Re-imagining Adelaide's Public Transport

By Andrew Leunig
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With some further notes as at 20 March 2015 (at rear)

Exec Summary

I believe that Adelaide could be the most livable and most learning City on the Planet.
The “most liveable” city in the world will get the balance between Public and Private transport right. It will be “liveable” for the old and the young, the rich and the poor.
Why couldn't Adelaide have the cleverest, most vibrant public transport system for a town of it's size on the planet ?
No Reason at all.
But we have to want it first.
At the moment our Public Transport mode share (9.9%) is about the lowest in Australia and that is our accepted norm.
Even our state plan is soft and timid.
“Increase the use of public transport to 10% of metropolitan weekday passenger vehicle kilometres travelled by 2018”.
I like the old saying "If you shoot for the stars you might not get there - but you are less likely to come up with fists full of mud".
At the moment our state plan shoots for the mud.
The solution ?
We need to re-imagine our network design.
As recommended by leading experts we should toss out our current hub (city) and spoke design and design our Network around the very layout that Adelaide is globally famous for - our grid.
I propose that we create The Adelaide Metro Grid - with buses running frequently in a straight line along our major roads, where transfers are presumed and every major intersection becomes a transfer point.
I believe that we could achieve a major improvement to service (and increase in usage) with a redeployment of existing assets and spend.
In particular we should be able to make it easy for parents to send their kids to school by bus and avoid a car drop-off.
Imagine if every day on the roads was like it is in school holidays ? We would not need massive new capex on roads, we could reinvest a fraction of that future spend on making the Public Transport system even better.
Other cities have done this - why can't Adelaide be clever ?
There are no real reasons that Adelaide could be the most livable and most learning City on the Planet.
The barriers are only in our heads.

Preface

This paper summarises some ideas that I have had for a long time but have recently been brought into sharper focus after reading two insightful books :

Transport for Suburbia by Paul Mees and,
Human Transit by Jarrett Walker

I believe that Adelaide could be the most livable and most learning City on the Planet. Globally attractive to current and future residents and an increasing number of tourists. These concepts go hand-in-hand. The most learning City on the planet implies an awareness of “smart” design of transit systems and lifestyles - a large University town if you like.

The “most liveable” city in the world will get the balance between Public and Private transport right. It will “liveable” for the old and the young, the rich and the poor. They can all benefit, they can all participate. Pedestrians will be well catered for, as will cyclists. Walking and cycling (fast walking) are critical for “the last kilometre” or even “the last 400 m”. Cycling, in particular makes perfect sense for trips of up to 6 km - and about half of all car journeys are less than 6km.

Our social norm default is now car travel. It is not clear that we are better off as a society for this. The habit of many (most) people now when leaving their house is to get in their car. It is the default. But - car travel is expensive - for individuals, families and society. The cost of maintaining a car (or two or three) is a big chunk of the average family’s budget. We need to work longer hours to fund this expense. Because we work longer hours we are always in a rush. Because more of us drive we spend more time in traffic. We are getting fatter. For many of us we now drive to a gym to ride an exercise bike or run on a treadmill. Go figure.

In the 1970’s about 70% of kids in the UK, USA, Canada & Australia found their own way to school, either by walking, cycling or catching Public Transport. Now 30% do. (In western Europe there has been no change).
Our social norm now is that we drive our kids to school. The impact of this additional traffic (particularly in morning peak) is dramatic. Everyone in a rush, everyone stressed. Can you remember when you last drove during school holidays? It is as if the roads are deserted. (If this was our norm we would need dramatically less capex on roads. If a high proportion of any ***growth*** in road use went to Public Transport and cycling we could achieve a massive deferral of capex.)

Are our kids any better off for this ? I doubt it. It breeds a sense of “transport entitlement” that means that the social norm of the kids is that their parents are an on-demand taxi service. What is the time and cost of this to parents ? And the impact on the kids. In her great book “Free Range Kids” Lenore Skenazy argues that we are creating generations of kids that don’t know how to fend for themselves or to even find their way around the block. Safety - one of the apparent drivers of the new social norms - is a great big Red Herring as the reality is that on average kids are much safer than previously, particularly with mobile phones. The most dangerous place for kids now ? The school drop off zone.

If none of these arguments grab you then consider the pure economics.
I reckon that it is pretty easy to argue that an extra $1 well spent on Public Transport could be more valuable to a car commuter than an extra $1 on roads.
Why ? Well every $1 spent on roads tends to either just get you to the next bottleneck faster OR encourages more drivers onto that road, negating any gains within months. it is a self-defeating black hole of capex.

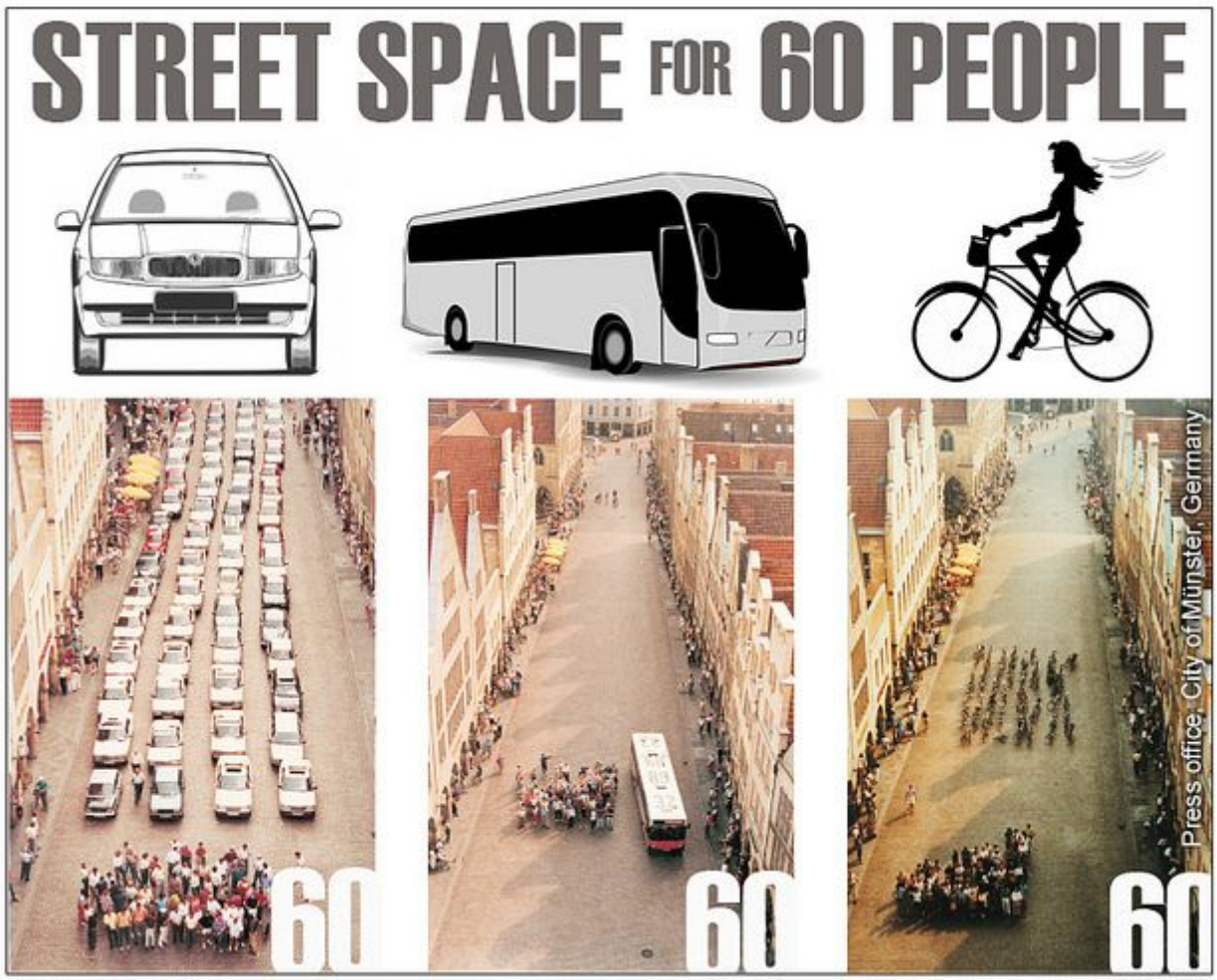
So $1 well spent could attract car drivers off the roads (or save their parents the trip) improving the experience of the remaining drivers.

