

Desirable Housing Location Analysis

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Introduction:

Last spring, my Dad and his family moved to Prince George after a series of unfortunate events caused them to leave their home in Burns Lake. Because of the unintended nature of this move, they were forced to take the first accommodations that would be suitable for the time being as or risk being homeless.

One year later, my family has decided to settle here permanently in Prince George and is now looking for a new home to buy. They have started to feel home here in Prince George as it provides a lot of opportunities for the family, but still has a “small town” feel that they have grown accustomed to. This is a very busy family of 3 who all want different amenities located in their neighborhood and therefore, are finding it challenging to settle on a location of where to buy a house.

This family consists of three members, including my dad Daniel¹, a stay-at-home dad, stepmother Victoria, who is a Public Health Nurse, and 13-year-old stepbrother Kevin, who is in French Immersion School and therefore will be attending Duchess Park Secondary School in September. In addition, my family also has a home share agreement with the provincial government, which allows for a young man with mental and developmental disabilities to live with them. There are also 3 dogs and 2 cats in the mix as well. Because of the variety of people and animals, finding a home that satisfies the needs of everyone can be quite challenging. One day while discussing this dilemma with my Dad, I proposed that I use my amazing GIS skills to analyze which area would be the most appropriate for him and his family to settle. Through a series of interviews, I devised a list of criteria to analyze using ArcMap and hopefully come up with an appropriate response.

Problem Statement:

The problem statement I used for this analysis was “What area of the City of Prince George would be the most desirable for my Dad and his family to buy a house”

Study Area:

The study area for the purposes of this analysis is the City of Prince George. One of the criteria for the analysis was to be connected to city services, which eliminated any of the rural areas adjacent to the city boundary.

¹ Names have been changed for this report

Data Sources:

Through the Ninkasi Server, I required all the information needed including

City_of_pg geodatabase (ENPL 303 lab folder)

- *Ct_zoning_7850*
- *CityBoundary*
- *Parcel*
- *Schools*
- *Park*

PGcity folder (Geog 413 lab folder)

- *Streets*
- *Pg_dem25*
- *Neighbourhood*
- *Major rivers*

Criteria, Analysis and Methodology:

The criteria for this analysis were derived from conversation between me and my Dad, Stepmom and Stepbrother. While all of them all had similar desires when finding a new house to live, each want was slightly different than the next, which makes it challenging to come to a consensus. Similar criteria for the family are as follows:

The criterion for each analysis is outlined in the following section.

- *Close to the Northern Health Public Health Unit:*
- *Close to AimHi-Prince George Association for Community Living*
- *Close to Duchess Park Secondary School*
- *Walking Distance to Bus Stops that Travel the 15, 16, 1 and 11 routes (for easy access to the Sports Centre, Northern Health and Aimhi)*
- *Close to major shopping centres*
- *Walking distance to off leash dog facilities.*
- *Located in certain neighborhoods (urban rather than rural)*

Well each family member has desired these criteria as important, each one put different weight on the criteria. This will be further explained in the procedure portion.

To solve this statement problem, raster analysis was used in achieving the results. Raster was chosen over vector analysis, as it is more efficient in spatial analysis. To be able to satisfy the requirements that each member of the family has, separate analysis was conducted and then combined into one final output.

Before any analysis was completed, the data first needed to be checked to ensure that all necessary information was available. As most of the data had come from the Ninkasi labs folder, it was a matter of ensuring that it was current.

The first task was to create specific point locations for AimHi and the Northern Health unit. This was achieved by adding the cadastral data set into ArcMap and using editor to create a point based on the address into an empty shapefile.

Next, the attributes for the other datasets were examined to ensure that all information was up to date and present. As the parks dataset did not contain any information on Off Leash dog areas in Prince George, a new field was added into the attribute table about the present locations of off leash dog parks in the city. The Duchess Community Park was also added into the data set as it had been built since the time the data was created. In the schools dataset, the current location for Duchess Park Secondary School was incorrect as the school was rebuilt three years ago on an adjacent lot as the old site had turned into a park.

Once the data was assembled and updated, certain data was selected from datasets as not all spatial information was required. This included selecting the C2 (Regional Commercial) and Z8 (Regional Shopping) as these zones contain the large grocery shopping centre’s in Prince George, all parks that allow dogs off leash, Duchess Park Secondary School and all bus stops along the 15, 16, 11, and 1 routes. This data was selected as it was deemed the most desirable qualities in choosing a neighborhood to live in.

