

Time Required To Evacuate The Te Atatu Peninsula In The Event Of A Tsunami

Introduction

We start by considering the time that would be available for evacuation in the event of a tsunami occurring, which was generated by an earthquake at a location, where it is likely to cause a tsunami that threatens the Te Atatu Peninsula. We have then created an evacuation plan for the peninsula, which we then model using evacuation modelling software. We then analyse the data given by the simulation.

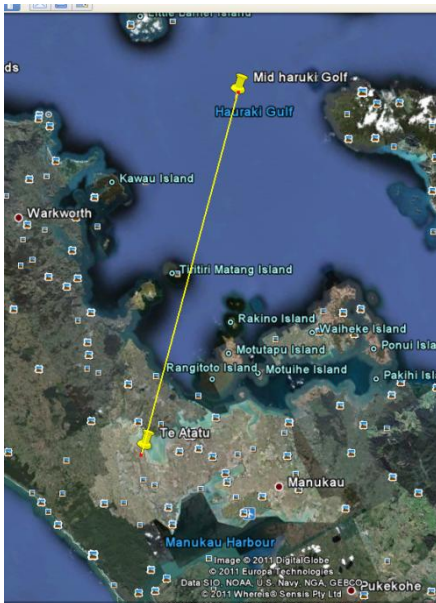
How Much Time Would Be Available To Evacuate if A Tsunami Is Caused By An Overseas Earthquake?

If an event overseas occurs it would be beneficial to find out what sort of time period is available, especially if a massive earthquake occurs. The place that Auckland city council identifies as the most likely location of a tsunami that threatens Auckland is on the convergent tectonic plate boundary near the coast of Chile³. For this we have decided to use the 1960 Lumaco earthquake as a model of the epicentre.¹

We obtained the co-ordinates from google earth of Lumaco, and Te Atatu peninsula.

Te Atatu: **S Latitude 36 50 27.54, E Longitude 174 39 6.63**

Lumaco: **S Latitude 38 8 57.67, W Longitude 72 54 47.73**



With this the distance between the points can be calculated if we take into account the curvature of the earth. We calculated the distance using the FCC website.² The result is **9174.487 KM** which is a sensible distance. In a worst case scenario we would want to have the fastest tsunami wave speed as possible to find the minimum time available. If there were to be another large earthquake in Lumaco, assuming a size about 9.5 on the Richter scale, the wave speed could be a maximum of 700km/h.³

Assuming a tsunami was to have the epicentre here this gives an approximate evacuation time as: $9174.487/700 \approx 13.1$ hours. Note that this assumes both maximal speed of tsunami, and a direct route, which leads to possibility of this being below actual time, however it also assumes, immediate notification which could lead to this overestimating time.

With this we know that if an event occurred in Chile then the minimum time before the earthquake hits will be approximately 13 hours. This will be used as the maximum time available to the residents to escape.

¹ 1960 Valdivia Earthquake. Retrieved October 1st from Wikipedia:
http://en.wikipedia.org/wiki/1960_Valdivia_earthquake

² Find Distance and Azimuths Between 2 Sets of Coordinates. Retrieved October 1st from:
<http://transition.fcc.gov/fcc-bin/distance?dlat=36&mLat=50&slat=27.54&ns=2&dlon=174&mLon=39&slon=06.63&ew=2&dlat2=38&mLat2=08&slat2=57.67&sn=2&dlon2=72&mLon2=54&slon2=47.73&we=1&iselec=1>

³ Natural Hazards; Tsunami. Retrieved from Auckland Regional Council 1st October:
<http://www.arc.govt.nz/council/civil-defence-emergency-management/natural-hazards/tsunami.cfm>

The other risk is of a tsunami generated in the in Hauraki Gulf⁴, we have used the same modelling approach to estimate the time⁴. We have chosen to take a point in the middle of the Hauraki Gulf, and because it is such a small distance, we have assumed the inbuilt Google earth measuring tool will be approximately the correct result. This returns the distance of approximately 69 kilometres. However it is unrealistic that the wave will travel inside the Gulf at 700km/h, so we need to find the speed of a wave in shallow water.

Shallow water wave equation $v = \sqrt{gb}$ (approximately)⁵

$$v = \sqrt{(9.81 \times 45)} = 21.0 \text{ ms}^{-1}$$

$$21.0 \times 3.6 = 75.6$$

When transformed to km/h (above), the result is approximately 75.6 km/h. We then substitute into distance found previously,

$$69 \div 75.6 = 0.91 \text{ hours}$$

This is approximately 55 minutes (2sf.).