In any case - as a minimum - I would argue that we could re-arrange and refocus our current Public Transport investment for the benefit of all - Car drivers in particular. We can do much better by better system design.

An increase in Public transport usage would lead to a more sustainable arrangement - both environmentally and economically.

I would also suggest that some current trends favour an improvement / refocus on public transport.
Asset light lifestyles , driven and enabled by cloud computing, smart-phones and collaborative consumption markets and products. In this regard I am talking about bike-sharing, ride-sharing and car-sharing systems. Smart planning tools such as Google Maps Transit planner can also help facilitate change. The tools to facilitate lower car usage are emerging.

As the graphic below illustrates the model of single driver cars is an absurdly inefficient use of road space.



Even this dramatic photo understates the road space consumed by the cars as they would never travel in such a tight transformation. So, whilst our roads may feel packed, they are in reality more like an inefficient, slow moving car park.

We should also consider parking space consumed as neatly illustrated by this advertisement for Brompton folding bicycles where 42 consume one car park or the other picture showing a car-sized bike rack that holds 10 bikes.

What makes a world class transit system - and how does Adelaide compare ?

Mees notes that “by the 1981 Census Adelaide’s Public Transport mode share for travel to work was 16 per cent. But the quarter century following saw a reversal of the Dunstan gains. Adelaide experienced the sharpest drop in public transport patronage and mode share of any Australian city. “

The Government’s “ transport advisers argued that the main problem was the decision to retain Adelaide’s antiquated, poorly patronized trains and trams, which should be replaced by cheaper, more flexible buses.

It proved politically impossible to close Adelaide’s rail lines, they had too much public support. But the investment tap was turned off, allowing infrastructure and rolling stock to decay, leading to even bigger deficits as patronage fell and operating costs rose.

Express bus services were introduced in competition with rail, by the same organisation that was paying the rail deficit; by contrast, feeder services were under-developed and cross-suburban links

practically non-existent. off-peak, evening and weekend timetables were steadily cut back during the 1980’s and early 1990’s.”

He also notes the recent decisions to upgrade the Glenelg tramline and the electrification of the Southern train-line .

How are we faring now ?

The table below shows current modal shares. Clearly density is an issue - but as Meers notes there are many examples of systems that work well, even with lower density and examples of systems in cities of high density that have poor mode share because of poor network design elements.

Mees - table 4.1 - mode of travel to work - 2006 data

City	Country	Population (M)	density (per Ha)	Car %	Public Transport %	Walking %	Cycling%	Other %
Sydney	AU	4.2	20.4	71.2	21.2	4.9	.7	2.0
Melbourne	AU	3.6	15.7	79.3	13.9	3.6	1.3	1.9
Adelaide	AU	1.1	13.8	83.1	9.9	3.2	1.5	2.3
Perth	AU	1.45	12.1	83.3	10.4	2.7	1.2	2.4
Canberra	AU	.37	10.8	82.0	7.9	4.9	2.5	2.7
Brisbane	AU	1.76	9.2	78.6	13.8	3.7	1.1	2.8
Toronto	CA	5.1	27.2	71.1	22.2	4.8	1.0	.9
Ottawa	CA	.85	17.2	68.1	21.2	7.6	2.2	.9
Zurich	SWI	1.36	38	25	63	8	5	0
Copenhagen	DEN	1.9		28	37	10	25	0
Portland	US	2.26	12.9	89.4	6	3.1	.8	.7
Seville	Sp	1.5		64	15	13	6	0

According to Mees these are the basic design elements that are common to any world class transit system - and my notes on how Adelaide is currently tracking.

#	Design Element	Adelaide's Status
1	The system must be treated as a Network with common branding and central network design.	No problem, Adelaide does this.
2	Ticketing systems should be simple and enable transfers.	Good. New Metro tickets are good and auto-recharging and online service are excellent.
3	Ticket prices should be reasonable and encourage usage by volume discounts.	At face value , ticket price framework seems reasonable.
4	"Transfers" should be presumed and made easy.	Big Problem. Basic design paradigm is "point-to-point". Some Interchanges - but limited.
5	Route design should be based on a grid not a hub and spoke. Passengers should be able to traverse the lattice to get pretty much anywhere.	Fail. Adelaide has a city-centric hub and spoke network design."Cross-suburban" links are practically non-existent".
6	Routes (and maps) should be intuitive - easy to understand and navigate.	Fail. Routes and maps are complicated and counter-intuitive. The Go-zone map is simplified but merely serves to emphasise the city-centric hub-and-spoke design.
7	Services should be frequent. Frequency trumps absolute speed and "enables" "transfers" to work.	Fail, particularly for anything other than City-centric Go-Zones.
8	Services should operate for as much of the day as possible - not just at peak times.	Fail. Not easily transparent or intuitive. A spaghetti bowl of alternative arrangements.
9	Services should not compete with each other - e.g. in close parallel."Parallel routes split the potential demand resulting in many routes competing for the same passengers and no route attracting enough demand to warrant a	Fail. Anzac Highway is a major bus route competing with the Tram. Many buses compete with all train lines.

