

## **Official Community Plan Amendment Bylaw No. 3634, 2025**

## **Zoning Bylaw Amendment Bylaw No. 3635, 2025**

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For additional information contact Ken Bourdeau, Senior Planner at [kbourdeau@nelson.ca](mailto:kbourdeau@nelson.ca) or 250-352-8202.

# PUBLIC HEARING

## THE CORPORATION OF THE CITY OF NELSON

### DEVELOPMENT APPLICATION

TAKE NOTICE that the Corporation of the City of Nelson proposes to amend the Official Community Plan Bylaw No. 3247, 2013 and Zoning Bylaw No. 3199, 2013.

#### What is proposed and where?

The proposal includes:

- an amendment to the Official Community Plan (OCP) land use designation for the subject site from Institutional to Mixed Use Core; and
- an amendment to the Zoning for the subject site from 'I-1 – Institutional' to 'CD-10 – Residential and Recreation Use'.

**The purpose of this application is to allow a 50-unit Multi-Unit Residential Building and a potential addition to the Nelson and District Community Complex (NDCC).**

This **subject site is 818 to 824 Front St and a portion of 305 Hall St**, legally described as:

LOT 8 to 12, BLOCK 59, DISTRICT LOT 95, KOOTENAY DISTRICT PLAN 9500 EXCEPT PARCEL A (SEE 27225I); and a portion of LOT B, DISTRICT LOT 95 KOOTENAY DISTRICT PLAN NEP83303. PID: 007-487-240, 012-487-231, 013-691-341, 013-691-198, 013-691-171, 027-011-151.



#### Do you have something to say?

City Council will hold a Public Hearing for the proposed amendments on:

**Monday, June 23, 2025 at 5:00 pm**  
**City Hall, Council Chambers, Second Floor**  
**310 Ward Street, Nelson, BC**

at which time and place all persons who deem their interest in property affected by the amending bylaws may be heard on matters contained therein. Written submissions for or against the proposed amendments can be read or verbal submissions made at the Public Hearing.

**Unable to  
attend?**

If you are unable to attend the Public Hearing, please submit your comments in writing to the Development Services and Climate Leadership Department prior to 4:30 pm on Friday, June 20, 2025. All written submissions must include your name and civic address and are public information pursuant to the *Freedom of Information and Protection of Privacy Act*.

Submissions may be delivered by:

mail or by hand to: City of Nelson, 101 - 310 Ward Street, Nelson, BC V1L 5S4,

by email to: [development@nelson.ca](mailto:development@nelson.ca)

The amending bylaws No. 3634, and No. 3635 are available for review on the City of Nelson website at: [www.nelson.ca/publicnotices](http://www.nelson.ca/publicnotices)

The amending bylaws may also be reviewed at the front counter of Development Services & Climate Leadership at:

City Hall, Second Floor, 310 Ward Street, Nelson, BC

From 8:30 am to 4:30 pm, Monday to Friday inclusive with the exception of Statutory Holidays, from the date of this notice until June 23, 2025.

**Need more  
information?**

**Questions of clarification regarding the amending bylaws should be directed to Development Services staff prior to the public hearing: [kbourdeau@nelson.ca](mailto:kbourdeau@nelson.ca) or 250-352-8202.**

Ken Bourdeau, Senior Planner

Development Services and Climate Leadership

*City of*  
**NELSON**

# THE CORPORATION OF THE CITY OF NELSON

## REQUEST FOR DECISION

**DATE:** June 3, 2025

**TOPIC:** Official Community Plan amendment, Zoning Bylaw  
Amendment and for 818-824 Front Street and a portion of 305  
Hall Street

**PROPOSAL:** To allow "A mixed-use building that includes 50 Multi-Unit  
Residential units and a potential addition to the Nelson and District  
Community Complex (NDCC)"

**PROPOSED BY:** Staff

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### ANALYSIS SUMMARY:

On behalf of Nelson CARES Society (NCARES), M'akola Development Services has submitted a development application for 818 to 824 Front Street, and a portion of 305 Hall Street, which includes an amendment to the Official Community Plan (OCP) Bylaw and Zoning Bylaw. Council is requested to pass 1<sup>st</sup> and 2<sup>nd</sup> reading of Official Community Plan Amendment Bylaw No. 3634, 2025 and Zoning Amendment Bylaw No. 3635, 2025 and direct Staff to schedule a Public Hearing.

### BACKGROUND:

The development application includes:

- an Official Community Plan (OCP) amendment to change the OCP land use designation of the subject site from "Institutional" to "Mixed-Use Core"; and
- a Zoning Bylaw amendment to rezone the subject site from 'I-1 Institutional Zone' to 'CD-10 Residential and Recreation Use' Zone, as shown in Attachment 4.

Project Overview: The applicant is proposing a 6-storey building that includes 50 Multi-Unit Residential units and may also include potential recreation space that will connect to, and expand the neighbouring Nelson and District Community Complex (NDCC). The proposal includes land owned by the City and a portion of the NDCC property owned by the Regional District of Central Kootenay (RDCK). Conceptual drawings showing what the proposed development could look like are shown in Attachment 3.

Context: The subject property is located Downtown. The surrounding neighbourhood includes a variety of land uses, including:

- NDCC - Recreation Campus to the south-east and south-west;
- commercial development to the north-west and north-east; and
- a variety of different residential development to the east.

There are also a wide range of services within close proximity to the site, including:

- shops and services provided in the downtown core;
- two bus stops both served by the Route 2 – Fairview, Route 10 - Balfour, Route 4 - Nelson Airport and Route 76 - Kaslo;
- Chahko Mika Shopping Centre; and
- Gyro Park.

The analysis includes a review of:

- OCP;
- Housing Needs Assessment; and
- Other documents, including:
  - Overview of RDCK Recreation Campus Planning;



- Phase 1 – Environmental Site Assessment;
- Transportation Assessment and Management Study (TAMS);
- Public Engagement Summary, Analysis and Response.

Greater Nelson Economic Development (GNED) partnership: In early 2024, the GNED approached the City regarding the shortage of rental housing and its economic impact on the community. Both GNED and businesses have reported consistent challenges with recruitment and retention of new employees, largely due to housing availability and affordability. According to residents and service providers, many young families are choosing to live outside of City limits, commuting for services and employment because the cost of housing is cheaper in neighbouring communities.

To address this, GNED requested the City collaborate with local non-profit housing providers on applications to BC Housing's Community Housing Fund (CHF) which provides capital funding for new affordable housing construction.

Regional District of Central Kootenays (RDCK) Recreation Campus Planning: In 2014, the Nelson and District Recreation Commission approved the Nelson and District Parks and Recreation Masterplan, which continues to guide decision-making for the NDCC. A map showing the area covered by the Master Plan is shown in Attachment 5. The Masterplan explored various recreation facility concepts for the land and existing facilities adjacent to the complex, including the subject site. Concepts for the subject site included potential future gym, basketball court, racquet courts, banquet hall, parking, child care, offices, and other amenities. Though the Masterplan does not arrive at a specific direction for the campus it does provide an understanding that the subject site is the only possible location for the future expansion of the existing NDCC. In 2024, the RDCK and City of Nelson began working together on public engagement to gather the community's input on the best recreational uses for the Community Recreation Campus considering its current facilities and any future ones. Ultimately, this engagement project will provide information to be used in the development of a shared vision for the Community Recreation Campus. It's important to note that the plan has no effect on land use planning decisions, as the City of Nelson is the land use authority for the campus.

Potential expansion of the NDCC: The proposal includes the potential expansion of the NDCC, which is owned and operated by the RDCK. Any decision to expand the facility will be made by the RDCK's Board of Directors, based on a recommendation from the Nelson & District Recreation Commission No. 5. The RDCK is currently assessing funding options for a potential future expansion. The proposed OCP amendment and rezoning would allow for Multi-Unit Residential and Institutional uses on the subject site, ensuring it can accommodate any future decision by the RDCK Board.

OCP Analysis: The current OCP land use designation is 'Institutional'. The applicant requests to change the land use designation to 'Mixed-Use Core'. Other than the land use designation, the remainder of the OCP provides numerous objectives and policies that support of this type of development:

OCP 'Nelson as a Whole' Objectives:

- *To achieve a geographical distribution and mix of housing types, densities, and tenures throughout the City of Nelson in order to provide the community with a variety of housing choices and lifestyle options;*
- *To maintain the integrity and character of Nelson's established residential neighbourhoods and to integrate new multi-unit housing within established*

*neighbourhoods in a manner which is compatible with the scale and character of adjacent structures;*

- *To provide a diversity of housing options that are appealing, attainable, and affordable to all citizens, of all ages, abilities, and income levels.*

OCP 'Housing' Objectives:

- *To continue to work to provide a full range of housing types and tenures for current and future residents of all incomes, ages, lifestyles and abilities. The City will do this by:*
  - *Encouraging the development of new rental housing.*
  - *Supporting the development of a broad range of housing options.*
  - *Promoting innovative approaches and design.*
  - *Using available financial resources and offer incentives where possible.*
  - *Supporting external groups.*
  - *Promoting the use of existing programs and resources.*
  - *Reviewing and monitoring Nelson's housing needs and achievements regularly.*
- *To encourage affordable, multi-unit housing to be located in areas without steep slopes, within reasonable walking distance of services such as a commercial area, a bus line, a park or recreation centre, and/or near medical facilities.*
- *To encourage multi-unit housing for families with children to be located near services/amenities such as an elementary school, a neighbourhood park, commercial services, and/or a bus route.*

OCP Policies:

- *The City will focus new growth and mixed used development in the Downtown and Waterfront to support a vibrant city centre while protecting outlying natural and agriculture areas from sprawl.*
- *The City will consider leasing city-owned land for affordable housing purposes.*
- *The City will consider measures to support development of purpose-built rental housing. These measures can include consideration of variances to reduce the off-street parking requirements, and fee and/or tax reductions.*
- *The City will expedite the approval process for development applications that contain affordable housing units.*
- *To infill key vacant or underutilised mixed use parcels within the Downtown to reinforce its position as a nucleus of the City.*
- *The City will assist in building the capacity of the non-profit sector.*
- *The City will support external groups where possible; and*
- *The City will foster partnerships and promote affordable housing projects.*

These objectives and policies the proposal meets the criteria established in the OCP for consideration of OCP and Zoning Bylaw amendments for Mixed-Use development in the downtown core.

Housing Needs Assessment: The recently completed Housing Needs Assessment provides statements regarding local housing need:

- *Qualitative and quantitative data both indicate an extreme lack of rental housing in Nelson. Vacancy rates are low, cost and competition for available units is high, and nearly no market rental stock has been constructed in recent years. In addition, data indicates rates of rentership are increasing, especially for couples and families with young children.*
- *The lack of rental housing has a profound economic impact on a community like*

*Nelson. Employers and business associations have reported consistent challenges with recruitment and retention of new employees, largely due to housing availability. According to residents and service providers, many young families are choosing to live outside of City limits, commuting for services and employment because the cost of housing is cheaper.*

- Insufficient starts and permitting indicates a slow response by the housing market to address need and prepare for anticipated population growth. To confront housing shortfalls, the City needs to continue to support traditional market housing investment, but also look to expand creative non-market partnerships and take advantage of Provincial and Federal housing and infrastructure programs.*
- There has been no notable change in the total primary rental universe size since 2013, nor any changes by unit size. This suggests that purpose-built rental completions have largely replaced, not supplemented, older rental stock.*
- Since 2014, the City of Nelson has experienced no years of “healthy” vacancy (a vacancy rate between 3% and 5%). The city has faced considerable demand for purpose-built rentals which has led to a considerable increase in rents. Between 2022 to 2023 the median rent rose from \$952 to \$1,075.*

The overall conclusion of the Housing Needs Assessment indicates “Nelson is experiencing a rental housing shortage, with low vacancy rates, rising rents and little purpose-built rental housing construction. The lack of rental housing is negatively impacting local businesses and making it difficult to attract and retain employees.” As a result, the Housing Needs Assessment indicates general support for this type of development.

Housing Analysis: The applicant intends to apply for an upcoming BC Housing - Community Housing Fund (CHF) funding call, expected to be announced in 2025.

The CHF program funds the construction of affordable rental housing and requires a mix of affordability levels and unit sizes. In alignment with CHF requirements, the applicant proposes:

A mix of affordability which includes:

- 50% of units that would rent for ‘rent-geared to income’ rates (i.e. 30% of a household’s income);
- 30% of units that would rent for ‘market-rent’ rates; and
- 20% of the units that would rent at deeply affordable rates (i.e. social assistance or pension rates).

The chart below illustrates how this project would contribute to housing needs assessment affordability goals.

	<b>Housing Needs Assessment 5-year target</b>	<b>Approximate project unit count</b>	<b>Percentage of target</b>
Market Units	262	15	5.7%
Affordable / below-market	139	25	17.9%
Deeply Affordable	56	10	17.8%
Overall total	457	50	10.9%

If this project was approved, it would contribute significantly to the 5-year goals in the

Housing Needs Assessment by contributing approximately 5.7% of needed market rental units, 17.9% of needed Affordable/below-market units and 17.8% of needed deeply affordable units.

The CHF program also requires a mix of unit types. BC Housing typically requests that applicants demonstrate unit-mix need by relying on the local municipality's Housing Needs Assessment. The Nelson Housing Needs Assessment indicates the greatest need for rental units that are studio/1-bedroom units, followed by 2-bedroom units.

In alignment with the Housing Needs Assessment, the applicant proposes:

- 14 studio units;
- 32 1-bedroom units;
- 2 2-bedroom units; and
- 2 3-bedroom units.