Euclidean distance surfaces were created based on the selected data above as well as for AimHi and Northern Health. Once the surfaces were created, they were then classified based on the desire of each household member. Table 1 shows the classification for each individual:

	Daniel	Victoria	Kevin²
Northern Health	1000	500	N/A
	1500	1000	N/A
	2000	1500	N/A
	2500	2000	N/A
	3000	2500	N/A
Duchess Park	1000	500	400
	1500	700	600
	2000	1000	800
	2500	1200	1000
	3000	1500	1200
Bus Stops	400	400	N/A
	600	600	N/A
	800	800	N/A
	1000	1000	N/A
	1200	1200	N/A
Shopping Centre	1000	N/A	400
	1500	N/A	600
	2000	N/A	800
	2500	N/A	1000
	3000	N/A	1200

² Not all family members required classification for each attribute

Off Leash Parks	500	N/A	N/A
	700	N/A	N/A
	1000	N/A	N/A
	1200	N/A	N/A
	1500	N/A	N/A

Once the data was symbolized for each household member, the reclassify tool was used to assign values of 1-5 to each attribute. A value of 5 was assigned to the lowest values, as this was the most ideal distance for the respective household member with values decreasing to 1 as the distances increased. Once each distance raster was reclassified, they were then combined using the raster calculator tool. This was completed three times for each family member, as each member put different importance on different attributes. Figures 1-3 shows the results for each household member. The following expressions were used in raster calculator:

*Daniel: Aimhi * .15 + Northernhealth * .2 + Bus * .3 + Duchesspark * .1 + Shopping * .2 + Parks **