	higher frequency service.	
10	Services should “connect” as seamlessly as possible, in regards to timing and convenience. “Pulse” alignment should be used where appropriate.	Fail. Lack of cross-suburban routes makes this a nonsense.
11	In considering the economics of the network, some routes should be considered loss-leaders to aid the integrity of the network.	Not clear. Not easily able to be determined. No clear public transparent policy.
12	Special routes that only operate at peak hours and separate night or weekend networks should be avoided.	Fail. All manner of special services operate on all sorts of routes at all sorts of times.
13	Bus planners should design routes as if they were operating trams or trains with simple, direct structures and as little duplication and overlap as possible. One section, one line principle.	Fail. No apparent logic, most likely legacy routes from the dust-bin of history. Many routes are complicated and counter-intuitive.
14	Designers should resist off-route deviations which delay through passengers and increase operating costs and system complexity.	Fail. Many indirect routes.
15	Design to link surface routes across the city centre, combining the functions of radial access and central distribution on a single line.	Fail.
16	Service provision should be “supply-based”. Timetables are designed to provide anywhere - to-anywhere travel throughout the day, even though this means some lines will be lightly loaded at particular times.Differences in patronage accommodated by different sized vehicles. Consistent service standards are offered across the entire network.	Fail. Would appear to be demand-based.
17	Making life easier for pedestrians will encourage public transport use.	Some positive signs in City Centre, little sign of progress elsewhere.
18	Park-and-ride schemes should focus on the bicycle not the car.	Fail, but some indication of change with recent announcement of secure bike parking facilities linked to the new Metrocard.

Jarrett Walker outlines seven broad expectations that potential riders have of a transit service that they would consider riding :

#	Walker's Seven Demands	How Adelaide fares
1	It takes me ***where*** I want to go	Fail. Unless you only want to go to the City.
2	It takes me ***when*** I want to go.	Fail. Unless you live on a GoZone and you only want to go to the City.
3	It is a good use of my ***time***	Fail - for anything other than a trip to the city on a GoZone.
4	It is a good use of my ***money***.	Ok, I'd say.
5	It ***respects*** me in the level of safety, comfort, and amenity it provides	Varies for service to service but lots of room for improvement.
6	I can ***trust*** it.	Well no. Confusing routing and lack of frequency magnifies any glitches.
7	It gives me ***freedom*** to change my plans.	Well no. Hub and spoke plan with limited frequency elsewhere restricts freedom.

The map of the Adelaide Go-Zones dramatically illustrates the city-centric “hub and spoke” layout of the current routes and the lack of not one cross-suburban GoZone.

What is a Go Zone?

A Go Zone is an area that offers public transport services every 15 minutes between 7.30am and 6.30pm Monday to Friday, and every 30 minutes at night, Saturday, Sunday and public holidays until approximately 10pm. Stops within Go Zones are indicated by red hoop signs.

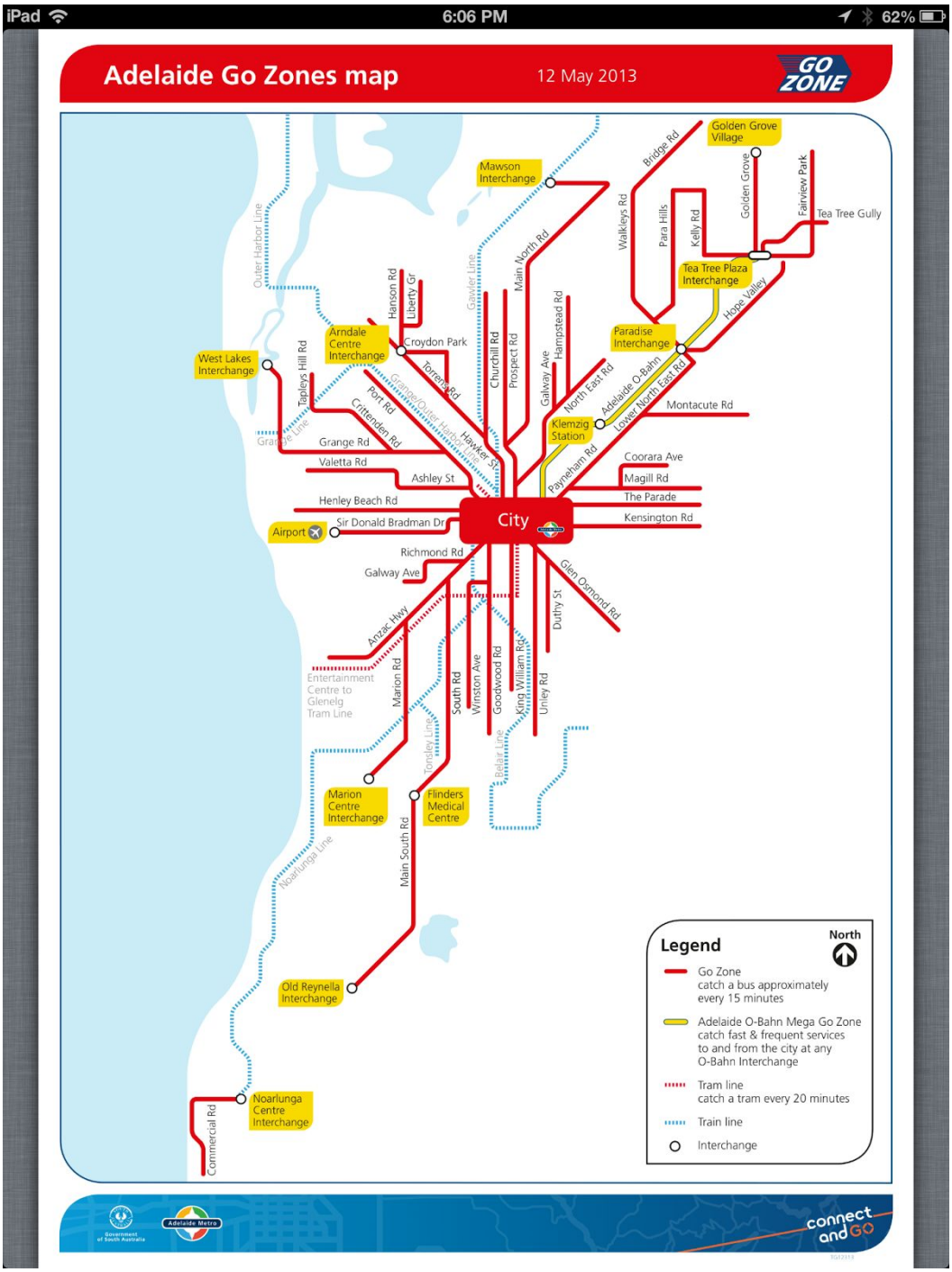
The O-Bahn is a Mega Go Zone

Adelaide Metro offers a high frequency Mega Go Zone to customers who travel on O-Bahn services. Maximum wait time in the Mega Go Zone is 15 minutes, 7 days a week.

It also illustrates the “parallel competition” that dilutes the ability to have great high frequency services.

The table below summarises the major Parallel competing routes.