Zoning Bylaw Analysis: The applicant is requesting a Comprehensive Development (CD) zone, a type of zoning that allows for custom land use regulations tailored to a specific site. CD zones are typically used for unique developments that could not have been reasonably anticipated when the Zoning Bylaw was originally drafted. As with all zones, a CD zone must be consistent with the objectives and policies of the Official Community Plan (OCP).

The proposed CD10 zone addresses a development scenario not contemplated by the current Zoning Bylaw. Specifically, a mixed-use building with a non-residential component (e.g. public indoor recreation space) located on the second floor. With the residential component of the building both below, adjacent to, and above the recreation space. Existing zones generally require such uses to be located at grade with the residential component behind or above the other uses. This would hinder the functional integration with the adjacent NDCC, where the main connect (e.g. the existing weight room) is situated approximately two floors above grade. Staff have reviewed the draft CD10 zone and confirm it is consistent with the intent of the proposed Mixed-Use Core OCP land use designation, as well as other objectives and policies within the OCP.

Other considerations: Other items reviewed and considered as part of this application:

- Phase I – Environmental Site Assessment (ESA): a Phase 1 ESA was conducted to assess the potential for environmental contamination. The ESA's overall conclusion indicates "No issues were identified that were considered to present a moderate or high risk of contamination to the Site. No further investigation is recommended at this time". The Phase I – ESA is shown in Attachment 6.
- Transportation Assessment and Management Study (TAMS): a TAMS was conducted to determine impacts on traffic operations, parking bylaw compliance and potential Transportation Demand Management (TDM) strategies to support multi-modal transportation options for future residents. The overall conclusion of the TAMS states:
  - the addition of traffic from the proposed development would have minimal impact to the study intersections. The TAMS recommends two options to help mitigate existing conditions. The first option would be to signalize the Front Street & Cedar Street intersection and the second option would be to restrict left turns from Cedar Street onto Front Street in both the north and southbound directions. Beyond the recommendations to mitigate existing conditions, no additional measures are recommended. Front Street

(Highway 3A) is under the jurisdiction of the Ministry of Transportation and Transit (MoTT). As part of the referral process they did not indicate a desire to make further changes to the intersection other than moving forward with already planned upgrades to the existing crosswalk (overhead flashing lights);

- proposed Bicycle and Motor-Vehicle parking is sufficient.
- The TAMS is shown in Attachment 7.

Summary of analysis: Staff recommend approval of the development application based on the following information:

- policies within the OCP that support OCP amendments and Rezoning for Mixed-Use development Downtown; and
- findings in the recently completed Housing Needs Assessment indicate:
  - a need for purpose-built rental units;
  - a need for affordable rental units at market, below-market and deeply subsidized (e.g. social assistance rates);
- general compliance with Zoning Bylaw regulations; and
- conceptual building designs that:
  - activate the corner of Front Street and Cedar Street, which is currently under-utilized;
  - locates residential units along Front Street to activate the street frontage and avoid blank wall that could be created by having parking at street level; and
  - locates motor vehicle access to the site from Cedar Street, a local road, rather than Front Street, a provincial highway (Highway 3A); and
  - maintains access to the NDCC through the lane.

#### **BENEFITS OR DISADVANTAGES AND NEGATIVE IMPACTS:**

The project would increase the overall number of purpose-built rental units in Nelson which has been identified by the City's Housing Needs Assessment as one of the most pressing housing issues in Nelson. This includes: market rental, affordable/below-market units and deeply affordable units.

If the RDCK moves forward with the expansion of the NDCC, it would also include additional recreation space within the community.

#### **LEGISLATIVE IMPACTS, PRECEDENTS, POLICIES:**

In accordance with section 464 of the *Local Government Act* a Public Hearing is required because an amendment to the OCP forms a part of this application.

#### **COSTS AND BUDGET IMPACT - REVENUE GENERATION:**

The cost of the amendment application is covered by the fees paid by the applicant.

#### **IMPACT ON SUSTAINABILITY, COUNCIL PRIORITIES AND STAFF RESOURCES:**

This application will not impact staff resources.

#### **COMMUNICATION:**

If directed by Council, a Public Hearing would be scheduled along with required notifications pursuant to the *Local Government Act* and the *Development Applications Procedures Bylaw*.

Public Information Session: A public engagement session was held on January 27, 2025. All properties within 60m of the proposed development received a hand-delivered notice of the public information session. Hand-delivery was undertaken due to the significant backlog of mail due to the recent Canada Post strike and concerns that the notification letters would not be received in a timely manner.

The applicant also advertised the session:

- by sending notifications to neighbours within 60 m medium of the subject site;
- in the Nelson Star newspaper on January 16 and 23, 2025;
- on their social media channels;
- on their website; and
- via e-mail invitations to community groups (both those who expresses opposition and support for the project).

74 feedback forms were received during the Public Information Session. This includes:

- 45 people supportive of the project;
- 12 people opposed to the project;
- 9 people concerned about the project, but acknowledged the need for affordable housing; and
- 8 people who made neutral comments about the project.

Additional information on the Public Information Session is available in:

- Attachment 8 - What We Heard Report.

Staff have reviewed both documents:

- the summary accurately reflects the view points expressed at the Public Information Session; and
- the post engagement letter addresses the questions and concerns received.

Public Comment: For the Public Hearing, all property owners and tenants within 60 meters of the subject property will be sent a notification letter informing them of the Public Hearing. The Public Hearing will also be advertised on the City's website and in the local newspaper.

Referral comments: Development Services sent the application to City of Nelson departments for referral, including: Nelson Hydro, Public Works, Engineering and Fire. The application was also sent to external agencies, including: Regional District of Central Kootenay (RDCK), BC Transit, FortisBC, Interior Health and the Ministry of Transportation and Transit (MoTT). No concerns were raised other than standard Engineering requirements as part of development. Referral comments received are shown in Attachment 9.

Additional referrals will be undertaken at the Development Permit stage should the OCP and Zoning Bylaw amendments be approved.

## **OPTIONS AND ALTERNATIVES:**

1. Provide alternate direction to Staff.

**ATTACHMENTS:**

- Attachment 1: Bylaw Amendments
- Attachment 2: Application
- Attachment 3: Conceptual architectural renderings and site plan
- Attachment 4: 'CD-10 Residential and Recreation Use' Zone
- Attachment 5: Recreation campus map
- Attachment 6: Phase 1 – Environmental Site Assessment (ESA)
- Attachment 7: Transportation Assessment and Management Study (TAMS)
- Attachment 8: What we heard report
- Attachment 9: Referral comments received

**RECOMMENDATION:**

That Council passes the following resolution/s:

1. THAT "Official Community Plan Amendment Bylaw No. 3634, 2025" be introduced and read a first and second time by title only;
2. THAT "Zoning Amendment Bylaw No. 3635, 2025" be introduced and read a first and second time by title only;
3. THAT Council, in accordance with Section 475 of the *Local Government Act*, has considered the impacts of Official Community Plan Amendment Bylaw No. 3634, 2025 on the City's Five-Year Financial Plan and Waste Management Plan and found no measurable impact;
4. THAT Official Community Plan Bylaw No. 3634, 2025 has been referred to:
  - BC Transit;
  - Interior Health;
  - Fortis BC;
  - Nelson Fire;
  - Nelson Hydro;
  - Public Works & Engineering; and
  - School Board No. 8 (Kootenay Lake).and has considered whether additional persons, organizations and authorities, are required to be consulted, including additional federal and provincial agencies and First Nations and is satisfied that the appropriate persons, organizations and authorities have been identified and consulted in advance of the Public Hearing.
5. THAT Staff be directed to schedule a Public Hearing.

**AUTHOR:**

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SENIOR PLANNER

**REVIEWED BY:**

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CITY MANAGER

THE CORPORATION OF THE CITY OF NELSON

BYLAW NO. 3634, 2025

BEING A BYLAW TO AMEND "THE CORPORATION OF THE CITY OF NELSON  
OFFICIAL COMMUNITY PLAN BYLAW NO. 3247, 2013"

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The Council of the Corporation of the City of Nelson considers it desirable and expedient to amend "The Corporation of the City of Nelson Official Community Plan Bylaw No. 3247, 2013" (hereinafter called "said Bylaw");

The Council of the Corporation of the City of Nelson, in open meeting assembled enacts as follows:

1. That Schedule B of the said bylaw be amended by changing the Land Use Designation of the land on:
  - a) LOT 12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 007-487-240;
  - b) LOT 11 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 007-487-231);
  - c) LOT 10 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 013-691-341;
  - d) LOT 9 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 013-691-198;
  - e) LOT 8 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 013-691-171; and
  - f) a 529.8 square metre portion of: LOT B DISTRICT LOT 95 KOOTENAY DISTRICT PLAN NEP83303 shown in Schedule A, PID: 027-011-151.  
from Institutional to Mixed-Use Core.
2. This Bylaw shall take effect immediately.
3. This Bylaw may be cited as **"Official Community Plan Amendment Bylaw No. 3634, 2025"**.

READ A FIRST TIME the \_\_\_\_ day of \_\_\_\_\_, 2025  
READ A SECOND TIME the \_\_\_\_ day of \_\_\_\_\_, 2025  
READ A THIRD TIME the \_\_\_\_ day of \_\_\_\_\_, 2025

FINALLY PASSED AND ADOPTED the \_\_\_\_ day of \_\_\_\_\_, 2025



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Mayor

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Corporate Officer

DRAFT

## Schedule A

Map of a 529.8 square metre portion of: LOT B DISTRICT LOT 95 KOOTENAY  
DISTRICT PLAN NEP83303 shown in Schedule A, PID: 027-011-151



THE CORPORATION OF THE CITY OF NELSON

BYLAW NO. 3635, 2025

BEING A BYLAW TO AMEND “THE CORPORATION OF THE CITY OF NELSON  
ZONING BYLAW NO. 3199, 2013”

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The Council of the Corporation of the City of Nelson considers it desirable and expedient to amend “The Corporation of the City of Nelson Zoning Bylaw No. 3199, 2013” (hereinafter called “said Bylaw”);

The Council of the Corporation of the City of Nelson, in open meeting assembled enacts as follows:

1. THAT Comprehensive Development 10 (CD10) Zone, as shown in Schedule A, be added as Section 9.10.
2. That Schedule B of the said bylaw be amended by rezoning the land on:
  - a) LOT 12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 007-487-240;
  - b) LOT 11 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 007-487-231);
  - c) LOT 10 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 013-691-341;
  - d) LOT 9 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 013-691-198;
  - e) LOT 8 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I), PID: 013-691-171; and
  - f) a 529.8 square metre portion of: LOT B DISTRICT LOT 95 KOOTENAY DISTRICT PLAN NEP83303 shown in Schedule B, PID: 027-011-151.  
From ‘I1-Institutional’ Zone to ‘CD-10 - Comprehensive Development 10 Residential and Recreation Use’ Zone;
3. This Bylaw shall take effect immediately.
4. This Bylaw may be cited as **"Zoning Bylaw Amendment No. 3635, 2025"**.

READ A FIRST TIME the \_\_\_\_ day of \_\_\_\_\_, 2025  
READ A SECOND TIME the \_\_\_\_ day of \_\_\_\_\_, 2025  
READ A THIRD TIME the \_\_\_\_ day of \_\_\_\_\_, 2025

FINALLY PASSED AND ADOPTED the \_\_\_\_ day of \_\_\_\_\_, 2025

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Mayor

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Corporate Officer

DRAFT

## Schedule A

### 9.10 CD10 Residential and Recreation Use Zone

#### 1. Purpose

The purpose is to designate and preserve land for the orderly development of a building that includes a mix of residential and recreational uses.

#### 2. Permitted Uses

The following uses of land, buildings and structures and no others shall be permitted to the CD10 Residential and Recreation Use Zone:

- a) Multi-Unit Residential
- b) Off-Street Parking
- c) Participant Recreation Services, Indoor
- d) Professional and Business Offices
- e) Public Administration
- f) Public Assembly

#### 3. Conditions of Use

- a. Exterior, unenclosed storage of goods or materials is not permitted.

#### 4. Minimum Lot Area and Minimum Lot Width

- a. The minimum lot area shall be not less than 278 sq. m.
- b. The minimum lot width shall not be less than 7.6 m.

#### 5. Minimum Setback and Maximum Height

Minimum Setback	
Front lot line	0 m
Rear lot line	0 m
If lot is not served by a constructed rear lane	1.5 m
Exterior side lot line	0 m
Interior side lot line	0 m
Maximum Height	
Principal Building	18 m
Accessory Building	4.5 m

- 6. Waste and Recycling requirements shall comply with applicable requirements of section 1.2.9. of Schedule "A".

7. Amenity Areas for Multi-Unit Residential dwelling units shall comply with applicable requirements of section 1.2.4. of Schedule “A”.
8. Parking and loading shall comply with the requirements of Off-Street Parking and Landscape Bylaw 3274, 2013, with the exception of Part 8 – Loading Spaces.
9. Landscaping shall comply with applicable requirements of Off-Street Parking and Landscape Bylaw 3274, 2013.

DRAFT

## Schedule B

Map of a 529.8 square metre portion of: LOT B DISTRICT LOT 95 KOOTENAY  
DISTRICT PLAN NEP83303, PID: 027-011-151





**MAKOLA**  
DEVELOPMENT  
SERVICES

# REZONING AND OCP AMENDMENT APPLICATION

## NELSON CARES SOCIETY





December 16<sup>th</sup>, 2024

VIA Electronic Delivery  
City of Nelson  
310 Ward Street  
Nelson BC, V1L 5S4

**RE: Application for Rezoning and OCP Amendment – 818-824 Front Street, Nelson BC**

Dear Ken Bourdeau,

Please accept this Rezoning and OCP Amendment Application from M'akola Development Society (MDS) on behalf of Nelson CARES Society (NCARES) for the properties at 818-824 Front Street, Nelson BC. NCARES is proposing to rezone the properties at 818-824 Front Street for the purpose of developing a six-storey, residential development comprised of 50 purpose-built, affordable rental units. The proposed building also includes a recreation space that will expand and connect to the neighbouring Nelson & District Community Complex Facility (NDCC).