The Evacuation Plan

The evacuation plan can involve two stages. Stage one involves all peninsula residents gathering at evacuation point we call DS1 at the junction between State Highway 16 and Te Atatu Road. If necessary a second stage then involves evacuating all residents of the peninsula along State Highway 16 to DS2, a suitable evacuation point north of Massey and west of West Harbour. The only way out of Te Atatu Peninsula was along Highway 16 via the point DS1. If a tsunami of approximate amplitude of ten metres were to occur, the best evacuation point would have to be one that has maximum inland distance, height and sufficient area to contain at least 13000 people whilst taking a minimum time to travel to, this would be DS2.

In the event of a tsunami of approximately 3 metres caused by an earthquake in the Hauraki gulf⁶, then DS1 would be the final evacuation point. We believe that the height of some of the roads in the junction would allow survival of a three metre tsunami. Furthermore this is the closest place that would be safe from the tsunami.

A suitable direction of travel is to the west or north-west of the peninsula, away from Auckland's CBD. A direction of travel northbound along State Highway 16 would lead the evacuees inland and to higher ground in the minimum time. The wide nature of the Highway means that evacuees will be given the most direct route to safety and the nature of the four-lane highway will minimise congestion. This evacuation plan will, however, only work if our assumption is correct that all evacuees from all Auckland districts travel by foot.

Much of the area around the peninsula is suburban, beyond this is farmland. We believe the farmlands just north of Massey would be the closest suitable area that can accommodate 13000 people given that

⁴ Natural Hazards; Tsunami. Retrieved from Auckland Regional Council 1st October:

<http://www.arc.govt.nz/council/civil-defence-emergency-management/natural-hazards/tsunami.cfm>

⁵ The shallow water wave equation and tsunami propagation. Retrieved October 1st from Terry Tao Wordpress:

<http://terrytao.wordpress.com/2011/03/13/the-shallow-water-wave-equation-and-tsunami-propagation/>

⁶ Natural Hazards; Tsunami. Retrieved from Auckland Regional Council 1st October:

<http://www.arc.govt.nz/council/civil-defence-emergency-management/natural-hazards/tsunami.cfm>

Diagram of route from DS1 to DS2:



Due to time constraints we are going to run a detailed model of the evacuation within the Te Atatu peninsula, specifically the part North of State Highway 16. We are then using less accurate predictions on time to evacuate from here.

We are modelling some intersections as nodes, and will associate these nodes with people in the surrounding area. Some roads will be modelled as arcs, connections between nodes which people can traverse at a set rate. The node arc network we use is overall. We will assume that all people follow Auckland City Council instructions to avoid use of personal vehicles, though in reality this is unlikely to occur. We assumed the population density is uniform across the peninsula.