	Major Route	Parallel Competing Routes
1	Gawler Train Line	Churchill Road
2	Outer Harbor train Line	Port Road, Torrens Road
3	Glenelg Tram	Anzac Highway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Adelaide Go Zones map
12 May 2013
GO ZONE
Mawson Interchange
Golden Grove Village
Tea Tree Plaza Interchange
Tea Tree Gully
Fairview Park
Golden Grove
Bridge Rd
Walkleys Rd
Para Hills
Kelly Rd
Hope Valley
Outer Harbor Line
Gawler Line
Main North Rd
Hanson Rd
Liberty Gr
Arndale Centre Interchange
Croydon Park
West Lakes Interchange
Tapleys Hill Rd
Grange/Outer Harbor Line
Torrens Rd
Churchill Rd
Prospect Rd
Galway Ave
Hampstead Rd
Paradise Interchange
North East Rd
Adelaide O-Bahn
Lower North East Rd
Montacute Rd
Port Rd
Crittenden Rd
Grange Rd
Hawker St
Klemzig Station
Payneham Rd
Coorara Ave
Magill Rd
The Parade
Kensington Rd
Valetta Rd
Ashley St
Henley Beach Rd
Sir Donald Bradman Dr
Airport
City
Richmond Rd
Galway Ave
Glen Osmond Rd
Duthy St
Anzac Hwy
Entertainment Centre to Glenelg Tram Line
Marion Rd
South Rd
Winston Ave
Goodwood Rd
King William Rd
Unley Rd
Belair Line
Torrens Line
Marion Centre Interchange
Flinders Medical Centre
Main South Rd
Noarlunga Line
Old Reynella Interchange
Noarlunga Centre Interchange
Commercial Rd
Legend
North
Go Zone
catch a bus approximately every 15 minutes
Adelaide O-Bahn Mega Go Zone
catch fast & frequent services to and from the city at any O-Bahn Interchange
Tram line
catch a tram every 20 minutes
Train line
Interchange
Government of South Australia
Adelaide Metro
connect and GO

Hub &

One of my favourite stories concerns the planning for a new university.
It all went well until they came to one of the final steps, designing the walking paths. no matter what, they couldn't agree, so they settled on a brilliant solution. They decided to just plant some grass and review it in 3 months time. Then they would simply observe where the foot traffic had worn away the grass and put the paths there. Let the students vote with their feet.

In a way we already have the answer to where most of the people want to travel - they're called our major roads.
So - you would think that it would make sense to have buses that ran along the full length of these major roads. But apparently the route planners don't think so.
It seems bizarre that the following roads are not Go-Zones

North-South

- Brighton Road / Tapleys Hill Road
- South Road
- Portrush Road / Hampstead Road
- Glynburn Road
- St Bernards Road/ Newton Road

East-West

- Sturt Road
- Oaklands Road /Daws Road
- Cross Road
- Greenhill Road
- Regency Road / Mullers Road
- Grand Junction Road

They all have massive volumes of car traffic and are an intuitive part of almost any trip that doesn't involve getting to the city.

As Jarret Walker notes on his blog http://www.humantransit.org/adelaide/ on 29 August 2012

"Adelaide is a very centralised city, but still, it's extraordinary to notice that you literally can't go anywhere at high frequency without going through the CBD. Only the stations of the O-Bahn, where routes converge from several directions to flow into the O-Bahn busway, is there any opportunity to make a frequent connection without going downtown.

Adelaide readers and citizens should think about the question: Do we really want it to be impossible to get around spontaneously -- i.e. without much waiting -- anywhere other than to and from the CBD? Since former Portland transit general manager Fred Hansen is now in Adelaide, I hope he is pitching the virtues of grid networks -- which Portland has had since 1982. A full grid is probably not appropriate for Adelaide's geography and resources, but radial systems with grid elements -- which I've been designing for years -- could open up vast new all-day travel markets. "

Surely this is just common sense !

Here are some fast facts on the size of the public transport network.

- 1,519 kilometres of bus routes carrying an average of 180,686 journeys each day.
- 120 kilometres of rail lines carrying an average of 34,537 journeys each day.
- 12.1 kilometres of O-Bahn track carrying an average of 27,645 journeys each day.
- 832 buses and more than 7,000 bus stops.
- 98 trains and 85 train stations
- 16 trams and 24 tram stops

Public transport journeys

Ever wondered how many journeys are made on our public transport system?

Here are some quick facts:

- 66 million journeys a year
- 1.9% growth or 1.23 million extra journeys in the last 12 months (from March 2009) over the entire network
- 3.3% growth or 422,000 extra journeys in the inner northern and inner southern areas
- 180,686 bus journeys every weekday
- 7,737 tram journeys every weekday
- 34,537 train journeys every weekday
- In total 222,961 journeys are made each average weekday
- 9,397 services operate using over 7,000 stops, stations and tram stops each average weekday.

What is the current stated vision for Adelaide's Transit System ?

What does the SA State Plan outline as a vision for Public Transport ?
http://saplan.org.au/targets/63-use-of-public-transport

63. Use of public transport:

Increase the use of public transport to 10% of metropolitan weekday passenger vehicle kilometres travelled by 2018

Here is a summary of the strategies to achieve this goal :
Target 63
Use of public transport: Increase the use of public transport to 10% of metropolitan weekday passenger vehicle kilometres travelled by 2018.
KEY STRATEGIES AND ACHIEVEMENTS

Deliver a modern, safe, accessible and reliable public transport network.
The government is continuing rollout of the Metrocard system, a new smartcard ticketing system, launch of the new Adelaide Metro website and introducing a system giving passengers access to real time information about the running times of buses, trams and trains.
A review will be undertaken on the performance of the dedicated bus lanes in the CBD and the development of similar lanes and measures to improve public transport on other corridors in the metropolitan arterial network.
The government is committed to enhancing rail infrastructure and services, including the deployment of the first electric trains, continuation of the resleepering program and the electrification of the Adelaide to Seaford line.
Park and ride facilities at interchanges along the O-Bahn corridor will continue to be improved, including expansion of parking capacity at the Klemzig interchange.
Progress towards target:
In the first of several initiatives to prioritise public transport and the movement of larger groups of people in
Adelaide, dedicated bus lanes have been established along the length of Currie and Grenfell Streets and part of East Terrace. The lanes operate between 7am and 7pm, Monday to Friday, allowing easier and faster bus travel across the city. Taxis, cyclists and emergency vehicles also use the lanes.
Revitalisation of Adelaide’s public transport network has continued by: providing new bus services in the Outer South and Outer North, including Gawler; refurbishing the 3000/3100 railcar fleet; continuing the rail line extension to Seaford; building new railway stations at Elizabeth and Munno Para, upgrading Hallett Cove Beach, Elizabeth South, Gawler, Chidda and Evanston stations, and developing a new car park at Smithfield station.
There has been a cumulative growth in passenger transport boardings since the introduction of the Adelaide Metro in 2000. The estimated metropolitan public transport patronage in 2009-10 was 7.5 per cent of total weekday passenger vehicle kilometres, i.e. total public transport and car use. This compares with a figure of 7.3 per cent in 2008-09.
There is a significant amount of activity to improve public transport and the road networks, which has had a negative effect on patronage. This included major rail line closures as part of the Rail Revitalisation works, as well as the closure of the Tonsley line and reduced services on the Grange line. These works are crucial in providing an improved public transport system for South Australians and will support increased public transport patronage in the future. Plans to increase public transport patronage to major events at Adelaide Oval with a 70 per cent target will also have a positive impact on this target.