The subject site is adjacent to the existing NDCC and is currently owned by the City of Nelson (the "City") (0.26 acres) and Regional District of Central Kootenay (RDCK) (0.13 acres). The proposed development represents an opportunity to create a new, collaborative residential and recreational development that would merge the lands into approximately 0.39-acre parcel. The proposed development will provide a mix of studio suites, one-, two-, and three-bedroom units that will be prioritized for low-to-moderate income Nelson residents.

The proposed development requires the following amendments to the Zoning Bylaw and Official Community Plan (OCP):

- 1) Rezone from I1 Institutional Use Zone to CD10 Residential and Recreation Use Zone; and
- 2) Re-designated the OCP Schedule B Land Use Designations Map from Institutional to Mixed Use Core.

Please find the following documents attached:

1. Application Form
2. Attachment A: Title Certificate(s)
3. Attachment B: Agent Authorization Form – Awaiting Signature from City
4. Attachment D: Site Disclosure Statement
5. Attachment E & F: Architectural Site and Development Plans
6. Attachment G: Proposal Summary, including
7. Attachment H: CD10 Zone
8. Attachment I: Additional Information, including:
  - Phase I Environmental Site Assessment
  - Topographic Survey

9. Attachment J: Sustainability Checklist

Supplementary report to follow:

10. Traffic Impact Assessment

If you have any questions about the proposed development, please contact the undersigned.

Sincerely,

A handwritten signature in blue ink that reads "Hillary Morgan".

Hillary Morgan, RPP MCIP  
Regional Manager – Interior  
M'akola Development Services

Enclosed.

cc: Joanne Motta, Housing Directly NCARES  
Kaela Schramm, Executive Director MDS  
Madelyn McPhee, Development Planner MDS



**M'AKOLA**  
DEVELOPMENT  
SERVICES

## APPLICATION FORM

# DEVELOPMENT APPLICATION FORM

OFFICE USE ONLY		PAYMENT STAMP
PERMIT #:	OCP & Rezoning 2409002	
APPLICATION FEE:	\$4500.00	PAID
	STAFF INITIALS: KB & JJ	

**Applicants are advised to consult with Development Services staff before applying. A Pre-Application Review (PAR) meeting with staff is required prior to submitting a major development application, as shown below. Note that only complete applications will be accepted.**

## APPLICATION TYPE Check all appropriate boxes

- |   |  |
|---|--|
| <input type="checkbox"/> Development Permit (Major > 50 m <sup>2</sup> ) <sup>2</sup>   | <input type="checkbox"/> Subdivision <sup>2</sup>  |
| <input type="checkbox"/> Development Permit (Minor < 50 m <sup>2</sup> / Wildfire Zone) | <input type="checkbox"/> Strata Title Conversion <sup>2</sup>                              |
| <input type="checkbox"/> Development Permit (Laneway House)                             | <input checked="" type="checkbox"/> Official Community Plan Bylaw Amendment <sup>12</sup>  |
| <input type="checkbox"/> Development Variance Permit                                    | <input checked="" type="checkbox"/> Zoning/Land Use Bylaw Amendment <sup>12</sup>          |
| <input type="checkbox"/> Board of Variance  | <input type="checkbox"/> Liquor Licence <sup>1</sup>                                       |
| <input type="checkbox"/> Temporary Commercial or Industrial Use Permit <sup>1 2</sup>   | <input type="checkbox"/> Cannabis Licence <sup>1</sup>                                     |
| <input type="checkbox"/> Removal of Charges/Notices on Title                            | <input type="checkbox"/> Road ROW closure <sup>2</sup>                                     |
| <input type="checkbox"/> Heritage Alteration Permit/Heritage Plaque <sup>2</sup>        | <input type="checkbox"/> <i>If this is an amendment/renewal of an existing application</i> |

<sup>1</sup> See Sign Notification requirements, *Land Development Applications Procedures Bylaw* (Sched. 1). Staff will confirm final sign design.

<sup>2</sup> This type of application requires a Pre-Application meeting, prior to submitting a formal development application

## PROPERTY INFORMATION

Site Address: 818-824 Front Street and 305 Hall Street, Nelson BC

PID(s) or Legal Description: 007-487-240; 007-487-231; 013-691-341; 013-691-198; 013-691-171; 027-011-151

Proposed Number of Lots/Strata Units (for subdivision or strata title applications):

### DESCRIPTION OF EXISTING LAND USE:

The subject sites are currently vacant lots with no buildings or structures, located beside the existing Nelson & District Community Complex Facility.

### DESCRIPTION OF PROPOSED DEVELOPMENT / USE / BYLAW / ZONING / OCP DESIGNATION:

The proposed project will be a six-storey, affordable multi-residential building that will connect to a new expansion of the existing NDCC Facility. The Proposed residential portion will be comprised of 50 units for low-to-moderate income Nelson residents. We are currently seeking to rezone these lands from the current I1 Institutional Zone to a CD Comprehensive Development Zone.

# DEVELOPMENT APPLICATION FORM

The undersigned hereby makes an application under the provision of the bylaws of the City of Nelson according to the following specifications and accompanying documentation:

APPLICANT			
APPLICANT IS THE:	<input type="checkbox"/> Owner <input type="checkbox"/> Designer/Contractor <input type="checkbox"/> Tenant <input checked="" type="checkbox"/> Other Authorized Agent of the Owner		
NAME:	Kaela Schramm		BUSINESS NAME:
E-MAIL:	kschramm@makoladev.com		PHONE: 778-256-7489
MAILING ADDRESS:	#107-731 Station Avenue, Victoria BC		PHONE (ALTERNATE) :
			POSTAL CODE: V9B 3S4
PROPERTY OWNER (IF DIFFERENT FROM APPLICANT AND/OR BUSINESS OWNER)			
NAME / COMPANY:	City of Nelson and RDCK		PHONE: 250-352-8221 ext. 221 and 250.352.81
			E-MAIL: nandrijancic@nelson.ca ; jchirico@rdck.bc.ca
If the applicant is not the registered owner, the owner must complete the "Owners Representative Form". See: <a href="http://www.nelson.ca/applications">www.nelson.ca/applications</a>			

## SIGNATURES

**A Permit is issued after review of the proposal. No work shall begin until a Permit is approved.**

I declare that the information submitted in support of this application is, to the best of my knowledge, true and correct and that I will submit further information deemed necessary by the City for processing this application.

I acknowledge that all fees paid in connection with this permit are non-refundable, except as noted in the City of Nelson Fees and Charges Bylaw.

IN CONSIDERATION OF THIS PERMIT being issued, I release and indemnify the City of Nelson, its Council members, officers, employees, and agents from and against all liability, claims and other expenses of any kind which I, or any other person, may have in connection with anything said or done, the granting of this permit or any action taken or not taken, by the City of Nelson and I agree that the City of Nelson owes me no duty of care in respect of these matters.



APPLICANT'S SIGNATURE

Dated this 16 Day of December 2024

## SUBMISSION CHECKLIST

DEVELOPMENT APPLICATION TYPE*	REQUIRED ATTACHMENTS
Official Community Plan Amendment	A, B, C, F, I
Zoning/Land Use Bylaw Amendment	A, B, C, D, E, F, G, I, K
Development Permit (Major)	A, B, C, D, E, F, G, H, I, J, K
Development Permit (Minor/Laneway House)	A, B, C, D, E, F, G, I, K
Development Variance Permit	A, B, C, E, F, G, I, K
Strata Title Conversion	A, B, C, E, F, G, I, K
Temporary Commercial or Industrial Permit	A, B, C, D, E, F, G, H, I, K
Board of Variance	A, B, C, E, F, G, I, K
Liquor Licensing	A, B, C, E, F, G, I
Cannabis Licensing	A, B, C, E, F, G, I, L
Road Closure	C, E, F, G, I
Subdivision	A, B, C, D, E, F, I

\* For other types of applications, contact Development Services to discuss what additional information will be required.

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# DEVELOPMENT APPLICATION FORM

## Attachment Information 1/2

ATTACHMENT			DETAILS
A	<input type="checkbox"/>	STATE OF TITLE CERTIFICATE	A copy of the title search, issued not more than 30 days prior to the application date, for any parcel of land subject to the application and a copy of all non-financial charges (i.e. restrictive covenants, easements and rights-of-way, etc.) registered on the subject property(s). The title search and the related documents can be obtained at myLTSA.com, through a notary, lawyer or search company, <b>or by the City, at your request, for a fee of \$15.</b>
	<input type="checkbox"/>	COPIES OF ALL NON-FINANCIAL CHARGES	
B	<input type="checkbox"/>	AGENT AUTHORIZATION	Written consent of <b>all</b> property owners, with one or more owners appointing an applicant to act as agent for all purposes associated with the application. Use the Owners Representative Form for applicants who are not registered owner of the property.
C	<input type="checkbox"/>	APPLICATION FEE	An application fee as set out in any applicable <i>City of Nelson Fees and Charges Bylaw</i> shall accompany the application.
D	<input type="checkbox"/>	PROVINCIAL SITE DISCLOSURE	As per current Contaminated Sites Legislation. * Contact staff to find out whether your application requires this document. Not all types of projects will require a site disclosure statement.
E	<input type="checkbox"/>	SITE PLAN	<p>Site plan of the proposed development drawn to scale and showing dimensions. The site plan must include:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> The civic address and full legal description of the property</li> <li><input type="checkbox"/> Lot dimensions</li> <li><input type="checkbox"/> Existing or required rights-of-way or easements; the name and extent of roads and lanes adjacent to the property, showing the traveled portion of the roads and lanes scaled from the property line to the edge of pavement;</li> <li><input type="checkbox"/> Location and dimensions (including setbacks) of existing and proposed buildings and structures on the site (a recent survey plan is preferable)</li> <li><input type="checkbox"/> Location of existing wells or other water sources on property</li> <li><input type="checkbox"/> Location of any existing or proposed septic fields</li> <li><input type="checkbox"/> Location of any watercourses, steep banks or slopes on or adjacent to the property</li> <li><input type="checkbox"/> Location of any existing community services of sanitary sewer, water, storm drainage and rights-of-way on the site or adjacent to the site</li> <li><input type="checkbox"/> Location of ditches, fire hydrants, fire department connections, gas lines, kiosks, hydro and telecommunications poles</li> </ul> <p>Submission must include one small scale letter sized copy of the proposed site plan and one pdf file of the proposed development.</p> <p><b>NOTE:</b> If the application is for a variance to an existing structure, a survey prepared by a BCLS is required to accompany the Site Plan in order to confirm the accuracy of the dimensions shown.</p>

# DEVELOPMENT APPLICATION FORM

## Attachment Information 2/2

F	<input checked="" type="checkbox"/>	PROPOSAL SUMMARY	<p>An outline of the type of development or land use proposed including:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> the number of units, lots and/or gross floor area if applicable</li> <li><input type="checkbox"/> Explanation of compliance with current zoning and proposed deviation or change, if applicable</li> <li><input type="checkbox"/> Explanation of community/neighbourhood benefit and impact of proposal</li> <li><input type="checkbox"/> For laneway houses, explanation of compliance with all laneway house design guidelines (see, especially, section “B” of the guidelines)</li> </ul>
G	<input checked="" type="checkbox"/>	DEVELOPMENT PLANS	<ul style="list-style-type: none"> <li><input type="checkbox"/> Detailed drawings of the proposed development, including building sections, elevations and floor plans proposed for the site. Development Permit applications must include information regarding building form and character (i.e. exterior finish)</li> <li><input type="checkbox"/> <b>A project summary sheet that includes: lot area, density and number of dwelling units, lot coverage, height, setbacks, off-street parking (required and actual), off-street loading (required and actual) and other relevant data and zoning analysis.</b></li> <li><input type="checkbox"/> Location and width of existing or proposed access(es) to the property, driveways, maneuvering aisles and parking layout</li> </ul>
H	<input type="checkbox"/>	LANDSCAPE PLAN	<ul style="list-style-type: none"> <li><input type="checkbox"/> Site plan draw to scale and showing dimensions, including any existing or proposed screening, landscaping and fencing</li> <li><input type="checkbox"/> Cost estimate prepared by a Landscape Architect or other persons approved by Development Services and Sustainability including a breakdown of plant cost, site preparation, material and labour costs</li> </ul>
I	<input checked="" type="checkbox"/>	ADDITIONAL INFORMATION THAT MAY BE REQUIRED	<ul style="list-style-type: none"> <li><input type="checkbox"/> Contour plan showing land contours before and after lot grading for the subject property and the adjacent properties</li> <li><input type="checkbox"/> Geotechnical analysis</li> <li><input type="checkbox"/> Survey certificate to identify the location of existing buildings/structures or watercourses, top of banks of other physical features</li> <li><input type="checkbox"/> Location of existing or proposed refuse enclosures, refuse and recycling bins</li> <li><input type="checkbox"/> Architectural rendering drawing which depicts the design, finish and colour of proposed buildings, landscaping detail and signage location. Renderings must not be embellished with unrelated details such as vehicles, wildlife, mountain, etc.</li> </ul>
J	<input type="checkbox"/>	DEVELOPMENT PERMITS FOR FORM & CHARACTER	<ul style="list-style-type: none"> <li><input type="checkbox"/> Colour renderings of proposed facades, including proposed signage locations, awnings etc.</li> <li><input type="checkbox"/> Colour Photographs</li> <li><input type="checkbox"/> Description of construction materials for the design of the development</li> </ul>
K	<input checked="" type="checkbox"/>	SUSTAINABILITY	It is highly encouraged that a Sustainability Checklist be reviewed & completed.
L	<input type="checkbox"/>	CANNABIS	Documentation as per Schedule 9, <i>Land Development Applications Procedures Bylaw</i>