*Victoria: Aimhi *.05 + Nothernhealth *.5 + Duchesspark *.35 + Bus * .1*

*Kevin: School * .5 + Shopping * .5*

Figure 1: Combined results for Daniel

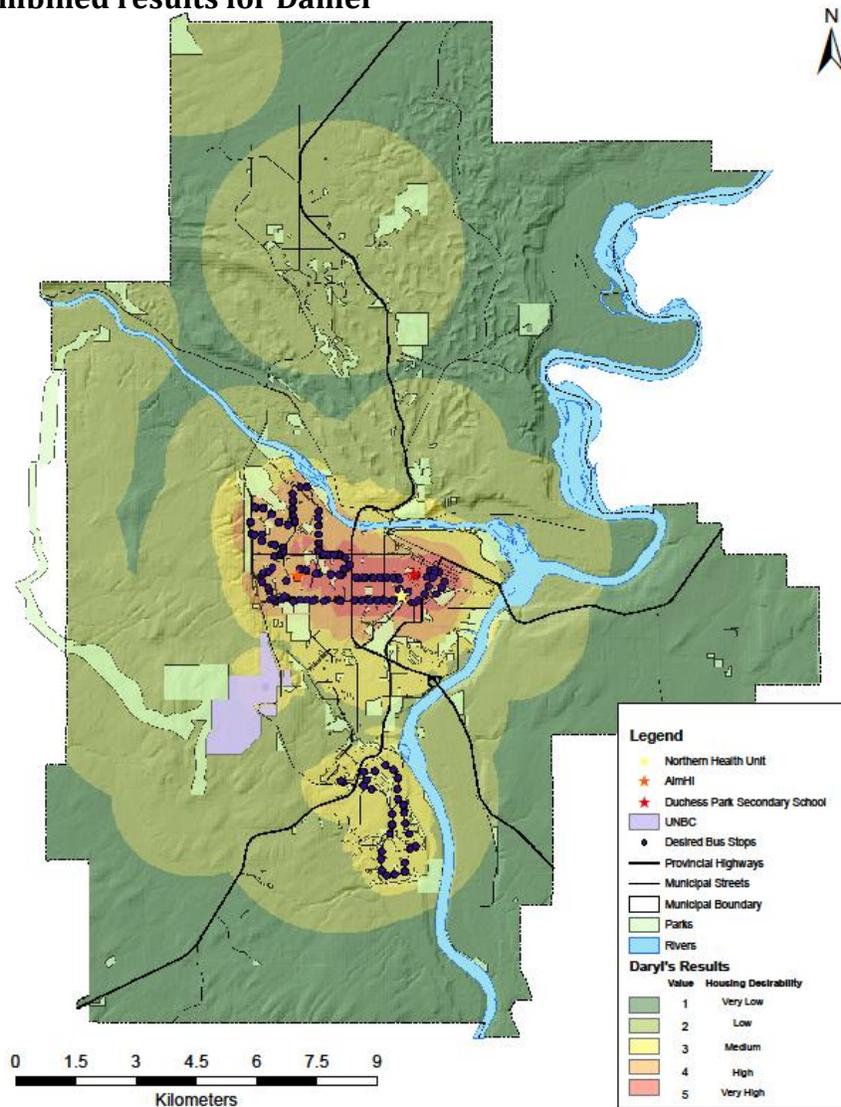