What can we learn from this ?
Firstly the key target : Increase the use of public transport to 10% of metropolitan weekday passenger vehicle kilometres travelled by 2018 is a timid, soft target.
This is an incremental target.
There is no mention in any of the strategies of making the system easier to use, more intuitive, more frequent.
Whilst the capex is useful and welcome, there seems to be no serious attempt to get Public Transit to where it could be, for all of the reasons previously outlined - BUT importantly taking pressure off the roads and giving time and money back to citizens, in particular parents.

What appears to be the mission for SA's Public Transport is described in the Annual Report :

Deliver a Modern, Safe, Accessible and Reliable Public Transport Network.

What is a realistic vision for Adelaide's Transit System ?

Why couldn't we be bold ?
If we are serious about Adelaide being the most liveable city on the planet - and why wouldn't we be - we should be much bolder.

Adelaide	Car %	Public Transport %	Walking %	Cycling%	Other %
Current (2006)	83.1	9.9	3.2	1.5	2.3
Target 2018	69.5	20.0	3.2	5.0	2.3

Note - the measure in the table above is a different measure in the State Plan but this does not matter in this context.

Note, that in addition to a substantial increase in Public Transit use I have also proposed a substantial increase in cycling. (This increase in cycling is substantially greater than proposed in the SA State Plan - as that goal is similarly timid).

Is this level of growth feasible ? Has it ever been achieved anywhere before in the world ?

Yes, examples include :
Public transport patronage in the City of Zurich, already amongst the highest in the world on a per capita basis, increased by about half during the 1980's, despite a slight decline in the population.

How could this possibly be achieved ?

It could be achieved by establishing a proper Grid with Cross-town functionality and in particular a focus on school kids - older primary and high school students.
A substantial amount of this change could be achieved by re-designing the network and re-deploying the existing assets.

What we should do next

Step 1 is to better define what we are seeking and the vision.
At the moment both the mission and the vision are timid.

Current Mission	Suggested Mission
Deliver a Modern, Safe, Accessible and Reliable Public Transport Network.	Deliver a Modern, Safe, Accessible and Reliable Public Transport Network that enables travel from anywhere to anywhere and is a realistic alternative to private car ownership and travel for most people.
Current Objective	**Suggested Objective**
	To : ● provide effective transport services for those who cannot or do not want to travel in a private car ● reduce cost of living by enabling more people to avoid time and dollar costs of : ○ owning and maintaining a car. ○ parking. ○ transporting kids (particularly to and from school) ● achieve greater use of public transport so that : ○ road congestion is reduced for the benefit of all
Current Vision by 2018	**Suggested Vision by 2018**
9.9 % mode share	20.0 % mode share

Network Design Principles

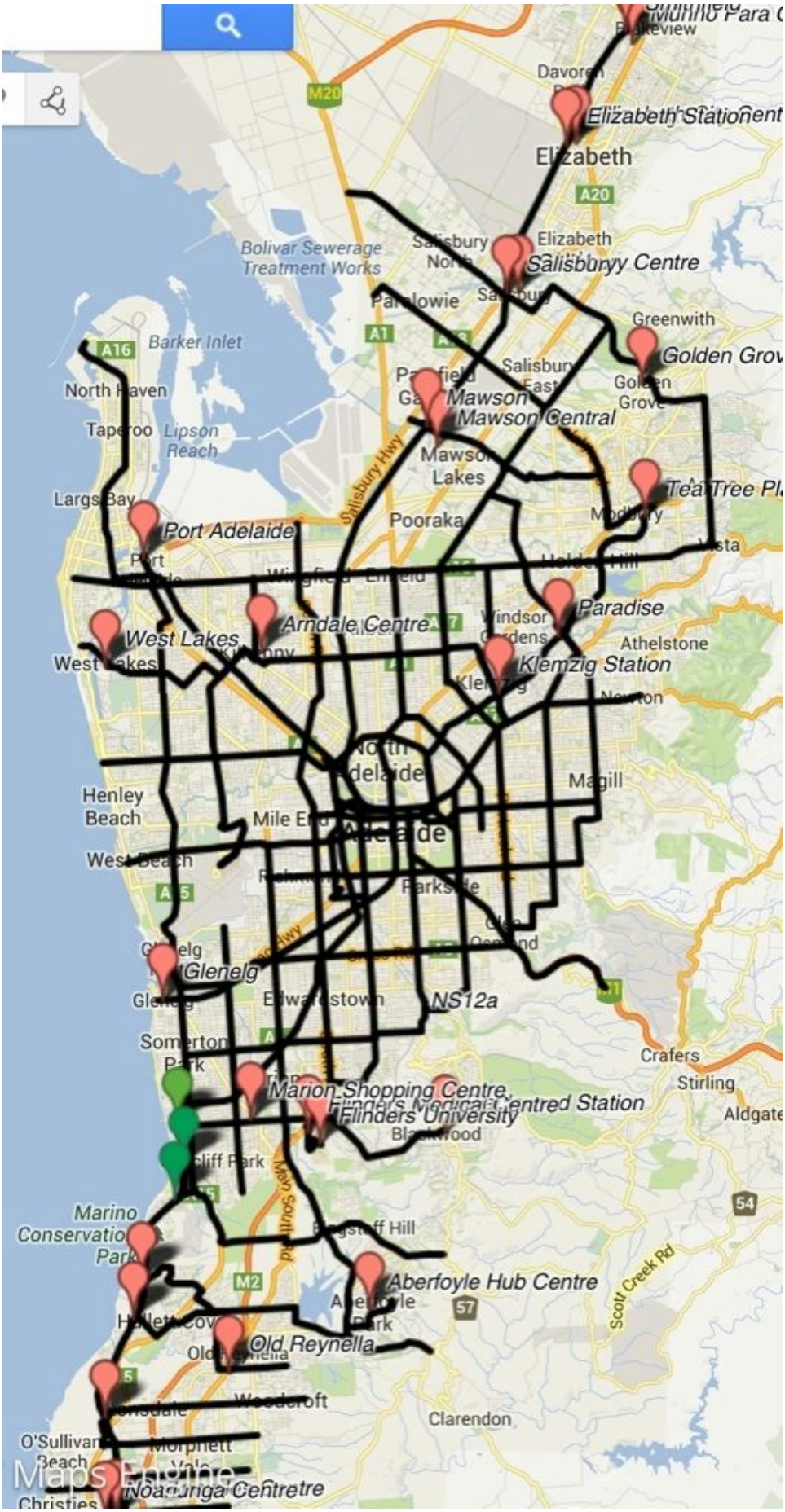
It is by no means clear what the design principles are for the Network.
The current Mission is : Deliver a Modern, Safe, Accessible and Reliable Public Transport Network.
There are no other publicly available design principles.