**MAKOLA**  
DEVELOPMENT  
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## ATTACHMENT A: TITLE CERTIFICATES



**TITLE SEARCH PRINT**

File Reference:

Declared Value \$SEE W9064

2024-08-14, 12:16:30

Requestor: Sierra Leung

**\*\*CURRENT AND CANCELLED INFORMATION SHOWN\*\*****Corner Lot - KB**

<b>Land Title District</b>	NELSON
Land Title Office	NELSON
<b>Title Number</b>	W9065
From Title Number	191196I
<b>Application Received</b>	1987-05-15
<b>Application Entered</b>	1987-05-22
<b>Registered Owner in Fee Simple</b>	
Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8
<b>Taxation Authority</b>	Nelson, The Corporation of the City of
<b>Description of Land</b>	
Parcel Identifier:	007-487-240
Legal Description:	LOT 12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)
<b>Legal Notations</b>	
	NOTICE OF TAX EXEMPTION, LOCAL GOVERNMENT ACT, SECTION 340, SEE KR165773
<b>Charges, Liens and Interests</b>	NONE
<b>Duplicate Indefeasible Title</b>	NONE OUTSTANDING
<b>Transfers</b>	NONE
<b>Pending Applications</b>	NONE
<b>Corrections</b>	NONE

**TITLE SEARCH PRINT**

File Reference:

Declared Value \$38,000

2024-08-14, 12:16:30

Requestor: Sierra Leung

**\*\*CURRENT AND CANCELLED INFORMATION SHOWN\*\***

House - KB

**Land Title District**

Land Title Office

NELSON

NELSON

**Title Number**

From Title Number

W9064

1911961

**Application Received**

1987-05-15

**Application Entered**

1987-05-22

**Registered Owner in Fee Simple**

Registered Owner/Mailing Address:

CITY OF NELSON  
502 VERNON STREET  
NELSON, BC  
V1L 4E8**Taxation Authority**

Nelson, The Corporation of the City of

**Description of Land**

Parcel Identifier:

007-487-231

Legal Description:

LOT 11 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL  
A (SEE 272251)**Legal Notations**NOTICE OF TAX EXEMPTION, LOCAL GOVERNMENT ACT, SECTION 340,  
SEE KR165773**Charges, Liens and Interests**

NONE

**Duplicate Indefeasible Title**

NONE OUTSTANDING

**Transfers**

NONE

**Pending Applications**

NONE

**Corrections**

NONE

**TITLE SEARCH PRINT**

2024-08-29, 10:12:01

File Reference:

Requestor: Madelyn McPhee

Declared Value \$N/A

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

<b>Title Issued Under</b>	SECTION 188 LAND TITLE ACT	Middle City owned lot - KB
<b>Land Title District</b> Land Title Office	NELSON NELSON	
<b>Title Number</b> From Title Number	XC8947 Q11786	
<b>Application Received</b>	1989-04-27	
<b>Application Entered</b>	1989-05-03	
<b>Registered Owner in Fee Simple</b> Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8	
<b>Taxation Authority</b>	Nelson, The Corporation of the City of	
<b>Description of Land</b> Parcel Identifier: Legal Description:	013-691-341 LOT 10 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)	
<b>Legal Notations</b>	NONE	
<b>Charges, Liens and Interests</b> Nature: Registration Number: Registration Date and Time: Registered Owner:  Remarks:	RESERVATION 19203D 1932-04-20 14:50 THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY INTER ALIA SEE 34009I	
<b>Duplicate Indefeasible Title</b>	NONE OUTSTANDING	
<b>Transfers</b>	NONE	

**TITLE SEARCH PRINT**

File Reference:

Declared Value \$N/A

2024-08-29, 10:12:01

Requestor: Madelyn McPhee

**Pending Applications**

NONE

TITLE SEARCH PRINT

2024-08-29, 10:12:02

File Reference:

Requestor: Madelyn McPhee

Declared Value \$N/A

\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\*

Title Issued Under	SECTION 188 LAND TITLE ACT	2 westerly City owned lots - KB
Land Title District	NELSON	
Land Title Office	NELSON	
Title Number	XC8946	
From Title Number	Q11786	
Application Received	1989-04-27	
Application Entered	1989-05-03	
Registered Owner in Fee Simple		
Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8	
Taxation Authority	Nelson, The Corporation of the City of	
Description of Land		
Parcel Identifier:	013-691-198	
Legal Description:	LOT 9 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)	
Legal Notations	NONE	
Charges, Liens and Interests		
Nature:	RESERVATION	
Registration Number:	19203D	
Registration Date and Time:	1932-04-20 14:50	
Registered Owner:	THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY	
Remarks:	INTER ALIA SEE 34009I	
Duplicate Indefeasible Title	NONE OUTSTANDING	
Transfers	NONE	

**TITLE SEARCH PRINT**

File Reference:

Declared Value \$N/A

2024-08-29, 10:12:02

Requestor: Madelyn McPhee

**Pending Applications**

NONE

**TITLE SEARCH PRINT**

2024-08-29, 10:12:02

File Reference:

Requestor: Madelyn McPhee

Declared Value \$N/A

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

<b>Title Issued Under</b>	SECTION 188 LAND TITLE ACT	City owned - KB
<b>Land Title District</b> Land Title Office	NELSON NELSON	
<b>Title Number</b> From Title Number	XC8945 Q11786	
<b>Application Received</b>	1989-04-27	
<b>Application Entered</b>	1989-05-03	
<b>Registered Owner in Fee Simple</b> Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8	
<b>Taxation Authority</b>	Nelson, The Corporation of the City of	
<b>Description of Land</b> Parcel Identifier: Legal Description:	013-691-171 LOT 8 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)	
<b>Legal Notations</b>	NONE	
<b>Charges, Liens and Interests</b> Nature: Registration Number: Registration Date and Time: Registered Owner:  Remarks:	RESERVATION 19203D 1932-04-20 14:50 THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY INTER ALIA SEE 34009I	
<b>Duplicate Indefeasible Title</b>	NONE OUTSTANDING	
<b>Transfers</b>	NONE	

**TITLE SEARCH PRINT**

File Reference:

Declared Value \$N/A

2024-08-29, 10:12:02

Requestor: Madelyn McPhee

**Pending Applications**

NONE



**TITLE SEARCH PRINT**

2024-12-16, 16:01:56

File Reference:

Requestor: Madelyn McPhee

**\*\*CURRENT AND CANCELLED INFORMATION SHOWN\*\*****Title Issued Under** SECTION 98 LAND TITLE ACT **NDCC lot - KB****Land Title District** NELSON  
Land Title Office NELSON**Title Number** LB24942  
From Title Number KR166410  
KR166411  
KR166412  
LB24949  
LB24950  
LB24951  
LB24953  
LB24954  
LB24955  
XB2192**Application Received** 2007-03-02**Application Entered** 2007-03-19**Registered Owner in Fee Simple**  
Registered Owner/Mailing Address: REGIONAL DISTRICT OF CENTRAL KOOTENAY  
202 LAKESIDE DRIVE  
NELSON, BC  
V1L 5R4**Taxation Authority** Nelson, The Corporation of the City of**Description of Land**  
Parcel Identifier: 027-011-151  
Legal Description:  
LOT B DISTRICT LOT 95 KOOTENAY DISTRICT PLAN NEP83303**Legal Notations**  
HERETO IS ANNEXED EASEMENT CA8868570 OVER PART OF LOT A PLAN NEP83303  
SHOWN ON PLAN EPP108467THIS TITLE MAY BE AFFECTED BY A PERMIT UNDER PART 29 OF THE MUNICIPAL  
ACT SEE XE5359 12/03/1991

**TITLE SEARCH PRINT**

2024-12-16, 16:01:56

File Reference:

Requestor: Madelyn McPhee

THIS TITLE MAY BE AFFECTED BY A PERMIT UNDER PART 29 OF THE MUNICIPAL  
ACT SEE XH8749

THIS TITLE MAY BE AFFECTED BY A PERMIT UNDER PART 26 OF THE LOCAL  
GOVERNMENT ACT, SEE KX85991

**Charges, Liens and Interests**

Nature:	RESERVATION
Registration Number:	11268D
Registration Date and Time:	1922-06-09 10:50
Registered Owner:	COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY
Remarks:	INTER ALIA PART FORMERLY PARCEL A (SEE 12619I) LOTS 8, 9, 10, 11 AND 12 BLOCK 60 PLAN 9500
Nature:	RESERVATION
Registration Number:	16034D
Registration Date and Time:	1928-12-15 10:00
Registered Owner:	COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY
Remarks:	INTER ALIA PART FORMERLY PARCELS A AND B (SEE 27225I)
Nature:	RESERVATION
Registration Number:	19203D
Registration Date and Time:	1932-04-20 14:50
Registered Owner:	THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY
Remarks:	INTER ALIA SEE 34009I
Nature:	RESERVATION
Registration Number:	28929D
Registration Date and Time:	1946-10-29 14:58
Registered Owner:	COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY
Remarks:	PART FORMERLY LOTS 1 AND 2 BLOCK 59 PLAN 9500 SEE 64039I
Nature:	COVENANT
Registration Number:	XH10480
Registration Date and Time:	1994-04-21 11:57
Registered Owner:	CITY OF NELSON
Remarks:	SECTION 215 LTA PART FORMER LOT 2 PLAN 14844

**TITLE SEARCH PRINT**

2024-12-16, 16:01:56

File Reference:

Requestor: Madelyn McPhee

Nature: EQUITABLE CHARGE  
Registration Number: XH10481  
Registration Date and Time: 1994-04-21 11:57  
Registered Owner: CITY OF NELSON  
Remarks: PART FORMER LOT 2 PLAN 14844

Nature: COVENANT  
Registration Number: LB24956  
Registration Date and Time: 2007-03-02 14:31  
Registered Owner: THE CORPORATION OF THE CITY OF NELSON

Nature: STATUTORY RIGHT OF WAY  
Registration Number: LB24957  
Registration Date and Time: 2007-03-02 14:31  
Registered Owner: THE CORPORATION OF THE CITY OF NELSON  
Remarks: INTER ALIA

Nature: STATUTORY RIGHT OF WAY  
Registration Number: LB24958  
Registration Date and Time: 2007-03-02 14:31  
Registered Owner: THE CORPORATION OF THE CITY OF NELSON

Nature: EASEMENT  
Registration Number: LB24959  
Registration Date and Time: 2007-03-02 14:31  
Remarks: PART ON PLAN NEP83306 APPURTENANT TO LOTS G AND H  
PLAN NEP83303  
DOMINANT TENEMENT CANCELLED AS TO LOT G PLAN  
NEP83303 BY CA3987416 2014-10-06

Nature: EASEMENT  
Registration Number: CA3987414  
Registration Date and Time: 2014-09-29 12:24  
Remarks: PART ON PLAN NEP83306  
APPURTENANT TO LOT G PLAN NEP83303

Nature: EASEMENT  
Registration Number: CA8868569  
Registration Date and Time: 2021-03-25 12:44  
Remarks: PART IN PLAN EPP108467; APPURTENANT TO LOT A PLAN  
NEP83303

**Duplicate Indefeasible Title** NONE OUTSTANDING

**Transfers** NONE



**MAKOLA**  
DEVELOPMENT  
SERVICES

## ATTACHMENT B: AGENT AUTHORIZATION FORMS



## Development Services & Engineering

Suite 101, 310 Ward Street, Nelson British Columbia V1L 5S4

Tel: (250) 352-8260

Email: [development@nelson.ca](mailto:development@nelson.ca)

Website: [www.nelson.ca](http://www.nelson.ca)

## OWNER'S REPRESENTATIVE FORM

The City of Nelson is collecting your personal information in accordance with Section 26 of the Freedom of Information and Protection of Privacy Act. The City of Nelson collects your information for the purposes of administering City of Nelson programs and services, including permits and licensing services. If you have any questions, please contact the Privacy Head at 310 Ward Street, Nelson, BC V1L 4P1 or FOI@nelson.ca or 250-352-8234.

### Property owner's agreement:

As owner(s) of the land described in this application, I/we hereby consent to the submission of this development or building application, and hereby authorize the following person to act as applicant in regard to this application:

**Name of Authorized Agent:** Kaela Schramm

**Agent's Business Name (if applicable):** M'akola Development Services

I have examined the contents of the application, certify that the information submitted with it is correct insofar as I have knowledge of these facts, and concur with the submission of the application. I acknowledge that it is my responsibility as the Property Owner to ensure full compliance with the Building Code, the Zoning Bylaw, Building Bylaw and other applicable legislation.

**Project Address:** 818-824 Front Street, Nelson BC, V1L 4B9

**Project Description:** Proposed 56 new, affordable residential units for low-to-moderate income people in Nelson

### REGISTERED PROPERTY OWNER(s): main contact

Please note for numbered or named companies, proof of signing authority is required.