Figure 2: Combined results for Victoria

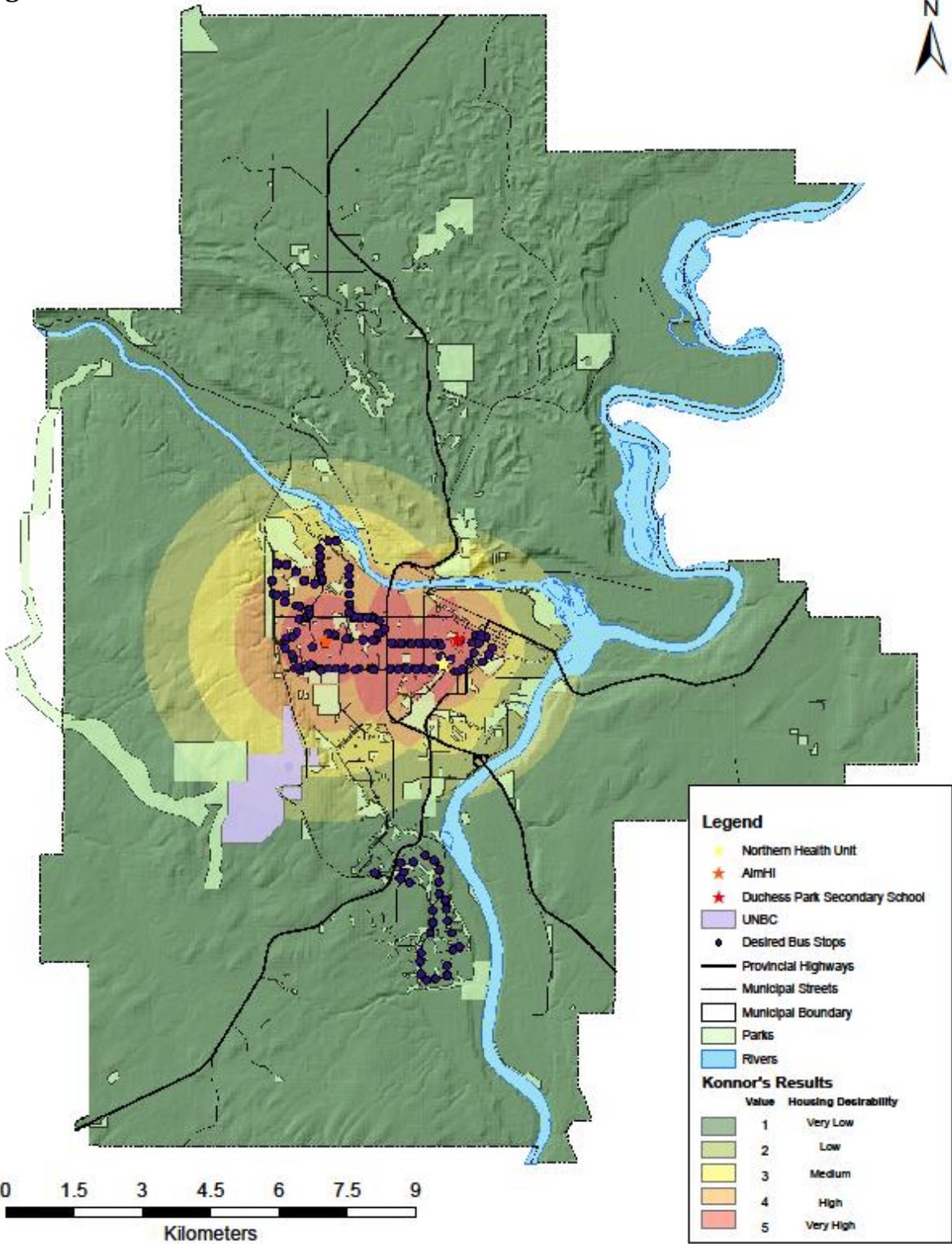
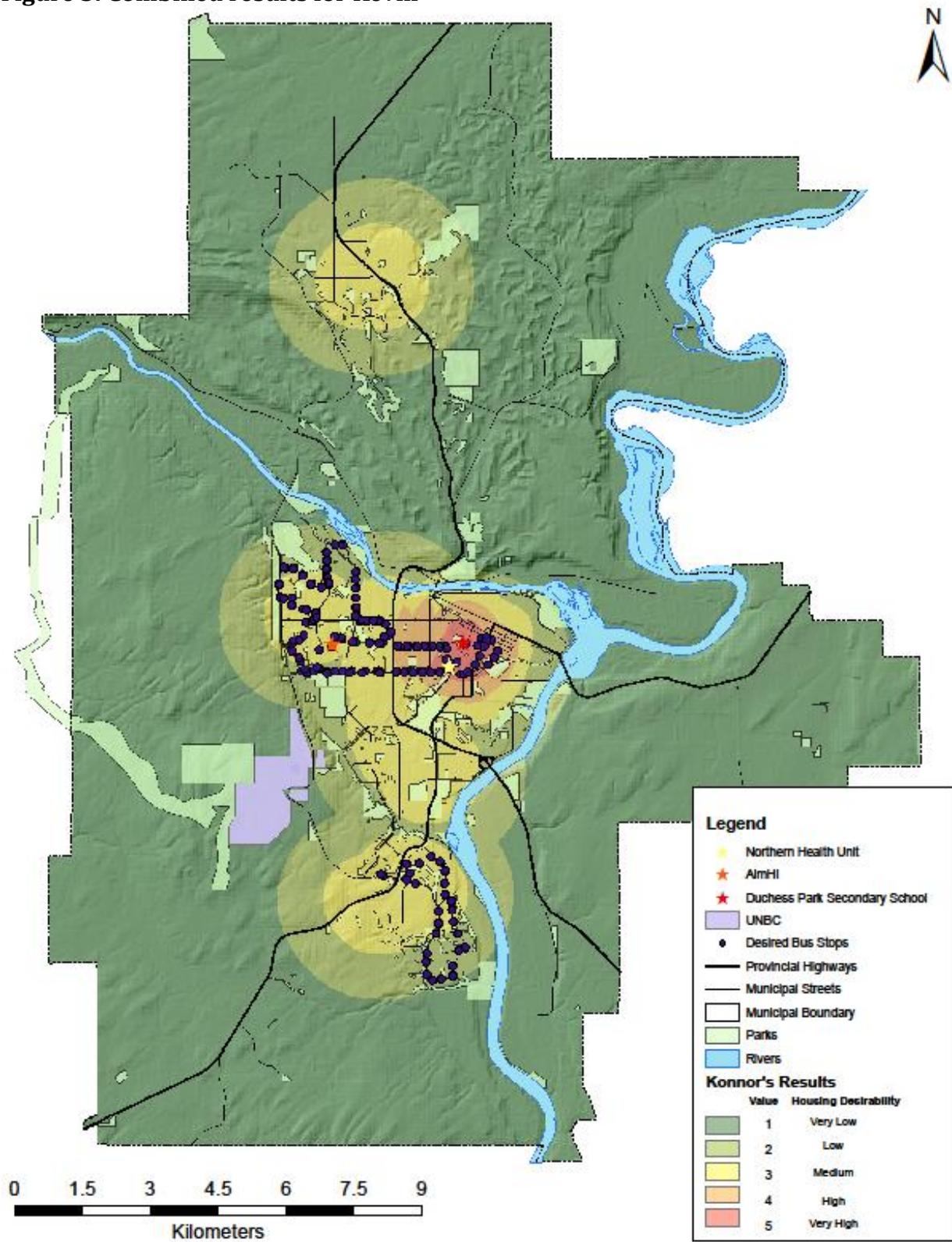
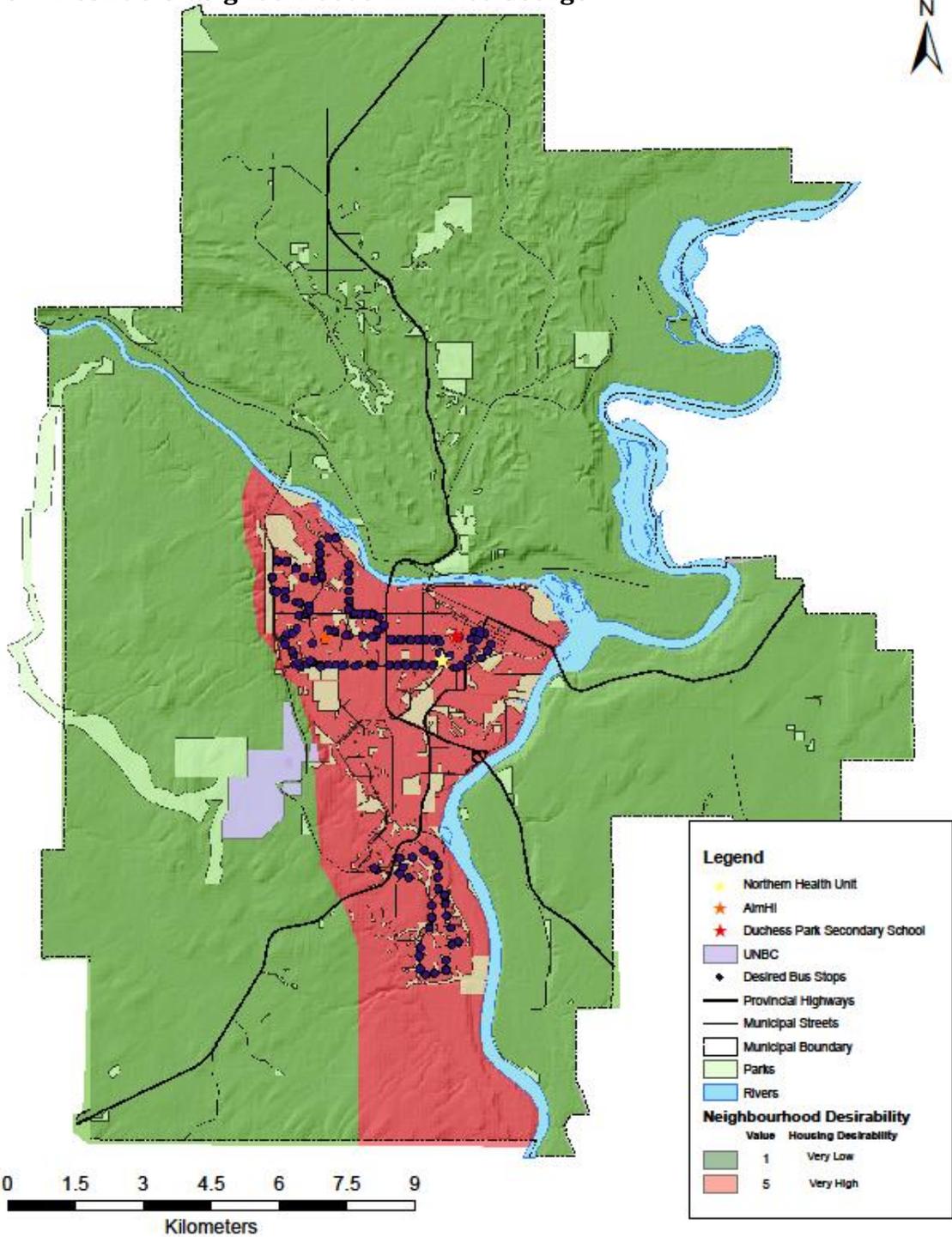


