cycle Network/Linkages	BRT
Demand Management	Expand BRT	Expand ITS Coverage	Complete Cycle Network/Linkages
DRT	Expand Cycle Network/Linkages	Expand Ped links	Complete ITS Coverage
Establish Ped Network	Expand ITS Coverage	Expand Water Bus Service	Complete Ped links
Improve Existing Bus Lines	Expand Ped links	Expand Zip Car coverage	Expand Zip Car coverage
Improve METRA Service	Expand Zip Car coverage	Extend BRT	Extend Demand Management Measures
Parking Measures	Extend Demand Management Measures	Extend Demand Management Measures	Extend DRT
Service by New Bus Lines	Extend DRT	Extend DRT	Improve Water Bus Service
Set up Free Bike Scheme and Link into Network	Further improvements to existing METRA	Further improvements to existing METRA	LRT - plus potential extention
Set Up ITS Structure	Introduce Water Bus	Further improvements to	PRT+

TRANSPORT OPTIONS			
Stage 1	**Stage 2**	**Stage 3**	**Stage 4**
	Service	local bus lines	
Set up Zip Car Scheme	Relative reduction in parking	Relative reduction in parking	Reduced parking provision
	Service by further improvments to bus lines	Transition to LRT	Refinement of local bus lines

			SCORES (0 - 10)										
ENVIRONMENTAL	Category Weighting	Max Possible Category Score	Dedicated BRT Infrastructure	Demand Management	DRT	Establish Ped Network	Improve Existing Bus Lines	Improve METRA Service	Parking Measures	Service by New Bus Lines	Set up Free Bike Scheme and Link into Network	Set Up ITS Structure	Set up Zip Car Scheme
Reduce carbon emissions	40.00	6.00	4	4	4	6	5	8	4	5	8	4	6
Improve Air Quality	40.00	6.00	4	3	4	6	4	8	5	4	8	4	6
Reduce consumption of scarce energy resources	20.00	3.00	4	4	4	6	3	4	4	3	8	4	6
TOTAL	100.00	15.00	12	11	12	18	12	20	13	12	24	12	18
%													
SOCIAL			Dedicated BRT Infrastructure	Demand Management	DRT	Establish Ped Network	Improve Existing Bus Lines	Improve METRA Service	Parking Measures	Service by New Bus Lines	Set up Free Bike Scheme and Link into Network	Set Up ITS Structure	Set up Zip Car Scheme
Provide benefits to the larger neighborhood	20.00	2.00	6	2	7	4	6	4	1	6	3	4	2
Minimize impact on social diversity	20.00	2.00	4	2	7	2	4	2	1	4	2	2	2
Provide access to services, transit (accessibilty)	20.00	2.00	6	2	7	6	6	6	4	6	6	5	5
Improve Safety	10.00	1.00	2	4	2	1	2	4	2	2	1	2	1
Public Acceptability	15.00	1.50	6	2	6	5	6	7	2	5	4	6	6
Create jobs, educational opportunities, sustainability awareness	15.00	1.50	2	2	1	1	2	4	2	3	2	2	2
TOTAL	100.00	10.00	26	14	30	19	26	27	12	26	18	21	18
%													
ECONOMIC			Dedicated BRT Infrastructure	Demand Management	DRT	Establish Ped Network	Improve Existing Bus Lines	Improve METRA Service	Parking Measures	Service by New Bus Lines	Set up Free Bike Scheme and Link into Network	Set Up ITS Structure	Set up Zip Car Scheme
Up-front cost	30.00	7.50	6	8	7	9	8	8	7	4	8	3	2
Operational cost	30.00	7.50	4	9	7	9	7	4	7	3	8	4	6
Return on Investment	20.00	5.00	4	9	4	1	4	4	8	4	1	6	6





3.4 Emerging Strategy

As has been touched on in the LITE Vision, the transport strategies are based on a layered approach, with expandable networks allowing for the evolution of the strategy for each Stage. Throughout the development walkable networks are prioritized as the basis for all movement.

This is then overlaid by a comprehensive network of both segregated and informal cycle paths serving the entire development area.

The next layer is transit, which makes the most of the efficiencies offered by the grid based road layout – high permeability, high accessibility and multiple route choice at all levels.

3.5 Key Performance Indicators (KPIs)

In another similarity with STAG, we proposed a series of KPIs that should be monitored to determine progress towards achieving the specific master plan targets, and to provide evidence to trigger intervention where required. Transportation indicators are generally related to one of four overall criteria: Performance, Availability, Cost and Utilisation and this was used as the basis to identify KPIs that can be used as benchmark data and (over time) to develop trend information.

Additionally, the KPIs will allow comparison with statistics for South Chicago, the rest of Chicago and best practice elsewhere – demonstrating where Lakeside falls in terms of taking transportation best practice forward. The KPIs are set out below.

Transportation Criteria	KPI	Target
Performance	Traffic flow (at key points, by mode and time)	Reducing
	Mode Share	70% PT
	Peak time average vehicle occupancy (mode)	100% & 2
	Emissions/resident (tonnes CO_2)	1
Availability	Proportion of area covered (including	100%

Transportation Criteria	KPI	Target
	reasonable walk distance)	
	Proportion of population covered (including reasonable walk distance)	100%
	Car ownership (per 1,000 residents)	225
	Parking space/residential unit.	0.8
	Maximum distance to stop.	400m
	Accessibility (e.g. peak time frequency)	5 mins
Cost	Cost for travel/km/mode (internal and external)	Reducing
	Accident record (by severity)	20% lower than City
	Average journey time/km by mode	Trend
Utilisation	Total journeys (by mode and time)	Relative reduction
	Passengers/vehicle/day – transit and car	Increase:Reduction
	Households with car-share membership	70%
	Traffic Volume/capacity	<0.80

3.6 Outcome

In working across the whole design team we have identified a dynamic approach to achieving the overall vision, an approach that has been tested, and which fits with the strategies being developed for urban design, energy and utilities, technology and lifestyle.

WSP has taken a unique approach through this master planning phase that has provided guidance to the client in terms of design, systems and solutions, and their comparative appraisal to effectively influence the masterplan in terms of density and massing, phasing and operation. This was achieved by developing the 'objectives-led' approach pioneered in STAG and applying a proportionate and effective multi-criteria modelling approach to the strategy options to provide an assessment of each (and of refinements within each) to demonstrate the level of contribution towards the overall vision, whilst providing easy to understand, graphical outputs to aid decision makers and influence the finalised shape of the emerging masterplan.

The outcome is a clearly defined and phased transport strategy, supported by an audit trail demonstrating why specific interventions have been included/excluded and showing a route to get from a very pragmatic first phase development to a visionary transportation package that contributes

meaningfully to the sustainable vision for the development. The final master plan transport strategy is shown below.

Lakeside Final Master Plan Transport Strategy (April 2012)