NAME: Ken Bourdeau	PHONE: 250.352.8202 ext. 202	PHONE (ALTERNATE) :
COMPANY: City of Nelson	E-MAIL: kbourdeau@nelson.ca	
MAILING ADDRESS: 310 Ward Street, Nelson BC	POSTAL CODE: V1L 5S4	

SIGNATURE

DATE

### OTHER REGISTERED OWNER(s)

NAME (PRINT)

SIGNATURE

DATE

NAME (PRINT)

SIGNATURE

DATE

## OWNER'S REPRESENTATIVE FORM

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### Property owner's agreement:

As owner(s) of the land described in this application, I/we hereby consent to the submission of this development or building application, and hereby authorize the following person to act as applicant in regard to this application:

**Name of Authorized Agent:** Kaela Schramm

**Agent's Business Name (if applicable):** M'akola Development Services

I have examined the contents of the application, certify that the information submitted with it is correct insofar as I have knowledge of these facts, and concur with the submission of the application. I acknowledge that it is my responsibility as the Property Owner to ensure full compliance with the Building Code, the Zoning Bylaw, Building Bylaw and other applicable legislation.

**Project Address:** 818-824 Front Street, Nelson BC, V1L 4B9

**Project Description:** Proposed 56 new, affordable residential units for low-to-moderate income people in Nelson

### REGISTERED PROPERTY OWNER(s): main contact

Please note for numbered or named companies, proof of signing authority is required.

NAME: Joe Chirico	PHONE: (250) 352-8158	PHONE (ALTERNATE):
COMPANY: Regional District of Central Kootenay	E-MAIL: jchirico@rdck.bc.ca	
MAILING ADDRESS: 202 Lakeside Drive, Nelson BC		POSTAL CODE: V1L 6B9



November 25, 2024

SIGNATURE

DATE

### OTHER REGISTERED OWNER(s)

NAME (PRINT)

SIGNATURE

DATE

NAME (PRINT)

SIGNATURE

DATE



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## ATTACHMENT D: SITE DISCLOSURE STATEMENTS

# Site Disclosure Statement

All fields marked with an asterisk (\*) are mandatory.

Has the site been used for any industrial or commercial uses described in [Schedule 2](#) of the Contaminated Sites Regulation? \*

☐ Yes

☒ No

If you answered no to the question above, the form is not submitted to the ministry. As per Section 3.5 of the Contaminated Sites Regulation, a municipality or approving officer may still request a person to complete a site disclosure statement for their records.

## ^ Section I - Contact information

### A: Site owners(s) or operators(s)

Last name \*

Chirico

First name \*

Joe

Company, if applicable

Regional District of the Central Kootenays

Address \*

202 Lakeside Drive

City \*

Nelson

Province \*

BC

Country \*

Canada

Postal code \*

V1L 6B9

Phone number \*

250-352-8158

Email \*

jchirico@rdck.bc.ca

Last name \*

Andrijancic

First name \*

Natalie

Company, if applicable

The City of Nelson

Address \*

310 Ward Street

City \*

Nelson

Province \*

BC

Country \*

Canada

Postal code \*

V1L 6A6

Phone number \*

Email \*

+ Add Another



250-352-8221 ext. 221

nandrijancic@nelson.ca

## B: Person completing site disclosure statement (leave blank if same as above)

Last name

Wilson

First name

Rob

Company, if applicable

Active Earth

## C: Person to contact regarding the site disclosure statement

Last name \*

Wilson

First name \*

Rob

Company, if applicable

Active Earth

Address \*

102 - 9914 Main Street

City \*

Summerland

Phone number \*

250-469-0934

Email \*

rob.wilson@activeearth.ca

## ^ Section II - Site information

### Coordinates for the centre of the site:

#### Latitude

Degrees \*

49

Minutes \*

29

Seconds \*

46.1

#### Longitude

Degrees \*

117

Minutes \*

17

Seconds \*

27.1

#### Attention:

A separate map with appropriate scale showing the location and boundaries of the site must be included.

☒ I will include a map with my submission \*

Land ownership \*

☒ Legally titled, registered property

☐ Untitled Crown land

#### For legally titled, registered property

Site address \*

818 and 824 Front Street

City \*

Nelson

Postal code \*

V1L 4B9

PID \*

013-691-171

Land description \*

LOT 8 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)



PID \*

013-691-198

Land description \*

LOT 9 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)



PID \*

013-691-341

Land description \*

LOT 10 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)



PID \*

007-487-231

Land description \*

LOT 11 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)



+ Add Another

PID \*

007-487-240

Land description \*

LOT 12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)



### ^ Section III - Specified industrial or commercial uses

Indicate all the industrial or commercial uses described in the Contaminated Sites Regulation [Schedule 2](#) which have occurred or are occurring on this site.

#### Example Schedule 2 references and descriptions

E1. appliance, equipment, or engine maintenance, repair, reconditioning, cleaning or salvage

F10. solvent manufacturing, bulk storage, shipping and handling

Schedule 2 reference and description \*

None

Select all that apply, choose "none" if no Schedule 2 uses apply.

### ^ Section IV - Additional information

1. Provide a brief summary of the planned activity and proposed land use at the site. \*

The development plans include 56 new affordable housing units.

If not applicable, type N/A

2. Indicate the information used to complete this site disclosure statement including a list of record searches completed. \*

- Phase I Environmental Site Assessment, prepared by Active Earth, dated October 2024.

3. List any past or present government orders, permits, approvals, certificates or notifications pertaining to the environmental condition of the site: \*

N/A

If not applicable, type N/A

### ^ Section V - Declarations

Where a municipal approval is not required, you must indicate the reason for submission directly to the registrar:

Under order  
BIA proceedings

Foreclosure  
Decommissioning

CCAA proceedings  
Ceasing operations

**By signing below, I confirm that the information in this form is complete and accurate to the best of my knowledge:**

SIGNATURE



Sign above

For agents completing this form, save to PDF then forward the form to the owner/operator to complete this section.

First and last name

Joanne Motta, Housing Director

Owner

☒ Operator

Date signed

November 5 / 2024



### Approving authority contact information

All fields in this section must be completed by the municipality (including regional districts) or approving officer prior to forwarding the form to the site registrar.

First and last name

Agency

Address

Phone number

Email

Reason for submission (Please check one or more of the following):

☐ Building permit

☐ Subdivision

☐ Zoning

☐ Development permit

for an activity that will likely disturb soil

for an activity that will likely disturb soil

Date received by approving authority

Date submitted to registrar





**LEGEND**

— APPROXIMATE LEGAL LOT LINE

— APPROXIMATE SITE BOUNDARY



CLIENT NAME:  
NELSON CARES SOCIETY

PROJECT LOCATION:  
NELSON, BC

**SITE PLAN**

818 - 824 FRONT STREET

DRAWN BY: TL  
CHKD: CF

DWG NAME: FIG2  
PROJ: 11x17

DATE: 2024-10-29  
GSFILE: 4233

FIGURE 2



REFERENCE: DATA CATALOGUE, ESRI WORLD IMAGERY DATED 2022



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## ATTACHMENT E & F: ARCHITECTURAL SITE AND DEVELOPMENT PLANS

NOTE: See Attachment 3 of Request for Decision (RFD)  
for architectural and site plan, concept plans



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## ATTACHMENT G: PROPOSAL SUMMARY



# FRONT STREET REZONING & OCP AMENDMENT

## 1. INTRODUCTION

Nelson CARES Society (NCARES) is proposing to develop 50-units of affordable rental housing at 818 and 824 Front Street in Nelson, BC (the subject site). The proposed development is a 6-storey building, offering a mixture of studio suites, one-, two-, and three-bedroom units. The building also includes a recreation space that will expand and connect to the neighbouring Nelson & District Community Complex Facility (NDCC).

The project represents a partnership between the City of Nelson (the City), the Regional District of Central Kootenay (RDCK), NCARES, and BC Housing. NCARES has received preliminary funding from the City of Nelson, Chamber of Commerce, the Columbia Basin Trust, and Pre-Development Funds from BC Housing.

NCARES is seeking full project funding for the proposed development through BC Housing's Community Housing Fund (CHF). The CHF fund is focused on providing permanent, independent, affordable housing for low- and moderate-income households. The project team anticipates the CHF Fund Call for Proposals will open in early 2025.

The proposed development requires the following amendments to the Zoning Bylaw and Official Community Plan (OCP):

- 1) Rezone from I1 Institutional to CD10 Residential and Recreation Use Zone; and
- 2) Re-designated the OCP Schedule B Land Use Designations Map from Institutional to Mixed Use Core.

This document provides information about the development and a rationale for the proposed OCP and Zoning Bylaw amendments. This development does not require any variances to the Zoning Bylaw.



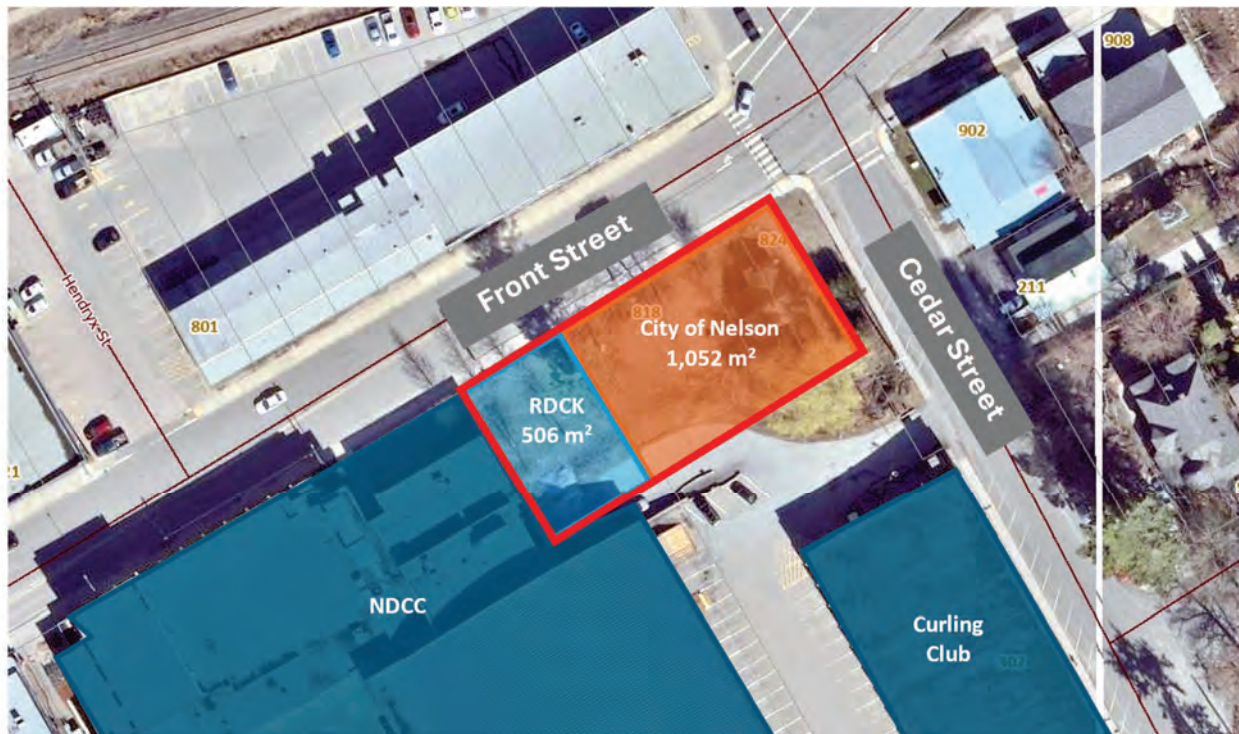


## 2. SITE OVERVIEW

The proposed site is located in the heart of downtown and neighbours the existing NDCC facility. The site is undeveloped and is currently vacant. The proposed development has been designed to activate the corner of Front Street and Cedar Street, which is currently under-utilized. The site is in close proximity to downtown amenities, shops, services, healthcare, and groceries, with direct access to nearby transit routes. As such, residents of the development will be within a 10-minute walk to the waterfront, and a 3-minute drive to the Kootenay Lake Hospital.

824 Front Street is a 1,052 m<sup>2</sup> (0.26 acre) property owned by the City of Nelson and 818 Front Street is a 506 m<sup>2</sup> (0.13 acre) property owned by the RDCK. The total size of the site is 1,558 m<sup>2</sup> (0.38 acres). The site is located between the NDCC building and Cedar Street, with the curling club located at the rear of the site (Figure 1).

Figure 1: Site Context



## 3. HOUSING NEED AND DEMAND IN NELSON

The recently updated (October 2024) City of Nelson Housing Needs Report highlights a significant need for more affordable housing opportunities to support community members living and working in Nelson. The updated 2024 Housing Needs Report estimates that the City may require an additional 3,104 rental units, with at least 717 at an affordable, below-market rent, to be built by 2041 to mitigate rising housing costs. Of those 3,104 rental units, it is anticipated that at least 1,034 studio/one-bedrooms and 869 two-bedrooms will be required to adequately address the growing demand. The proposed 50 rental units will directly work to address the projected demand by providing 14 studios, 32 one-bedrooms, 2 two-bedrooms, and 2 three-bedroom units for community members living and working in Nelson.

In 2021, Statistics Canada reported approximately 21% of households in Nelson were living in unaffordable circumstances, with 10% of those living in core housing need, meaning that they are spending 30% or more of their income on shelter costs. Of those living in core housing need, 19% are renter households.

In addition, the updated 2024 Housing Needs Report demonstrates that renter households are among the greatest housing need and suggests that 43% of new units should be available at affordable or below-market prices.

Additional details about how data about housing need informed the development is provided in Section 5.5.