I suggest the following design principles :

1. The network should be :
    a. designed to get from anywhere to anywhere
    b. a ***realistic*** alternative to private car travel for ***most*** people.
    c. designed to cater well for tourists.
    d. well connected to major infrastructure - e.g. Adelaide Airport and other feeder services.
    e. considered in it's entirety, like an ecosystem.
    f. easy to understand and easy for trip planning - it should be intuitive.
2. Transfers must be presumed and facilitated.
3. Presume that people will walk 800m to a more frequent service.
4. The entire system should be safe - for your youngest child and your mum.
5. The main Grid should have a start and finish time such that you can catch the first flight or get home after the last arrival from Adelaide Airport.
6. Frequency of Service takes priority over absolute speed
7. Frequency should be at least 10 mins (Peak) / 20 mins (off Peak) for main Grid, less so for feeder services.
8. Special emphasis be placed on achieving growth in use by school children. Make it easy for Parents to choose not to drive their kids to school.
9. Funding decisions should take into account the benefit of deferring car congestion, enabling deferral of major capex otherwise required (or sought).
10. Don't let the vocal minority influence decisions to the detriment of the silent majority.
11. A mode share of 20% is targeted by 2018 to achieve sustainable critical mass.

My First "Rough Draft of a Network Design

This is very much a first cut, done one recent Sunday afternoon.
My objective was to make use of the existing main roads and design it as a grid.
I haven't yet crunched the numbers but I reckon that this could be achieved without a massive additional expenditure (if any).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Port Adelaide
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Arndale Centre
West Lakes
Klemzig Station
Athelstone
Magill
Henley Beach
Glenelg
NS12a
Crafers
Stirling
Marion Shopping Centre
Flinders University
Aberfoyle Hub Centre
Old Reynella
Clarendon
Scott Creek Rd
Maps Engine

Further Thoughts - 20 March 2015

How has my thinking emerged / changed since August 2013 when I originally wrote this paper ?
Firstly I would note that nothing has dented my view on the basic proposition. Many credible people have read the original document in Government and the private sector and they all seem to agree with the broad principles.
If anything I am more than ever convinced that the logic is sound.
A modest re-allocation of spend from roads to public transport is a way to reduce (defer) future capex demands.
Current road capex projects in SA include Darlington (2.3 Km cost $620 Million) and Torrens to Torrens (3.7 km cost $896 million). That's a lot of money to get cars more quickly to the next traffic jam.

Reinforcing Ideas

Public Health benefits

At Velo-city Global 2014 in Adelaide (May 2014) I attended a presentation by Dr Larry Frank Professor in Sustainable Transportation and Population Health University of British Columbia.

We are all aware of the benefits of activity and exercise but I was staggered at Dr Frank's research findings.

He has developed the ability to look at the map of a neighbourhood to predict the "walkability" of the area and thus make predictions about the health of that population.

The numbers are staggering. A small increase in daily walking - e.g. 400 metres each way to and from the bus stop can have a very substantial impact on weight gain, obesity and Type 2 diabetes .

There are also significant mental health benefits from more active forms of transport.

I also learned that a child who skips breakfast and walks or cycles to school is more ready to learn than a child that has breakfast but is driven to school.

The economic benefit of moving from an automobile based transport system to an active transport approach is enormous, particularly when you consider a reduction (slowing) of car congestion which is the driver of expensive road capex.

References :

The hidden health costs of transportation

The Walkable City : Neighbourhood Design and Preferences, Travel Choices and Health. April 2012

Larry Frank: New research on the health impacts of land use and transportation YouTube Video from Velo-City Global 2014

Creating new habits

My own personal insight is that car travel is a “hard-wired” habit.
The habit of walking from the front door of the house to the car is hard to break but research indicates that habits can be broken in about 28 days.
My own experience in breaking my car habit fits the experience of others.
Once I broke the car habit - primarily through urban cycling, I found that I was also much more likely to catch a bus or walk to the shops.
The car was no longer my “default”, I was open to other modes of transport.

Have we already passed “Peak Car” ?

There is an emerging view that we have already passed the peak private use of cars.
See http://en.wikipedia.org/wiki/Peak_car

The reasons are increasing congestion and costs but also anecdotally that young people (having been used to being driven by their parents) are getting their driver’s licence later and later. Many young people seem to prefer public transport as they can stay “online” .
Just another reason to shift some spend from road infrastructure to public transport infrastructure.

Driverless cars and trucks

Clearly driverless cars are coming and the first application will probably be taxis - it’s no coincidence that Google (developer of a driverless car) is also an investor in Uber.

But what about driverless trucks ?
Surely this is even easier than driverless cars.
It is easy to see that driverless trucks could move freight off-peak - say 1AM to 5AM when they would have the roads pretty much to themselves.
Simple “trucks” (think container trolleys in convoys) could move freight easily and safely across an urban grid.

People don’t trust buses

One of the reasons that people like trams is that you can be certain of their path, you know where they are going.
Who knows where the Adelaide buses are going ?
The more complex the route structure - the twists and turns, the illogical routes, the less people are likely to trust them.

This is not so much an issue for the daily user who is familiar with the complexity on a given route but it becomes particularly important for someone who is using the system as a car alternative which means they will frequently be travelling on unfamiliar routes.
This view was reinforced by a friend who has studied commuter behaviour on London's trains. Passengers would get on a later train that they had confidence in rather than an earlier train of which they had some uncertainty of which stations it stopped at.
If you don't trust the system as an adult, you will certainly not entrust your children to it!
A grid pattern, where all of the buses travel in a straight line (behaving like trams) is much more likely to engender confidence.

Specific comments about changes to Adelaide's network

Real-time arrival capability is fantastic but would be easier to use as an App compared to a browser. It could also be improved if the app linked to a scannable QR code on each stop , easily giving you direct info for that stop.
Why aren't we seeing more publicly visible boards on stops that display this information for everybody ?
Surely this would be very low cost per unit. Simple solar powered set-up could be installed in minutes.
The Skybus (airport) service does start early enough to allow you to catch the first flight but there is no way to connect with that service as no other services start that early. For example the first train from Gawler arrives at Adelaide Railway Station at 6.05 AM.
Every bus stop should have simple (but good) bike racks that encourage people to ride to stops.
Slightly increase space between stops and with increased frequency (particularly at peak) ban drivers (who are slightly ahead of schedule) from stopping - this is a big passenger turnoff.
Map

"Local" Services to be operated by Local Councils

The current paradigm seems to be to offer a service that provides a bus to within 400 metres of every home, even at VERY LOW FREQUENCY.
When the network map is published it would appear that there are bus services to everywhere but this is misleading as the frequency of service is so low as to make it completely impractical as a car replacement.
This paradigm also leads to the unbelievably complicated bus routes that we currently have.
Why not have the State operate a high frequency Grid and devolve the local services to local councils who are much better suited to manage local services. This reduces system wide complexity and could provide much better utilisation of an expanded council owned community bus fleet. There could also be sharing pooling with local schools.
The other part of the local puzzle are better local cycling facilities (cycle a bit further to the bus stop) and adoption of rideshare (e.g. Uber X) and "on-the-fly" ride pooling (e.g. Uber Pool).