⁷ EVACNET4. Retrieved 1st October: <http://www.ise.ufl.edu/kisko/files/evacnet/>

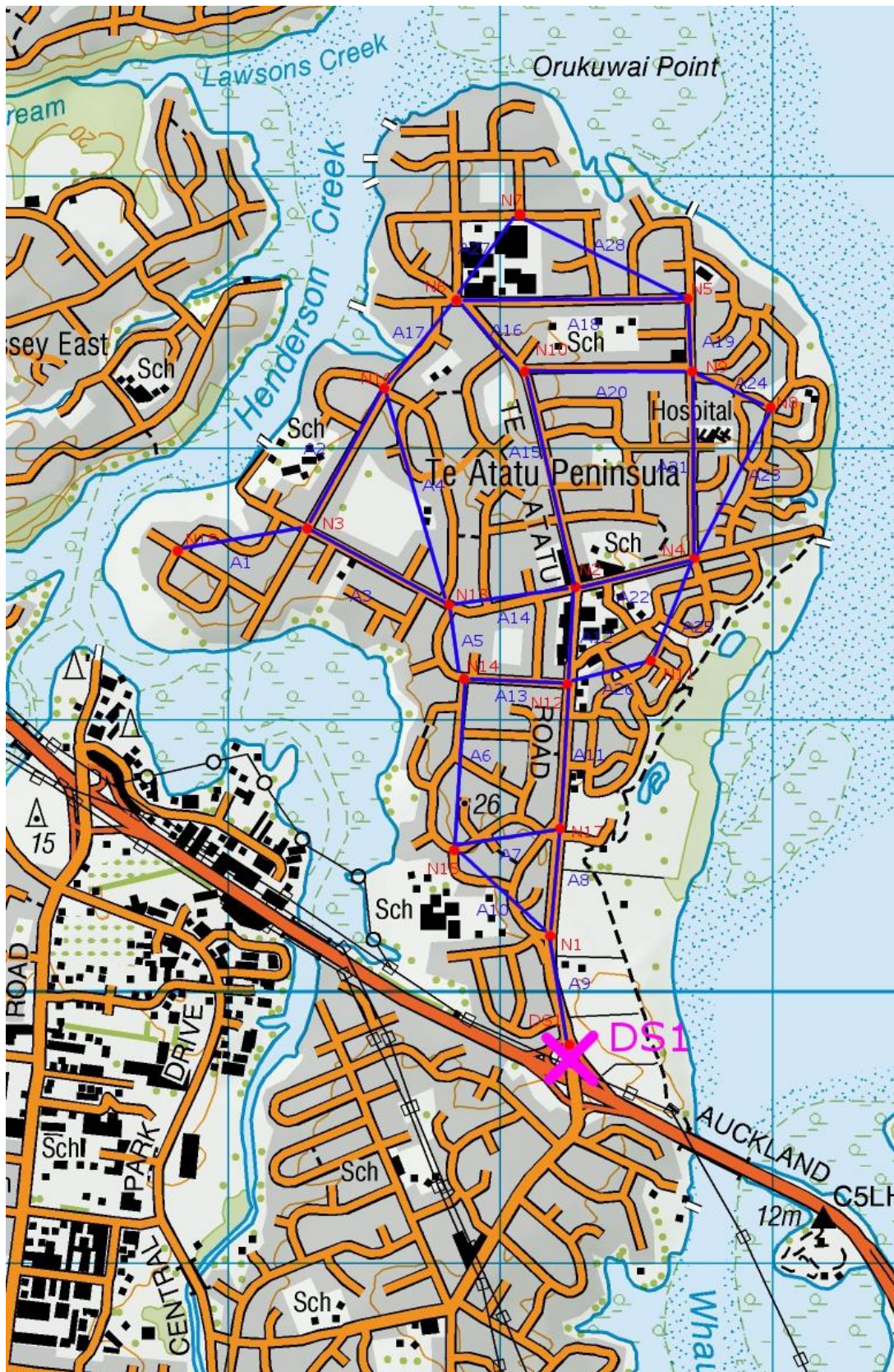
Due to the different population distributions at different times, we will run multiple models:

- Daytime-Weekdays – based on the role data for the schools Rutherford College, Te Atatu intermediate and Peninsula Primary School⁸ we will assume there is 1321 students at Rutherford College, 278 students at Te Atatu Intermediate and 411 students at Peninsula Primary School. We now calculate the percentage of people in employment who will not be present on weekdays is $100 \times \frac{2214000}{3464000} = 64$ percent (2sf.) based on the data at the statistics NZ website⁹. The school role figures give a total of 2010 school students. This gives us an estimate of approximately; $13000 \times 0.36 - 2010 = 2670$ people still present at homes, during a week day, and the 2010 students at schools.
- Daytime-Weekends/after hours on weekday –We will assume all 13000 residents are at home.
- Night-time-We will assume that all 13000 residents are at home, and will reduce mobility speeds, based on darkness. We have doubled the transit time for all arcs at night.

Diagram illustrating Nodes and arcs of the model:

⁸ Search for a New Zealand School. Retrieved from TKI 1st October: <http://www.tki.org.nz/Schools>

⁹ Household Labour Force Survey: June 2011 quarter. Retrieved from Statistics New Zealand 1st October: http://www.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/HouseholdLabourForceSurvey_HOTPJun11qtr.aspx



The code for the simulations on EVACNET4, are included in Appendix I. It is important to note that the simulation treats time as a discrete variable¹⁰, doing calculations in terms of multiple time periods,

¹⁰ EVACNET4. Retrieved 1st October: <http://www.ise.ufl.edu/kisko/files/evacnet/>

we used a time period of 1 minute. For the night evacuation as everyone did not evacuate before the time limit we were able to calculate the time for evacuation by doubling, the times given in the day results (though this decreased accuracy by giving an effective time period of 2 minutes as opposed to 1 minute), and halving the average number of people who evacuated each hour.

How we modelled the number of people who could move along the roads:

We used Google Earth to measure the length of each road connecting nodes in kilometres. There were two types of road, two lane roads which are approximately 7.8m wide, and four lane roads which are approximately 16.6m wide. While in the above diagram arcs do not always trace along roads, we measured the distance of arcs by measuring along the roads that connected the two nodes in the shortest possible distance.