#### 4. FUNDING CONSIDERATIONS

In 2025, NCARES will submit an application to BC Housing Community Housing Fund (CHF). The CHF program is focused on permanent and long-term, independent housing for individuals, seniors, and families with low to moderate incomes. The CHF Program includes affordable rental housing but, does not include supportive or emergency housing.

The CHF Program requires the following rental mix:

- 30% Near Market Rent
- 50% Rent Geared-To-Income (qualifying tenants pay 30% of their income to shelter costs for those who are at or below the Housing Income Limit (HILs))
- 20% Deeply Affordable Units

Eligible applicants for Near Market Rent must meet the current low-and moderate-income limits. For 2024, this means applicants must have household income between \$84,780 to \$134,140 to apply. Tenants eligible for Near Market Rent will be required to provide proof of income when moving in. Residents eligible for RGI must have an income below the HILs and are required to be selected from BC Housing's Housing Registry. In addition, Deeply Affordable units will be eligible to residents with an income below the Deep Subsidy Income Limits, as established by BC Housing, and will be selected from the Housing Registry. Those on RGI and Deeply Affordable units are subject to an annual rent review.

HILs represent the eligible maximum gross household income for many affordable housing program, including CHF, and are based on figures established by CMHC. The HILs are intended to reflect the minimum income required to afford appropriate accommodation in the private market. HILs data for Nelson is considered under the Non-Market Areas for Southern BC and are as follows:

- \$65,000 for one-bedroom or less
- \$78,000 for two-bedrooms
- \$87,000 for three-bedrooms

As a part of the CHF Program requirements, the development cannot have more than 30% of non-residential space.

## 5. BUILDING OVERVIEW AND SITE DESIGN

### 5.1 BUILDING PROGRAM

Figure 2 provides a schematic overview of the building program. The proposed building includes:

- 2 storeys of parking (with a total of 45 parking spaces)
- 50 residential units
- 510 m<sup>2</sup> NDCC expansion on Level 3 (with double-height ceilings). The proposed NDCC expansion will connect to the existing NDCC space and will not interfere with any operational services.

The proposed building includes studio units along Front Street to activate the street frontage and avoid a blank wall that could be created by having parking at street level.

Figure 2: Schematic Overview of Building Program

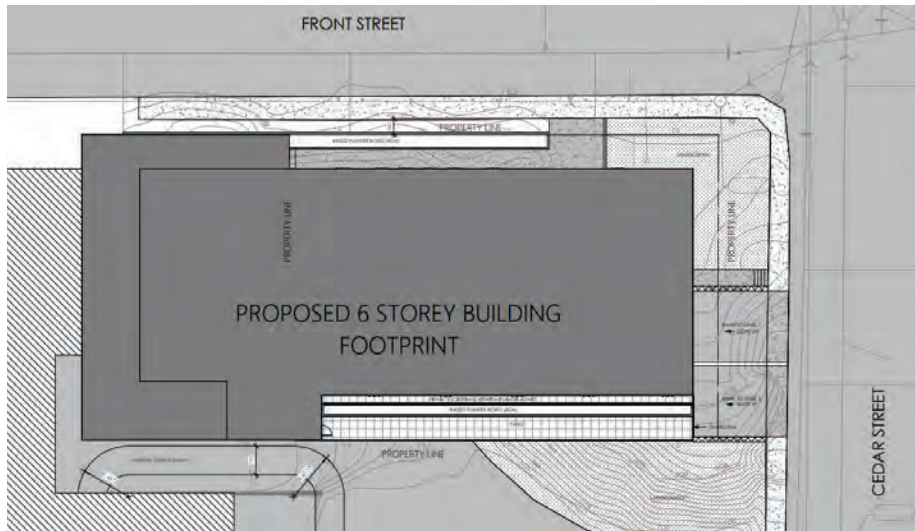




## 5.2 SITE LAYOUT AND ACCESS

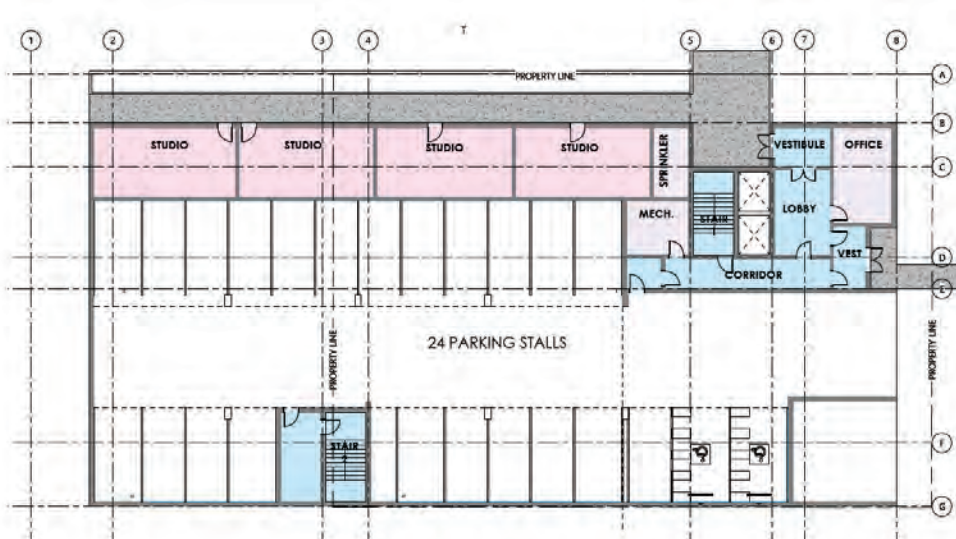
Figure 3 provides an overview of the proposed site plan. Vehicle access to the parking area will be from Cedar Street. There will be one ramp to Level 1 parking and one ramp to Level 2 parking from Cedar Street. The proposed building has been designed to accommodate for zamboni access and turn around to the arena at the rear of the proposed building.

**Figure 3: Site Plan**



There will street-level pedestrian access to the building from both Front Street and Cedar Street through a vestibule that leads to a lobby and the stairs and elevator (Figure 4).

**Figure 4: Level 1 Floor Plan**



---

### 5.3 RESIDENT AMENITIES

Residents of the proposed building will have access to amenities on-site, including short-term and long-term bike storage, a shared laundry room, significant tenant storage, a shared indoor amenity space, and access to outdoor green space. Level 2 of the proposed building includes space for 59 long-term bike storage lockers and a tenant storage area.

---

### 5.4 ACCESSIBILITY AND ENERGY EFFICIENCY

All of the units in the proposed building will be Adaptable as per the BC Building Code standards and a minimum of 3 units will be fully accessible (BC Housing requires 5% of units be fully accessible for the CHF program). Accessible units will be prioritized for people with disabilities.

The proposed development will achieve Step Code 3.

---

### 5.5 UNIT COUNT AND BEDROOM TYPOLOGY

The proposed development includes 50 units with the following bedroom typology:

- 14 studios
- 32 one-bedrooms
- 2 two-bedrooms
- 2 three-bedroom

Figure 5 (from the City's Housing Need Report) summarizes housing need by bedroom type and level affordability. Figure 4 illustrates that for Affordable and Deeply Affordable housing, there is a stronger need for studio and 1-bedroom units, whereas for market housing the need is greater for 2-bedroom and larger + units.

Figure 5 – 5 and 10 Year Housing Need by Bedroom Typology and Affordability

	Market		Affordable / Below-market		Deeply affordable		Total	
	5-year	20-year	5-year	20-year	5-year	20-year	5-year	20-year
0- / 1-bed	161	460	152	484	39	90	352	1,034
2-bed	260	741	33	108	8	20	302	869
3-bed	194	578	22	76	6	14	222	668
4+ bed	153	475	14	48	3	9	170	532
Total	768	2,253	221	717	56	134	1,045	3,104

The proposed development is pursuing funding from BC Housing's CHF program, which requires the following tenant mix:

- 30% Near Market Rent (15 units)
- 50% Below Market (25 units)
- 20% Deeply Affordable (10 units)

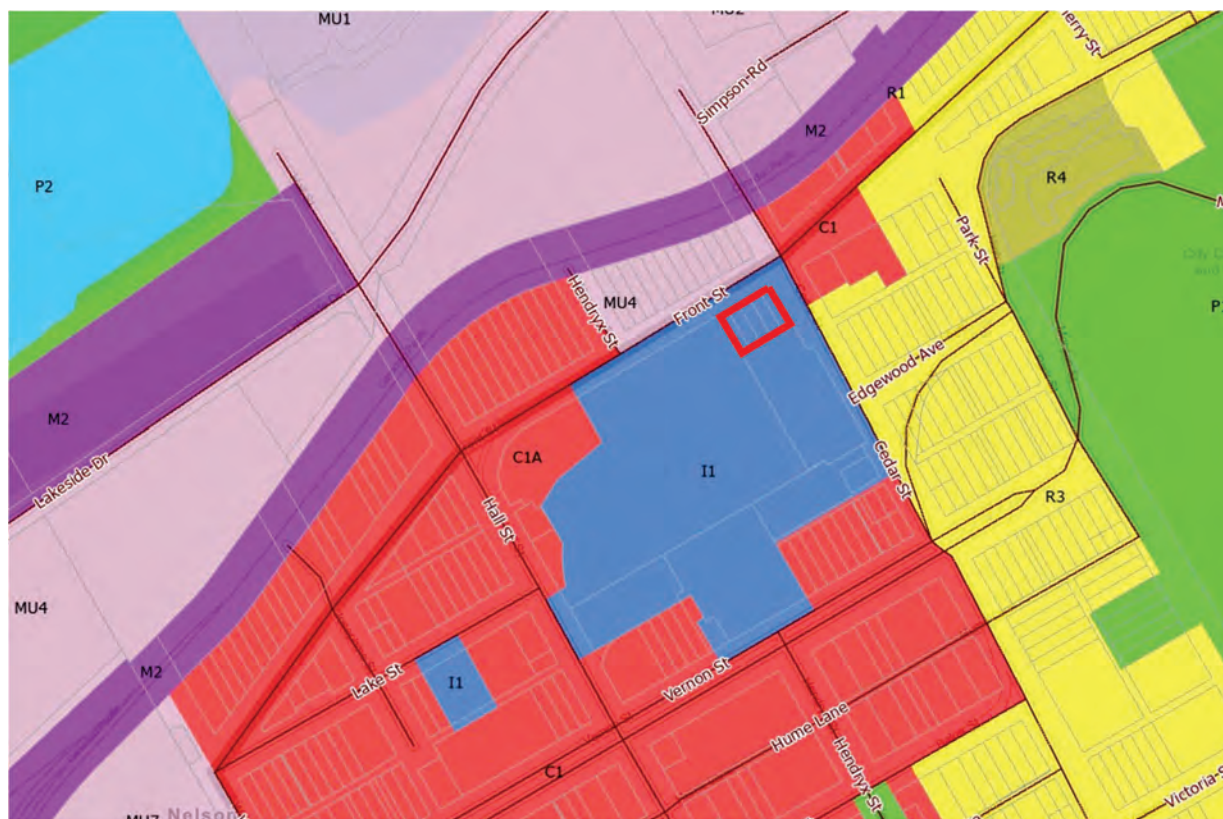
Given that 35 of the 50 units will be Below Market or Deeply Affordable, the proposed development includes predominantly studio and one-bedroom, reflecting that studio and one-bedroom units are in the most need for Below Market and Deeply Affordable housing. The development does include two 2-bedroom and two three-bedroom units to accommodate families.

## 6. ZONING ANALYSIS

The proposed development is located in the I1 Institutional Zone (Figure 6). The Site is in a part of the downtown that has a mix of C1 Core Commercial, I1 Institutional, R3 Downtown Residential and R4 High Density Residential, and MU4 Waterfront Mixed-Use.

For this development we propose a Comprehensive Development (CD) zone in order to develop a zone that meets the specific needs of the building. The proposed CD10 Residential and Recreation Use Zone (enclosed with the rezoning application) includes specific regulations that are similar to the C1 and C1A zone. The proposed CD10 zone includes significantly fewer permitted uses than the C1 and C1A zone, to reflect the vision for a building that can combine recreational/community uses with multi-unit residential uses.

Figure 6 – Current Zoning Map



## 6.1 LAND USE AND BUILDING SITING

Table 1 provides an analysis of zoning regulations for the proposed CD10 zone. Table 1 includes C1 Zone regulations for reference to help illustrate the similarities and differences between the proposed CD10 and C1 zones.

Table 1: Zoning Analysis

Regulation	C1 Zone	CD10 Requirement	Provided	Compliance
<b>Permitted Uses</b>	<ul style="list-style-type: none"> <li>31 commercial uses</li> <li>Residential uses are permitted when in a mixed-use building</li> </ul>	<ul style="list-style-type: none"> <li>Off-Street Parking</li> <li>Participant Recreation Services, indoor</li> <li>Professional and Business Offices</li> <li>Public Administration</li> <li>Public Assembly</li> <li>Multi-Unit Residential</li> </ul>	<ul style="list-style-type: none"> <li>Off-Street Parking</li> <li>Participant Recreation Services, indoor</li> <li>Multi-Unit Residential</li> </ul>	Complies
<b>Front Lot Line Minimum Setback</b>	0 m	0 m	0 m at NDCC Expansion 3.1 m at main building	Complies
<b>Rear Lot Line Minimum Setback</b>	0 m	0m	0 m	Complies
<b>Rear Lot Line Minimum Setback if lot is not served by a constructed rear lane</b>	1.5 m	1.5 m	n/a	n/a
<b>Exterior Side Lot Line Minimum Setback</b>	0 m	0m	2.3 m	Complies
<b>Interior Side Lot Line Minimum Setback</b>	0 m (3.0 m if not served by a lane or if adjacent to residential zoning)	0 m	0 m NDCC expansion	Complies
<b>Maximum Height Principal Building</b>	16 m	18 m	16.4	Complies
<b>Maximum Height Accessory Building</b>	4.5 m	4.5 m	n/a	Complies
<b>Minimum Lot Area</b>	278 m <sup>2</sup>	278 m <sup>2</sup>		Complies after lot consolidation
<b>Minimum Lot Width</b>	7.6 m	7.6 m		Complies after lot consolidation

## 6.2 PARKING

The proposed development includes a total of 45 parking spaces, with 5 spaces dedicated for NDCC and 40 spaces dedicated to the residents of the building. One of the spaces will be an accessible parking stall. The NDCC expansion is not expected to significantly increase parking demand because the space represents an expansion of existing uses (as opposed to the creation of a new arena, pool or other facility). The NDCC expansion is intended to provide more space for existing programming.