Car Hire, RideShare & Car Pooling

If I own a car I'm less likely to use Public Transport.
If the Public Transport System is not designed or operated to be a feasible alternative to private car ownership I'm more likely to own a car.
Catch 22.
It takes time for people to transition in or out of car ownership (maybe 1 to 3 years).
Car ownership is somewhat "sticky".
If I can access short term car hire (e.g. GoGet) I'm more likely to go car free.
It is estimated that each fully utilised GoGet car has the ability to replace 14 privately owned cars. There is a network effect associated with these cars. Adelaide only has a few. The more there are the more practicable the system gets. we should consider "seeding" these cars throughout city and suburbs to create an initial network effect. they complement The Grid.
Uber X and the like are a proven cheaper alternative to traditional taxis.
Legalising UberX and the like is a key step to build the non-private-car ecosystem.
People will mix and match with The Grid.
I may jump on The Grid to travel 15 kms and book an UberX in transit to take me the last 2kms direct to my final destination.
UberPool - the ability to "on-the-fly" share a low cost ride with strangers going in the same direction has a similar benefit and would be a perfect compliment to the final leg after say using the 'Hills Line" to a major stop.

Operate "The Hills Services" like a train

Currently various services run from various Hills towns to the CBD. This is complicated and leads to reduced frequency and increased cost.
We should treat "The Hills Line" as if it was a train.
There is one "train line" that runs high frequency up the Freeway.
At peak times it would offer very limited stops between CBD and the Toll gate, then major towns along the freeway. At selected stops, smaller "pulse" buses would leave from those stops after arrival of "The Hills Line" bus. These services may be operated by local councils and I am sure that you could easily equal current service frequency to final destination.
Also these major stops could be service by "Kiss and drop", UberX and UberPool.

Make the train run from Gawler to Seaford (and faster)

Adelaide currently runs the following Train Services :

- Gawler to City
- Seaford to City
- Grange to City
- Tonsley to City
- Outer Harbour to City
- Belair to City

Let's get real. The only lines that can justify trains on a volume basis (at anything approaching a sensible frequency) are Gawler and Seaford.
The spare capacity is hopeless.
Adelaide is a linear city hemmed in between the sea and the hills.
Let's just run a high speed train from Gawler to Seaford, with a high speed automated shuttle (think Singapore Airport) from an appropriate point in North Adelaide / Hindmarsh area to the existing Railway Station.
Reduce the number of stations and speed the train up.
Make it easy to transition from North Adelaide, Mile End and Wayville Railway Stations to North Adelaide, the City / Greenhill Road.
This would make it much easier to travel from say Gawler to Greenhill Road or from Seaford to points North of the city.
The O-bahn could link with the Mile End Station.
Mile End could link with an Airport Bus.

You could probably keep the Outer Harbor line open until you can extend the tram to Port Adelaide but with The Grid in operation you can easily provide improved services to Grange & Belair including "pulse" buses from appropriate rail / tram stations.

The Tonsley line is in the process of electrification. At best this should have been light rail connecting to the Ascot Park Station, operating on a "pulse" basis.

At every touch point make transition from the train to The Grid painless.
Establish "pulse" bus services to leave after every train North (say to Barossa) and South (say to Victor Harbor / Goolwa).

Focus on reducing on reducing the school run

As previously noted there has been a massive increase in kids getting dropped off / picked up from school.
I have been unable to find any data on the congestion impact of this but anyone who has driven on Adelaide's roads in School Holidays knows how much this school traffic contributes to congestion. Congestion = massive road spend.
In addition the health benefits, the reduced stress, the reduced cost to families (particularly if the family can move from two cars to one).
Each school provides a community where issues can be identified, understood and worked on. Starting modality share and progress can be measured.
The solutions may involve one or more of the following :

- tweaks to local bus, rail services - frequency, stops etc.
- changes to car use in the proximity of the school to make it safer
    - for pedestrians
    - for cyclists
- Cycling education and training programs - e.g. Way2Go
- Addressing other issues of perceived or real safety

Change the environment around the school particularly to facilitate car slowing and creation of “filtered permeability”. (where people and bikes can “go through” but cars have to “go around”.

Make the “core service” so good that separate school buses are not required

If The Grid was operating as I envisage it then separate school bus services would be not necessary. Money saved could be re-invested in The Grid.

Provide a Concierge service at high volume stops at peak hour

Think Melbourne Airport skybus.
Have someone with a mobile ticket reader pre-processing / selling tickets to reduce time at stops. This person can also help with queries and aid with safety - particularly important to give parents confidence in the system.
The State Government has announced a similar idea but I have yet to see any detail and I suspect that it is not likely to be widespread.

Basic Design Philosophy

The basic idea is that the Public Transport system, rather than only being useful to get to the city or to work, becomes the core of a viable way to move around the city (not just to the city) including unusual or one-off cross town trips.

As Paul Mees says in his excellent book “Transport for Suburbia : Beyond the Automobile Age” :

“the central challenge is to provide sufficiently high occupancies to support high system-wide service levels, on cross-suburban lines as well as radial lines, and to low-density as well as high-density areas.This challenge is met by providing a sparse but high quality network comprised of relatively few lines but operating at high service levels.
A sparse network concentrates services, allowing higher frequency and longer operating hours. It is also simple and stable, and thus easier for passengers to understand.
Ease of understanding, or legibility is not regarded as important in traditional public transport systems designed for regular commuters or “captive” patrons as it is assumed people will use the same services every day and become used to any quirks or complications. But region-wide networks are for everyone : regular users, occasional travellers, people visiting unfamiliar parts of the city, hikers and tourists. They must be stable and comprehensible, just like a road system.”

This describes The Grid idea perfectly.
What it means in practice - rather than having a bus heading to the city ***every hour*** from a stop 100 metres from your house, with a 5 to 15 minute walk you can access The Grid that has services running ***at least every 15 minutes*** connecting you to a network that can take you pretty much anywhere within the metropolitan area.

This is like a transition from the telephone (point to point) to the internet (traversing a connected network).

In the excellent Griffith University paper The Principles of Public Transport Network Planning: A review of the emerging literature with select examples. the authors state:

“For a public transport network to be operationally legible and understandable it needs to be described as a complete network. Passengers on public transport networks are motivated by their desire to travel across urban space. Although planners often engage in debates over the optimal transport modes for particular system tasks the critical factors from a passenger perspective are service speed, frequency, connectivity and legibility. Connectivity and legibility depend on the ability to understand the range of journey path options which in turn requires a full system map. “

If any further proof was needed that Adelaide Metro do not see their system as being used for anything other than the daily commute - they no longer produce and distribute network wide maps. I was staggered to discover this fact. Adelaide must be the only city on the planet that doesn’t do this. Why ? “They are costly and hardly anybody wanted them”.
** You can download a pdf but it would need to be printed on a Poster size page to be legible.