We have modelled each person as taking up a square of 0.5 by 0.5 meters, which is an area of 0.25 square meters. The average person walks at approximately 4.5km/hr.¹¹ Hence if w is the width of a road in metres and l its length in kilometres; the number of people who can be on it at one time is;

$$4w \times 4000l = 16000wl. \text{ The time (in hours) taken for each person to traverse it is } t = \frac{l}{4.5}.$$

This is based on the assumption that everyone obeys the Auckland City Council recommendations of not using personal motor vehicles¹², which is however probably unlikely. Furthermore the evacuation modelling software we used assumes that everyone takes the fastest route to the destination, as opposed to using behavioural modelling, both of these mean that our conclusions are probably overly favourable, giving a less than actual value for the evacuation time.

This gave us the following results:

Arc	Length(km)	2 lane or 4 lane	Approximate width(m)	Time to traverse (min)	Time to traverse (nearest minute)	Capacity (People)
1	0.66	2	7.8	8.8	9	82368
2	0.59	2	7.8	7.866667	8	73632
3	0.58	2	7.8	7.733333	8	72384
4	0.87	2	7.8	11.6	12	108576
5	0.33	2	7.8	4.4	4	41184
6	0.7	2	7.8	9.333333	9	87360
7	0.43	2	7.8	5.733333	6	53664
8	0.36	4	16.6	4.8	5	95616
9	0.4	4	16.6	5.333333	5	106240
10	0.57	2	7.8	7.6	8	71136
11	0.56	4	16.6	7.466667	7	148736
12	0.35	2	7.8	4.666667	5	43680
13	0.39	2	7.8	5.2	5	48672
14	0.49	2	7.8	6.533333	7	61152
15	0.83	2	7.8	11.06667	11	103584

¹¹ Average Human Walking Rate. Retrieved 1st October from:
http://wiki.answers.com/Q/What_is_the_average_human_walking_rate

¹² Natural Hazards; Tsunami. Retrieved from Auckland Regional Council 1st October:
<http://www.arc.govt.nz/council/civil-defence-emergency-management/natural-hazards/tsunami.cfm>

16	0.34	2	7.8	4.533333	5	42432
17	0.47	2	7.8	6.266667	6	58656
18	0.84	2	7.8	11.2	11	104832
19	0.25	2	7.8	3.333333	3	31200
20	0.62	2	7.8	8.266667	8	77376
21	0.71	2	7.8	9.466667	9	88608
22	0.44	2	7.8	5.866667	6	54912
23	0.68	2	7.8	9.066667	9	84864
24	0.32	2	7.8	4.266667	4	39936
25	0.47	2	7.8	6.266667	6	58656
26	0.34	2	7.8	4.533333	5	42432
27	0.37	2	7.8	4.933333	5	46176
28	0.55	2	7.8	7.333333	7	68640