The development includes 40 spaces for the residential portion of the development to accommodate tenants who live in Market Rental (15 units) and some of the tenants living in RGI (25 units), as these tenants are more likely to own a vehicle. Tenants living in Deeply Affordable Units (10 units) earn less than \$30,000 per year and are unlikely to own a vehicle; therefore, parking spaces for Deeply Affordable units are not provided.

The proposed parking regulations outlined in the CD10 zone seek to meet the unique needs of the building and include:

- Participant Recreation Services, indoor: 1 space per 100 sq m of GFA
- Multi-Unit Residential: 0.8 space per 1 dwelling unit

The proposed 0.8 parking spaces per dwelling unit is based on parking demand in comparable non-profit housing developments in Nelson, as shown in Table 2.

Table 2: Parking Supplies vs In Use at Non-Profit Housing Developments in Nelson

Location	Unit Count	# Stalls	Stalls in Use	In Use/Unit
Herridge Place	• 39 RGI Units	19	19	0.5 spaces per unit
Copper Mountain Court	• 37 RGI Units	39	31	0.8 spaces per unit
Hall Street	• 12 Near-Market • 20 RGI units • 9 Deeply Affordable • 2 Community Living BC for people with disabilities • T=41 units	27 for residential tenants	25	0.6 spaces per unit

Given the location in downtown Nelson, the project does not include visitor parking or loading spaces. Visitor parking and loading spaces will be in the form of on-street parking. Our expectation is the 38 residential parking spaces will not be fully utilized, and some underground visitor parking will be available.

To help reduce parking demand, the proposed development includes:

- 1 of the 45 required stalls will be dedicated to a car share vehicle. Prior to Final Reading, NCARES will provide a Memorandum of Understanding outlining the agreement between NCARES and Kootenay Car Share.
- All spaces will be Electric Vehicle (EV)-ready



- 2 spaces will include EV chargers
- 59 secure, long-term bike storage spaces will be available for tenant's use.

The proposed 45 stalls meet the requirements of the proposed CD10 zone following the calculation below:

- 5 parking spaces for NDCC (1 space per 70 m<sup>2</sup>)
- 40 spaces for Residential (0.8 spaces per dwelling unit)
- **Total = 45 parking spaces**

---

### 6.3 TRAFFIC IMPACTS

To address any potential issues, the Project Team is currently having a Traffic Impact Assessment and Parking Study conducted to confirm if the proposed concept accounts for parking and traffic appropriately. Furthermore, the Project Team has accommodated the required parking underground, with access off of Cedar Street to ensure traffic is kept out of the way from neighbouring businesses.

---

### 6.4 MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

Front Street is a provincial highway (Highway 3A) and is regulated by MOTI. Given the Site is within 800 m of a controlled Highway access, MOTI will be required to review and approve the proposed zoning bylaw amendment.

## 7. OFFICIAL COMMUNITY PLAN ANALYSIS

We understand that the City is currently undergoing an Official Community Plan (OCP) update process, but we anticipate the final OCP will not be adopted ahead of this application being submitted, therefore we have relied on the policies and land use designation in OCP Bylaw No. 3247, 2013.

This application proposes an OCP amendment to re-designate the Site from Institutional to Mixed Use Core. Figure 5 illustrates the current OCP designation. The proposed Mixed Use Core designation is appropriate because it aligns with land use designations in the surrounding area and reflects the Site's downtown location. The reason an OCP amendment is required is because the site is currently designated for institutional uses, which do not capture the proposed residential uses. The following section provides an analysis of how the proposed development aligns with and is supported by OCP policies.

**Figure 5: Current OCP Land Use Designation**



While the development aligns with numerous policies within the OCP, the proposed development requires an OCP amendment to reflect the change from purely institutional use to a mix of institutional and residential uses. The table below summarizes OCP guidelines and objectives that support the proposed development.

OCP Goal/Objective/Policy	Proposed Project Alignment
To achieve a geographical distribution and mix of housing types, densities, and tenures throughout the City of Nelson to provide the community with a variety of housing choices and lifestyle options. (Page 26)	By offering a range of unit sizes at a mix of affordable rental costs, the proposed project will diversify the housing types and tenures accessible for all residents in Nelson.
To provide a diversity of housing options that are appealing, attainable, and affordable to all citizens, of all ages, abilities and income levels (p.26)	The proposed development includes a mix of bedroom typologies (studio, 1-bedroom, 2-bedroom and 3-bedroom) and a range of affordability levels to meet the needs of a diverse range of people. The development also includes a high level of accessibility for seniors and people with disabilities, including 3 Accessible units and all other units are Adaptable (meaning they can be easily upgraded to become Accessible).
To ensure our neighbourhoods are complete communities and that each have convenient access to commercial, leisure, and education spaces and services. (P.26)	The proposed development is in close proximity to downtown amenities, shops, services, healthcare, and groceries, with direct access to nearby transit routes. Residents of the development will live within a 10-minute walk to the waterfront, and a 3-minute drive to the Kootenay Lake Hospital.
The City will focus new growth and mixed used development in the Downtown and Waterfront to support a vibrant city centre while protecting	The proposed project has been designed to fit into the surrounding neighbourhood by creating additional housing options to support a vibrant

outlying natural and agriculture areas from sprawl. (Page 26-27)	city centre. Through the connection to the existing Nelson & District Community Complex and detailed building design, the development process will ensure elements to support the proper integration into the existing community.
The City will consider changes to regulations which would permit 6 storey wood frame construction in the Downtown or other suitable areas. (Page 28)	The proposed development has been designed to be a 6-storey building to maximize units available on site and provide sufficient parking. As the subject site is located in the Downtown and Waterfront area, this building height has been developed to compliment to existing neighbourhood character and surrounding buildings such as the NDCC.
To encourage mixed use buildings in the Downtown and accommodate residential units above retail/office uses. (Page 31)	Aligning with this goal, the proposed residential development has been designed to include a mixed-use component for tenants through its connection to the existing NDCC Facility.
To continue to work to provide a full range of housing types and tenures for current and future residents of all incomes, lifestyles, and abilities. (Page 46)	By offering a range of unit sizes at a mix of affordable rental costs, the proposed project will diversify the housing types and tenures accessible for all residents in Nelson.
To encourage affordable, multi-unit housing to be located in areas without steep slopes, within reasonable walking distance of services such as a commercial area, a bus line, a park or recreation centre, and/or near medical facilities. (Page 46)	The location of the proposed project has been identified in collaboration with the City. The subject site is located within the Downtown Core with direct access to shops, amenities, transit, health services, parks, and the Waterfront area.
The City will consider measures to support development of purpose-built rental housing. These measures can include consideration of variances to reduce the off-street parking requirements, and fee and/or tax reductions. (Page 46)	The proposed project will be a purpose-built, affordable residential building for low-to-moderate income residents. Residents will have direct access to active transportation systems, and it is assumed that tenants of this development will have lower rates of car ownership. To ensure that parking and traffic is accurately accounted for, a Traffic Impact Assessment is currently being conducted.
The City will consider leasing city-owned land for affordable housing purposes. (Page 46)	NCARES is a non-profit housing provider and committed to creating affordable housing opportunities for all Nelson community members. As such, the proposed project is located on City and RDCK owned lands and has been identified as a potential opportunity to enhance affordable housing options in Nelson.
To infill key vacant or underutilised mixed use parcels within the Downtown to reinforce its position as a nucleus of the City.	The proposed development represents an efficient use of vacant land and will activate a corner of downtown that is currently inactive.

## 8. COMMUNITY ENGAGEMENT

NCARES will host a community meeting and schedule a public hearing in early 2025 as a part of the rezoning and OCP amendment process. NCARES has already had initial conversations with community members through an Open House for one of their existing buildings to initiate knowledge sharing about the proposed Front Street development. Throughout the development process, the Project Team will ensure that the proposed project will fit into the existing downtown neighbourhood around Front Street, and by extension the entire Nelson community as whole.

NCARES is planning to use the following engagement tools to keep the community informed:

- 1) Project webpage to share key information and project updates.
- 2) Email address for NCARES Project Lead for the public to direct inquiries to.
- 3) NCARES is hosting one-on-one meetings with members of the public.
- 4) Project Update Presentation to Council December 6, 2024

The open house will be promoted through the following methods:

- 1) Advertisement in the local newspaper 1 week in advance of the event.
- 2) Notification to neighbours within 60 m of the Site.
- 3) Information on the NCARES webpage about the open house.

Following the open house there will be a 2-week comment period. All comments received at the open house and during the 2-week comment period will be compiled into a report summarizing how verbal and written comments were addressed. This report will be provided to the City for consideration with this application.



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## ATTACHMENT H: CD10 ZONE

NOTE: See Attachment 4 of Request for Decision (RFD)  
report for draft CD10 zone



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## ATTACHMENT J: SUSTAINABILITY CHECKLIST



# Sustainability Checklist

## RESIDENTIAL CONSTRUCTION

### FOR BC BUILDING CODE PART 9 AND PART 3 BUILDINGS (CLIMATE ZONES 5 TO 7A)

**Attention to sustainability** in planning and building your residential project will create a quality building with reduced long-term utility costs. Use this checklist to help plan, design and build with goals of sustainability and energy-efficiency.

The RDCK encourages energy efficiency measures and renewable energy technologies in new residential construction and retrofits. This supports regional goals of sustainability and energy reduction objectives as outlined in the Strategic Community Energy and Emissions Plan.

**Please return the completed checklist with your building permit application package.**

Property Owner/ Project Manager Name

Property Address

Project Description

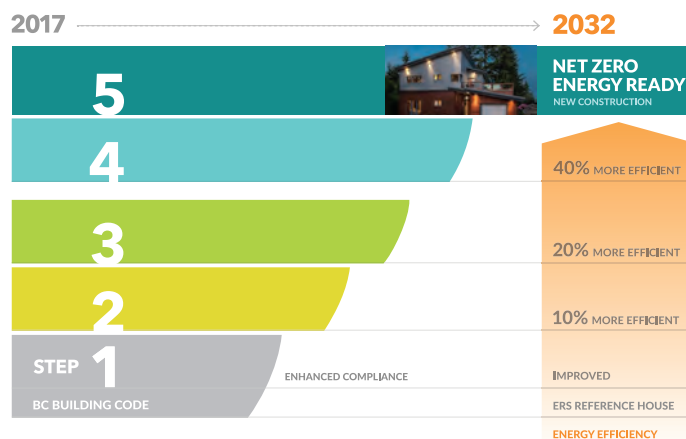
- ☒ New residential construction
- ☐ Addition to existing residence
- ☐ Structural or building envelope renovation
- ☐ Other

#### Consider each item and check those applicable to your project: (also see reverse)

- ☒ Take a holistic approach to building and reap the reward: energy efficiency, shade trees, solar exposure, attention to building practice detail, etc.
- ☒ Find an Energy Advisor through **BC Home Performance Stakeholder Council** or **Natural Resources Canada** service provider listings.
- ☒ Check for updated energy advice and incentives at <https://efficiencybc.ca>
- ☒ Work with an Energy Advisor from initial project design. Plan to meet a minimum **Step 1** of the BC Energy Step Code
- ☒ Review BC Energy Step Code guidelines. Examples of green labels include ENERGY STAR® for New Homes or R-2000 home
- ☒ Review utility rebates and savings offers as applicable:  
<https://efficiencybc.ca>  
<https://www.fortisbc.com/Rebates/RebatesOffers/Pages/default.aspx>  
<https://www.bchydro.com/powersmart/residential/savings-and-rebates.html>

#### Notes on BC Energy Step Code

The BC Energy Step Code is a voluntary provincial standard that provides a consistent approach to achieving more energy-efficient buildings. Builders work with an energy advisor, who uses software to analyze construction plans and determine building energy efficiency. During construction, pay special attention to air sealing, walls, windows, doors and insulation to achieve energy model performance. Regardless of the BC Energy Step Code step chosen, the ultimate building comfort and reduced utility bills will reward the future homeowner / building occupant.



# SUSTAINABILITY CHECKLIST INSTRUCTIONS:

**The intent of** this Checklist is not to “pass” or “fail”, but rather to assist applicants and the Building Department to work together to develop high quality residential buildings and promote energy efficient building practice in our region. Please review and consider all items on the checklist.