Figure 3: Combined results for Kevin



Finally, the family has collectively expressed that they wish to remain in the urban area of Prince George and as close to downtown as possible. To account for this wish, the neighborhood shapefile was converted to raster format and reclassified with highly desirable neighbourhoods given a value of 5 and non-desirable neighbourhoods given a value of 1. Figure 4 shows the results of this analysis.

Figure 4: Desirable Neighborhoods in Prince George



To find the ideal location for housing, each combined raster for each household member was combined, along with the desirable neighbourhood analysis. After discussion with the adult members of the household, it was determined that Daniels and Victoria's rasters would be assigned values of 22.5% with Kevin's being assigned 5%. The neighborhood raster was assigned a value of 50% as this is the number one factor of searching for a new home.

Results and Limitations:

The final raster was reclassified 1-5 to show areas of high desirability to purchase a home. The areas of highest desirability are symbolized in red and are located mostly between downtown and Foothill Boulevard. The areas of least desirability are located in the rural areas and in the Hart. Figure 5 shows the final combined raster.

In the future, some more analysis should be conducted, pending on data collected. Some data that could be useful in the future is crime rates in certain areas of the city, as the family would prefer to move an area of low crime. Street connectivity and walkability could also be further explored as well. As this family is a single car family, much of their commuting is completed by bike or walking. Areas of high walkability could be analyzed and then added to the raster format. However, the concepts of what is "walkable" would need to be explored and could possibly manifest into whole other analysis.

Figure 5: Combined results for Each Household Member Resulting in Desired Housing Location