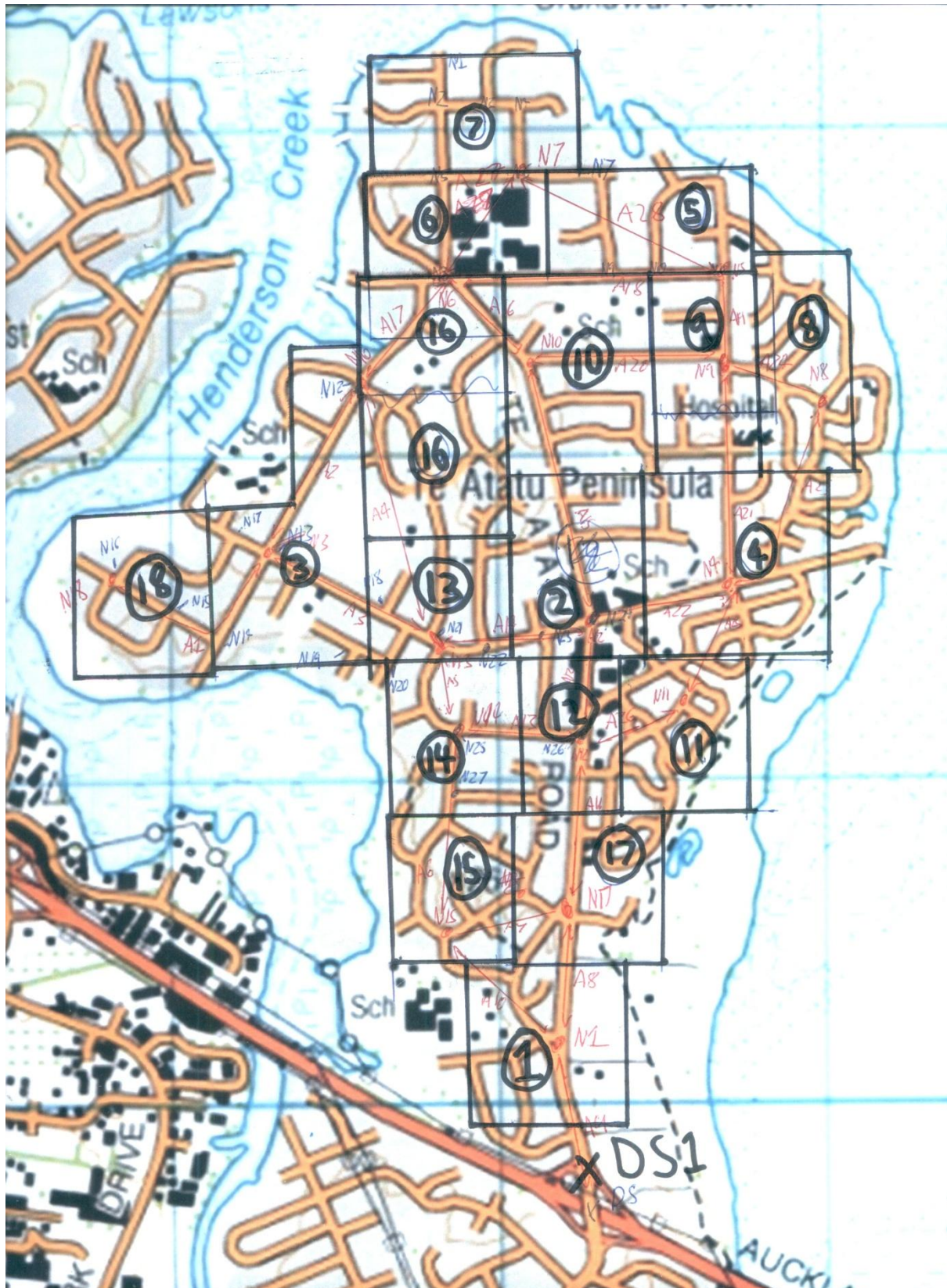
As all road capacities are greater than 13000 (the number of people on the peninsula), we have set the limit at 15000 for all roads, this will allow everyone on the peninsula to move along any one road.. Furthermore as each road is traversable in two directions, for each arc in the table above, we have in fact created two arcs, one in each direction.

Modelling of the number of People at Each Node Initially

We divided map up into areas we associated with each node, and assumed a uniform population density. For daytime we used the process explained in the section of our report “Modelling the Evacuation.” We associated the schools with the following nodes: Rutherford College- Node 1, Te Atatu Intermediate-Node 2, Peninsula Primary School-Node 10. This gives the following table for the number of people at each node:

Node	Number Of people At Node		
	Weekday - Daytime	Weekend - Daytime	Night- time
1	1482	786	786
2	431	747	747
3	221	1074	1074
4	213	1036	1036
5	130	634	634
6	119	578	578
7	137	666	666
8	130	631	631
9	130	634	634
10	595	898	898
11	120	582	582
12	98	475	475
13	106	514	514
14	131	640	640
15	112	546	546
16	233	1136	1136
17	144	703	703

This diagram shows how we divided up the areas to each node:



Results and Conclusion

In the weekend simulation the average time per evacuee our method gave was 33.7 minutes to reach evacuation point DS1. The total time for all people to evacuate to this point was 50 minutes. The average number of evacuees per minute was 260. These results give an estimate that all 13000 residents could be evacuated in about 50 minutes meaning that it is likely that the survival rate would be 100% if a tsunami were to occur similar to the Hauraki Gulf's, and residents were notified within less than 5 minutes. This time frame is the estimated minimum time for evacuation. If the evacuation is 100% successful for this timeframe then the success rate will be 100% for larger tsunamis occurring on other offshore fault lines such as Chile. Therefore the estimated total evacuation time to safety point DS1 for a small tsunami similar to the Hauraki Gulf tsunami would be approximately 50 minutes. For a large tsunami of amplitude 10m that could occur with an epicentre near Chile, which requires the higher safety point DS2, the estimated time for evacuation is 2 hours 20 minutes, well under the time it takes for a tsunami of that amplitude to reach New Zealand. Our results show that it is likely that all 13000 residents of the Peninsula would be evacuated if a tsunami were to occur.

Due to the assumed slow transit speeds at night time the time for all residents of Te Atatu Peninsula to be evacuated is greater than that during the day. Our method shows that it would take 1 hour 40 minutes for all 13000 residents to be evacuated to safety point DS1 with the average person taking 67.4 minutes to reach it. This means that the survival rate is likely to be much less during night time. The average number of evacuees per minute is 130 people (half the rate of successful evacuees as in the weekend as there is assumed to be the same number of people who take twice as long to evacuate). The estimated total number of survivors from the peninsula is 7150 (130 people per minute for 55 minutes) out of 13000 for the Hauraki Gulf type tsunami. This is the worst case scenario. However if a larger amplitude tsunami came from further offshore then it is likely that all residents from the peninsula would survive with a total maximum time to reach safety being 4 hours 40 minutes. Whether or not it would still take twice as long to travel from DS1 to DS2 is irrelevant as this time is well within the time it takes for a large tsunami to travel from Chile, which was calculated earlier.