This paper is also worth a read.
Public Transport Network Planning in Australia: Assessing current practice in Australia’s five largest cities (Mees & Dodson May 2011)

My (selected) takes from this paper (my emphasis) :
“Adelaide **was once a leader** in Australian public transport. During the 1970s, it was the only city where public transport usage rates and shares of work travel increased.
However, beginning in the 1980s, concerns about rising deficits led to a reversal of some of the policies of the 1970s. **Service levels were gradually reduced**, especially on off-peak, evening and weekend services.
The rail service received little capital investment, some lines were closed and service levels remained poor. **Express bus services were introduced that competed with the rail system for passengers.**
Adelaide now has the lowest mode share for work trips, and the lowest per capita usage rates, of the cities discussed in this report, having initially fallen behind Brisbane and more recently Perth. **Service levels are generally low, particularly outside peak periods:** for example, most rail lines operate hourly in the evening and on weekends, and most bus services provide similar service levels.
Low service frequencies acts against the development of the system into a high quality integrated public transport network.

In the summary for Adelaide, the Authors say :

“Adelaide perhaps faces fewer transport problems than other Australian cities due to relatively modest population growth. And it is making progress on infrastructure improvements to some network links. But the city nonetheless suffers inadequacies in transport provision that are partly tied to the wider planning of its public transport networks. **There are clear opportunities for the rationalisation of bus lines in Adelaide especially at key interchanges such as the city centre.** While the GO-Zones doe satisfy some of the public transport network planning principles of fast (largely) frequent services **these still operate multiple lines on the same routes and timetable structuring and coordination has not been optimised.** While investing in new infrastructure 17 Adelaide would do well to rigorously apply the principles of public transport planning set out in this and the previous paper. “

Another useful resource:

[Organization before Electronics before Concrete and Supporting “Networked Transit” Principles]

A simpler system requires less “Head Office” Bureaucracy

Savings can be reinvested in service delivery.

“Cars just seem to disappear” Jane Jacobs

So what happens if we allocate more road space to public transport and maybe bicycle lanes ?
As Jane Jacobs observed “the cars just seem to disappear”.

The traffic that used the formerly busy road disappears, through countless private readjustments, so long as there is an abundant grid of alternate paths into which traffic can disperse, and other modes, such as public transit, to which it can convert, and other times of day to which it can shift its travel. (Anthony Downs later coined the term “triple divergence” to describe these three universally available paths of dissipation.)

A personal example of the costs imposed on families due to an inadequate public transport system.

I could give you other examples but this is the one that hurts the most.
My youngest daughter Isabelle is 11.
I am a proud father - she is in the Australian Trampoline Team and trains 5 days a week with the elite squad at Marion Aquatic Centre.
The family home is at Beulah Park and she goes to school at Burnside Primary School.

3 Training sessions are after school, 1 before and 1 on Saturday morning.
We have about 60 minutes to get to / from school after / before training.
The family home is only a few minutes walk from either The Parade or Magill Road.
Burnside Primary School is about 100 metres from Greenhill Road.
Marion Aquatic Centre is about 250 metres from Oaklands Railway Station.
Wayville Railway Station is adjacent to Greenhill Road.

The train journey takes the following times :

- City to Oaklands Park - 17 mins to 22 mins (depending upon train)
- Wayville to Oaklands Park - - 13 mins to 16 mins (depending upon train)

The Bus journey from Beulah Park, Magill Road to Adelaide Railway Station takes about 21 minutes and operates every 15 minutes.

The real problem is the journey from Burnside Primary School to Wayville (Adelaide Showgrounds) Railway Station.
You would think that given the popularity of Greenhill Road (and the number of offices along it) that there would be a bus that regularly trundled along Greenhill Road that would take my daughter from Burnside to Wayville Station.
You would be wrong.
Bus 580 in fact does take this route. It takes a scheduled 18 minutes to travel from school to the Station. This would make the journey by bus and train quite effective.
There is only one problem. Bus 580 runs only twice per day. So unless you happen to need to depart stop 13A at either 8.20 AM or 3.46 PM you are out of luck.
Any other time you will need to take 3 buses via the city and it will take you about 1 hour and 10 minutes.

Consequently we have given up on Public Transport for the purpose.
Yes we could probably use it on Saturdays but on those days the traffic is light and the (traffic avoiding) advantage of the train is less significant. Not to mention that we are so familiar with the car journey - car is the default.

The costs ?

Parent time consumed :
Round trip - approx 4 hours x 5 sessions x 48 weeks = 960 hours.

After tax dollars :

42.7 kms x 5 x 48 = 10,248 kms per annum.
(3.7 + 19 + 20)

Using ATO per kilometre full cost rates = 10,248 x .77c = $7,890

Less : Student metrocard 28 day pass = $39 x 13 = $507

Summary :
The failure in the public transport service costs our family :

$7,383 of after tax dollars and 960 parent hours.
That is significant.
That is money that could be put to better use.

The residual question then is : Is it safe for our 11 year old daughter to travel alone on this journey. My wife is doubtful. I would offer a qualified “probably” but there is certainly room for our safety confidence levels to be improved.
Of course, the other issue is the additional traffic congestion.
It is one additional car on the road at peak times that doesn’t need to be there.
This is a classic example of a journey that should be “doable” by Public Transport but isn’t.

Transitional Plan

Significant changes of the type proposed need to be carefully implemented.
My basic principle would be to carefully “add” before any reductions / tweaks.
So - in my view you would need to get the basic framework of the grid operating.
To untangle the existing routes - as some minor existing routes were reduced / varied / ceased I would propose :

- the mooted “local” services by councils be brought on-stream
- the frequency of The Grid services be increased (say at peak from 15 mins to 7.5 mins).
- there is a very significant communication investment, helping people to understand what their new options were.

In any case the reasons for the changes and the end vision need to be continually communicated and lots of work needs to be done to ease transition for people.
It also needs to be explained that this is not cost cutting - in fact there will overall be a greater investment in Public Transport but at the same time the system will be made more effective and sustainable.

About Andrew Leunig

Andrew Leunig is a Business Architect.

He grew up in the delightful Clare Valley and was educated at Clare's Kindergarten, Primary & High Schools.

He is a Graduate of Uni SA and the AICD Company Directors Course.

He started his business career as a banker before ramping up the excitement levels and becoming an Accountant.

Sadly this still didn't keep him interested and for the past 15 years he has worked as Business Architect helping businesses, not for profits and Government Agencies review and reinvent their business models and strategies.

The business models of the world are changing rapidly, influenced by changes in technology, demographics and society.

Andrew's work and networks provide him with unique insights. He gets to see the early developments and trends that will shape our futures.

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