In the weekday scenario where a tsunami event occurs, the approximate time that our method gave for the whole population of the island to evacuate is 50 minutes. The time taken for a single average person to evacuate is 26.3 minutes, and we get an approximate 93.6 people escaping to safety every minute. In total 4680 people escape in the time frame and everybody present on the peninsula survives, whether the tsunami is due to an earthquake in the Hauraki Gulf or whether it occurred near Chile. In the Latter Case it would take a total of approximately 2 hours 20 to reach the safe point we termed DS2.

In the case that a large earthquake causes a tsunami with epicenter Chile, the total 2 hour 20 minute time period it takes to reach safety (location DS2) is much smaller than the 13.1 hours it will take for the wave to hit the Te Atuta peninsula. When we compare this to an earthquake hitting the Hauraki Gulf, we have calculated previously that the residents have 54 minutes to escape to safety. Since our model shows that they can escape within approximately 50 minutes, only if the warning system¹³ is activated in less than 5 minutes will all residents be able to evacuate before the tsunami.

Evaluation Of Model

¹³ Natural Hazards; Tsunami. Retrieved from Auckland Regional Council 1st October:
<http://www.arc.govt.nz/council/civil-defence-emergency-management/natural-hazards/tsunami.cfm>

We assumed that everyone would be able to walk at an approximately equal pace. We believe that this is a sufficiently accurate assumption, however as some people will not be able to walk at this pace, it is likely that more elderly, and less fit people may not in fact be able to evacuate. This is especially true in the case of the St. Margaret's Hospital, a 50 bed rest home, which also includes a dementia care unit. Our model does not take into account these people, It is probable that in the case of a 13 hour warning emergency services could evacuate such people, however it is very likely that evacuation could not occur in the case of only a one hour warning, especially in the night-time simulation.

We assumed that people would follow the Auckland City Council directives to refrain from the use of motor vehicles. This is unlikely due to the panic that would occur at a tsunami warning. However it is possible that with more public awareness of such directives and the reasons behind them, that this could be attained. However at the moment, it is likely that people would use motor vehicles and this would result in the capacity of each street, with regards to how many people could walk down it to be dramatically reduced. However footpaths could still be used, and the margins present with regards to how many people can walk down each street are large enough that this would probably not make too much of a difference to the people walking. However it is likely that people driving would meet congestion, resulting in a slower evacuation.

The EvacNet4 program assumes that all people take an optimal route to DS1, in reality this is unlikely. However due to the geography of the peninsula, it is likely that most people would walk in approximately the right direction. Hence it is probable that this would not have too large an effect on the time taken to evacuate. However at the schools, particularly primary schools, unless teachers organise students effectively, it is possible that students would not take an optimal evacuation route, if they evacuated at all.

The EvacNet4 program does not use any behavioural modelling. In reality it is likely that people would be trying to find friends and family. This would increase the length of time that the evacuation took. Ideally if a longer time period for this study was available, we would run a simulation program that took human behaviour into account.

We used a simplified network of Nodes and Arcs to model the street network. Furthermore we modelled people in the surrounding area as being exactly at the node. Both of these are simplifications of the real situation. We are not aware of the precise affect that these simplifications would have on the predictions given by the model. Ideally, models of different accuracies could be tested to see what the precise effect this has is. Due to Braess' paradox¹⁴ we cannot assume that additional roads will result in a faster evacuation time.

The assumption that all movements at night time would take twice as long was a somewhat arbitrary assumption. While a night-time evacuation would take longer, given more time it would be best to approximate how large this effect is by using data gathered from the effect it has made in real life evacuations. Hence the conclusions for night-time evacuation are less reliable than the others.

Furthermore thought time is a continuous variable, it was treated as a discrete variable, using time periods of one minute, and time periods of two minutes for the night-time simulation. This makes the night-time evacuation value less reliable, and it is not definite what effect it has on the overall results, though the effect should not be too major.

¹⁴ Braess's Paradox. Recovered from Wikipedia on 1st October:
http://www.en.wikipedia.org/wiki/Braess's_paradox

Bibliography

1960 Valdivia Earthquake. Retrieved October 1st from Wikipedia:
http://en.wikipedia.org/wiki/1960_Valdivia_earthquake

Find Distance and Azimuths Between 2 Sets of Coordinates. Retrieved October 1st from:
<http://transition.fcc.gov/fcc-bin/distance?dlat=36&mlat=50&slat=27.54&ns=2&dlon=174&m lon=39&slon=06.63&ew=2&dlat2=38&m lat2=08&slat2=57.67&sn=2&dlon2=72&m lon2=54&slon2=47.73&we=1&iselec=1>

Natural Hazards; Tsunami. Retrieved from Auckland Regional Council 1st October:
<http://www.arc.govt.nz/council/civil-defence-emergency-management/natural-hazards/tsunami.cfm>

The shallow water wave equation and tsunami propagation. Retrieved October 1st from Terry Tao Wordpress: <http://terrytao.wordpress.com/2011/03/13/the-shallow-water-wave-equation-and-tsunami-propagation/>

EVACNET4. Retrieved 1st October: <http://www.ise.ufl.edu/kisko/files/evacnet/>

Search for a New Zealand School. Retrieved from TKI 1st October: <http://www.tki.org.nz/Schools>

Household Labour Force Survey: June 2011 quarter. Retrieved from Statistics New Zealand 1st October: http://www.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/HouseholdLabourForceSurvey_HOTPJun11qtr.aspx

Average Human Walking Rate. Retrieved 1st October from:
http://wiki.answers.com/Q/What_is_the_average_human_walking_rate

Braess's Paradox. Recovered from Wikipedia on 1st October:
http://www.en.wikipedia.org/wiki/Braess's_paradox

Appendix I

Note that the code has been arranged into columns, for this code to work there must be no additional spaces, and no line breaks. The code would have to be put in the format specified in the Evacnet4 release notes, found in the "READ" section. Simulation code:

Weekday Simulation:

SYS	WP8.1,15000,130
1	WP9.1,15000,130
480	WP10.1,15000,595
3	WP11.1,15000,120
60	WP12.1,15000,98
5	WP13.1,15000,106
TE_ATATU_EVACUATION	WP14.1,15000,131
END	WP15.1,15000,112
EN	WP16.1,15000,233
WP1.1,15000,1482	WP17.1,15000,144
WP2.1,15000,431	WP18.1,15000,148
WP3.1,15000,221	DS1.1
WP4.1,15000,213	END
WP5.1,15000,130	EA
WP6.1,15000,119	WP1.1-WP17.1,15000,5
WP7.1,15000,137	WP1.1-WP15.1,15000,8

Team Code: 1014

WP1.1-DS1.1,15000,5
WP2.1-WP4.1,15000,6
WP2.1-WP12.1,15000,5
WP2.1-WP13.1,15000,7
WP2.1-WP10.1,15000,11
WP3.1-WP16.1,15000,8
WP3.1-WP13.1,15000,8
WP3.1-WP18.1,15000,9
WP4.1-WP2.1,15000,6
WP4.1-WP11.1,15000,6
WP4.1-WP8.1,15000,9
WP4.1-WP9.1,15000,9
WP5.1-WP9.1,15000,3
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WP5.1-WP7.1,15000,7
WP6.1-WP5.1,15000,11
WP6.1-WP16.1,15000,6
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WP7.1-WP5.1,15000,7
WP8.1-WP4.1,15000,9
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WP9.1-WP4.1,15000,9
WP9.1-WP10.1,15000,8

WP10.1-WP9.1,15000,8
WP10.1-WP2.1,15000,11
WP10.1-WP6.1,15000,5
WP11.1-WP4.1,15000,6
WP11.1-WP12.1,15000,5
WP12.1-WP11.1,15000,5
WP12.1-WP2.1,15000,5
WP12.1-WP14.1,15000,5
WP13.1-WP2.1,15000,7
WP13.1-WP14.1,15000,4
WP13.1-WP16.1,15000,12
WP13.1-WP3.1,15000,8
WP14.1-WP13.1,15000,4
WP14.1-WP12.1,15000,5
WP14.1-WP15.1,15000,9
WP15.1-WP1.1,15000,8
WP15.1-WP14.1,15000,9
WP15.1-WP17.1,15000,6
WP16.1-WP3.1,15000,8
WP16.1-WP13.1,15000,12
WP16.1-6.1,15000,6
WP17.1-WP12.1,15000,7
WP17.1-WP15.1,15000,6
WP17.1-WP1.1,15000,5
WP18.1-WP3.1,15000,9
END

Weekend Simulation:

SYS
1
480
3
60
5
TE_ATATU_EVACUATION
END
EN
WP1.1,15000,786
WP2.1,15000,747
WP3.1,15000,1074
WP4.1,15000,1036
WP5.1,15000,634
WP6.1,15000,578
WP7.1,15000,666
WP8.1,15000,631
WP9.1,15000,634
WP10.1,15000,898
WP11.1,15000,582
WP12.1,15000,475
WP13.1,15000,514
WP14.1,15000,640
WP15.1,15000,546
WP16.1,15000,1136
WP17.1,15000,703
WP18.1,15000,720
DS1.1
END
EA

WP1.1-WP17.1,15000,5
WP1.1-WP15.1,15000,8
WP1.1-DS1.1,15000,5
WP2.1-WP4.1,15000,6
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WP2.1-WP13.1,15000,7
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WP5.1-WP9.1,15000,3
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WP8.1-WP4.1,15000,9
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WP11.1-WP12.1,15000,5
WP12.1-WP11.1,15000,5
WP12.1-WP2.1,15000,5
WP12.1-WP14.1,15000,5
WP13.1-WP2.1,15000,7
WP13.1-WP14.1,15000,4
WP13.1-WP16.1,15000,12
WP13.1-WP3.1,15000,8
WP14.1-WP13.1,15000,4
WP14.1-WP12.1,15000,5

WP14.1-WP15.1,15000,9
WP15.1-WP1.1,15000,8
WP15.1-WP14.1,15000,9
WP15.1-WP17.1,15000,6
WP16.1-WP3.1,15000,8
WP16.1-WP13.1,15000,12
WP16.1-6.1,15000,6
WP17.1-WP12.1,15000,7
WP17.1-WP15.1,15000,6
WP17.1-WP1.1,15000,5
WP18.1-WP3.1,15000,9
END

Night-Time Simulation:

SYS
1
480
3
60
5
TE_ATATU_EVACUATION
END
EN
WP1.1,15000,786
WP2.1,15000,747
WP3.1,15000,1074
WP4.1,15000,1036
WP5.1,15000,634
WP6.1,15000,578
WP7.1,15000,666
WP8.1,15000,631
WP9.1,15000,634
WP10.1,15000,898
WP11.1,15000,582
WP12.1,15000,475
WP13.1,15000,514
WP14.1,15000,640
WP15.1,15000,546
WP16.1,15000,1136
WP17.1,15000,703
WP18.1,15000,720
DS1.1
END
EA
WP1.1-WP17.1,15000,10
WP1.1-WP15.1,15000,16
WP1.1-DS1.1,15000,10
WP2.1-WP4.1,15000,12
WP2.1-WP12.1,15000,10
WP2.1-WP13.1,15000,14
WP2.1-WP10.1,15000,22
WP3.1-WP16.1,15000,16
WP3.1-WP13.1,15000,16
WP3.1-WP18.1,15000,18
WP4.1-WP2.1,15000,12
WP4.1-WP11.1,15000,12
WP4.1-WP8.1,15000,18
WP4.1-WP9.1,15000,18

WP5.1-WP9.1,15000,6
WP5.1-WP6.1,15000,22
WP5.1-WP7.1,15000,14
WP6.1-WP5.1,15000,22
WP6.1-WP16.1,15000,12
WP6.1-WP10.1,15000,10
WP6.1-WP7.1,15000,10
WP7.1-WP6.1,15000,10
WP7.1-WP5.1,15000,14
WP8.1-WP4.1,15000,18
WP8.1-WP9.1,15000,8
WP9.1-WP8.1,15000,8
WP9.1-WP4.1,15000,18
WP9.1-WP10.1,15000,16
WP10.1-WP9.1,15000,16
WP10.1-WP2.1,15000,22
WP10.1-WP6.1,15000,10
WP11.1-WP4.1,15000,12
WP11.1-WP12.1,15000,10
WP12.1-WP11.1,15000,10
WP12.1-WP2.1,15000,10
WP12.1-WP14.1,15000,10
WP13.1-WP2.1,15000,14
WP13.1-WP14.1,15000,8
WP13.1-WP16.1,15000,24
WP13.1-WP3.1,15000,16
WP14.1-WP13.1,15000,8
WP14.1-WP12.1,15000,10
WP14.1-WP15.1,15000,18
WP15.1-WP1.1,15000,16
WP15.1-WP14.1,15000,18
WP15.1-WP17.1,15000,12
WP16.1-WP3.1,15000,16
WP16.1-WP13.1,15000,24
WP16.1-6.1,15000,12
WP17.1-WP12.1,15000,14
WP17.1-WP15.1,15000,12
WP17.1-WP1.1,15000,10
WP18.1-WP3.1,15000,18
END