## Site consideration

- ☒ Optimum solar orientation and use natural geographic/ecological features in building siting.
- ☒ Compact development and minimum disturbed site area considered.
- ☒ Surface water management: permeable lot, permanent erosion controls and/or roof run-off management.
- ☒ Landscape plan: shade trees, fire-smart varieties, low irrigation demand, drought tolerant plants, no invasive plants.
- ☒ Plan for site erosion control during construction.
- ☒ Make your property FireSmart

## Building Energy Efficiency (BC Energy Step Code)

- ☒ Work with a **Certified** Energy Advisor.
- ☐ Review building energy efficiency and EnerGuide home evaluations
- ☒ Use efficient hot water distribution/domestic hot water equipment.
- ☒ Install hot water pipe insulation.
- ☒ Use appropriate sized & high efficiency HVAC equipment; minimal losses from heating and cooling distribution system.
- ☒ High performance envelope; including exterior or enhanced insulation.
- ☒ Build for minimal envelope leakage and maintain strict attention to air sealing detail during construction.
- ☒ Install enhanced performance windows and doors.
- ☒ Install external window blinds / shades
- ☒ Use efficient ENERGY STAR® lighting options.
- ☒ Install ENERGY STAR® water efficient appliances, e.g., washing machine.
- ☒ Investigate renewable energy system, e.g., air source heat pump with electric or natural gas backup.
- ☒ Investigate drain water heat recovery.
- ☐ Install solar photovoltaic system, or make ready for future retrofit.

## Waste Management

- ☒ Plan for recyclables, compost and waste storage on site.
- ☒ Use environmentally preferred products.
- ☒ Practice material efficient framing (order waste factor limit, detailed framing documents, detailed cut list and lumber order, framing efficiencies, off-site fabrication).
- ☒ Use construction waste management and reduction practice.

## Active and Low Carbon Transportation

- ☒ Clear and safe pedestrian access and pathways.
- ☒ Bicycle storage or racks.
- ☒ Electric vehicle charging infrastructure placement (make ready for easy retrofit of “level 2” charger).

## Indoor Environmental Quality (BC Building Code)

- ☒ Review combustion venting measures.
- ☒ Review moisture load control.
- ☒ Install outdoor air ventilation.
- ☒ Install local exhaust vents.
- ☒ Consider enhanced energy efficiency performance for distribution of space heating and cooling.
- ☒ Install high quality air filters.
- ☒ Choose low-VOC or zero-VOC (volatile organic compounds) paint.
- ☒ Use radon resistant construction practices.
- ☒ Ensure garage pollutant protection.

## Water Conservation

- ☒ High efficiency fixtures and fittings (low flush toilets, low flow showerheads, tap aerators).
- ☐ Rainwater harvesting system.
- ☐ If available, graywater reuse system.
- ☒ Maintain xeriscape or low irrigation needs (e.g. consider native plants, fire-smart varieties) or high efficiency irrigation system.
- ☒ Ability to monitor occupant water usage. (i.e., install water meter)

## Awareness and Education

- ☒ Be familiar with energy efficiency practices and efficient use of heating /cooling /ventilation building controls (and teach all residents of home).
- ☒ Be familiar with BC Energy Step Code

Date Checklist completed

Signature

Property Owner/Project Manager



Area A

Area B

Area C

Area D

Area E

Area F

Area G

Area H

Area I

Area J

Area K







# Sustainability Checklist

## COMMERCIAL CONSTRUCTION

FOR BC BUILDING CODE PART 9 AND PART 3 BUILDINGS (CLIMATE ZONES 5 TO 7A)

**Attention to sustainability** in planning and building your commercial project will create a quality building with reduced long-term utility costs. Use this checklist to help plan, design and build with goals of sustainability and energy-efficiency.

The **RDCK** encourages energy efficiency measures and renewable energy technologies in new commercial building construction and retrofits. This supports regional goals of sustainability and energy reduction objectives as outlined in local **Strategic** Community Energy and Emissions Plans.

**Please return the completed checklist with your building permit application package.**

Property Owner/ Project Manager Name

Property Address

Project Description

- ☐ New construction
- ☐ Addition to existing building
- ☐ Structural or building envelope renovation
- ☐ Other

**Consider each item and check those applicable to your project: (also see reverse)**

- ☐ Take a holistic approach to building and reap the reward: energy efficiency, shade trees, solar exposure, attention to building practice detail, etc.
- ☐ Review BC Energy Step Code guidelines.
- ☐ Work with an energy modeller from initial project design and choose the performance path to meet the energy requirements of the Building Code.

- ☐ Review utility offers and programs to help your business save energy and money, as applicable:

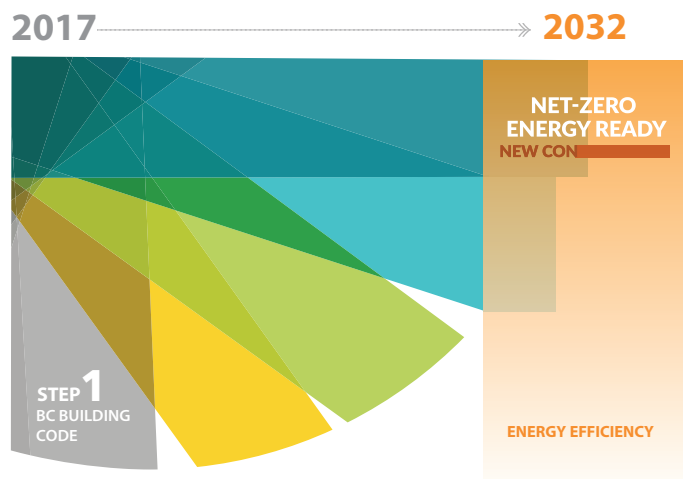
<https://efficiencybc.ca>

<https://www.fortisbc.com/Rebates/RebatesOffers/Pages/default.aspx>

<https://www.bchydro.com/powersmart/business.html>

### Notes on BC Energy Step Code

The BC Energy Step Code is a voluntary provincial standard that provides a consistent performance-based approach to achieving more energy-efficient buildings. Builders work with an energy modeller, who uses software to analyze construction plans and determine building energy efficiency. During construction, pay special attention to air sealing, walls, windows, doors and insulation to achieve energy model performance and air-tightness. The BC Energy Step Code will eventually become the base building code as the province moves towards net-zero energy buildings by 2032. Become familiar with it now and take advantage of benefits such as improved building comfort and reduced utility bills for the occupants.



# SUSTAINABILITY CHECKLIST INSTRUCTIONS:

**The intent of** this Checklist is not to “pass” or “fail”, but rather to assist applicants and the Building Department to work together to develop high quality commercial buildings and promote energy efficient building practice in our region. Please review and consider all items on the checklist.

## Site consideration

- ☐ Optimum solar orientation and use natural geographic/ecological features in building siting.
- ☐ Compact development and minimum disturbed site area considered.
- ☐ Surface water management: permeable lot, permanent erosion controls and/or roof run-off management.
- ☐ Landscape plan: shade trees, fire-smart varieties, low irrigation demand, drought tolerant plants, no invasive plants.
- ☐ Plan for site erosion control during construction.
- ☐ Make your property FireSmart

## Building Energy Efficiency

- ☐ Design and construct a high performance building envelope
- ☐ Exterior or enhanced insulation
- ☐ Advanced framing techniques
- ☐ Attention to air sealing detail
- ☐ Enhanced performance windows and doors
- ☐ External window blinds/shades to mitigate unwanted heat gain
- ☐ Choose energy efficient and appropriately-sized mechanical systems
- ☐ HVAC equipment with minimal losses from heating and cooling distribution system
- ☐ Efficient hot water distribution/domestic hot water equipment, drain water heat recovery, hot water pipe insulation
- ☐ Investigate renewable energy systems
- ☐ Air source heat pump with backup
- ☐ Solar photovoltaic system, or make ready for future retrofit
- ☐ Meet the energy requirements of the building code with the BC Energy Step Code
- ☐ Work with an energy modeller on building design and airtightness testing

## Waste Management

- ☐ Plan for recyclables, compost and waste storage on site.
- ☐ Use environmentally preferred products.
- ☐ Practice material efficient framing (order waste factor limit, detailed framing documents, detailed cut list and lumber order, framing efficiencies, off-site fabrication).
- ☐ Use construction waste management and reduction practice.

## Active and Low Carbon Transportation

- ☐ Clear and safe pedestrian access and pathways.
- ☐ Bicycle storage or racks.
- ☐ Electric vehicle charging infrastructure placement (make ready for easy retrofit of “level 2” charger).

## Equipment, Appliances and Lighting

- ☐ Use efficient ENERGY STAR® lighting options.
- ☐ Install ENERGY STAR® / water efficient appliances, e.g., washing machine.
- ☐ Commercial kitchens: FortisBC has incentives for electric and natural gas kitchen equipment (depending on your service area).
- ☐ Industrial facilities: Investigate other equipment-specific opportunities and incentives.

## Water Conservation

- ☐ High efficiency fixtures and fittings (low flush toilets, tap aerators, pre-rinse spray valves).
- ☐ Rainwater harvesting system.
- ☐ If available, graywater reuse system.
- ☐ Maintain xeriscape or low irrigation needs (e.g. consider native plants, fire-smart varieties) or high efficiency irrigation system.
- ☐ Ability to monitor occupant water usage. (i.e., install water meter)

## Awareness and Education

- ☐ Once the building is operational, ensure best energy management practices. All operators must be familiar with energy efficiency practices and efficient use of heating /cooling /ventilation building controls.
- ☐ Practice regular energy performance checks as regular building maintenance.
- ☐ Use ENERGY STAR® PortfolioManager®.

Date Checklist completed:

Signature

Property Owner/Project Manager



Area A

Area B

Area C

Area D

Area E

Area F

Area G

Area H

Area I

Area J

Area K





January 10, 2025

VIA Electronic Delivery  
City of Nelson  
310 Ward Street  
Nelson BC, V1L 5S4

**RE: Response to City Comments for Nelson CARES Rezoning and OCP Amendment – Front Street**

Dear Ken Bourdeau,

Thank you for your response to our rezoning and OCP amendment application for the Nelson CARES affordable housing and NDCC expansion development. Enclosed with this letter are revised architectural drawings.

A key challenge identified through the design review is the loss of on-street parking stalls on Cedar Street due to the proposed access. We have requested that the City considers access from the rear lane, which is City-owned property. During pre-application meetings, the City did not support rear lane access to the building, but based on conversations with City staff they may be willing to support the proposed change.

We will share both design options during the public open house planned for the development. Following the two-week public comment period, we will submit a final design to the City for consideration. Please note we cannot finalize our traffic impact analysis until the access to the site is confirmed. We are working towards having all the necessary material submitted to the City to provide adequate time for this proposal to be considered for 1<sup>st</sup>/2<sup>nd</sup> Reading on March 4, 2025.

This following outlines responses to City comments received via email on December 19, 2024.

**1. Please provide a copy of charges from title 027-011-151 (NDCC).**

*We will provide this via email later this week.*

**2. There's a significant amount of info missing from the drawings. Please review the drawings to ensure all info needed to ensure compliance with the Zoning Bylaw and Off-Street Parking & Landscaping Bylaw is included. Here are some of the items I noticed, there may be more:**

- Dimensions for vehicle and bicycling parking stalls, drive-aisle etc. *They conform and dimensions have been added to A200.*
- Location of visitor vehicle parking stalls. What's the plan for visitors to access those? *Given the downtown location, we proposed visitor parking to be on-street. As discussed, there will be 5 on-site stalls dedicated to NDCC staff, but no plans for on-site visitor parking as Nelson CARES wants to restrict access to underground parking for security reasons.*
- Location of short-term bicycling parking. It appears all bike parking is located in the storage area on Level 2. Review Section 9.1 (5) of the Off-Street Parking Bylaw for location requirements. *Bicycle parking has been added to the Cedar Street frontage; see A101.*
- Location of the 2 EV chargers mentioned in your cover letter. The Bylaw review table states "42 Level 2 Chargers". Is the intent to have 2 EV chargers or 42? The Off-Street Parking Bylaw requires all stalls to be EV ready with 2 chargers. *We intend to have 43 EV-ready stalls*



- and 2 stalls with EV chargers, but subject to review by the electrical engineer when the design progresses. We can provide that more detailed design at DP Stage.*
- Dimensions for amenity spaces *All areas are noted in the table on A003*
  - Location of Waste/Recycling Collection room *See A202 between Grid Line F and G, adjacent to stairwell.*
  - LEVEL 1 – Parking stalls for people with disabilities. It appears there are 5 columns located within each of the stalls. *Those are not columns, they are painted pavement markings for access to the accessible parking stalls, per 3.8.3.2. of the BC Building Code; A200 has been updated for clarity.*
- 3. The cover letter mentioned 5 stalls for NDCC. What's the plan to allow public access to those?**  
*It would not be for public access, just limited RDCK staff use.*

#### **4. Development Permit Guidelines – DP Area #2**

Even though, we're not at DP stage yet. I did a brief overview of the design and there are a number of potential issues with DP design guideline compliance:

- Overall concern with building materials. Please review section 3.3.2.c of Development Permit Area #2 design guidelines. Some general comments:
  - Yellow Accent colour is not permitted: "Colours – A variety of colour schemes is encouraged, yet overly bright or displeasing colours is discouraged. Generally, colours should be based on hues found within the natural environment, and be augmented with white and/or black to mute their tone." *We will propose colour samples at the DP stage, although it's worth noting that there are buildings in town which are entirely yellow (adventure hotel), and in this case it is only a feature accent, not the colour of the entire building. The drawing set has been updated with greyscale drawings for now.*
  - Provide a sample (electronically or otherwise) of the proposed building materials. *At the DP stage a sample of the building materials will be incorporated into the submission. The elevation drawings (A300) do provide a list of planned materials.*
- Cedar Street & Front Street corner: How are you going to deal with deliveries and people being dropped off? Right now the building entrance is oriented towards Front St which is going to encourage people to stop directly in front of the building entrance on the highway when dropping someone off, or delivering something. The building entrance should be opened up more towards Cedar through the use of a ramp, wider stair case etc. *It is a good suggestion, and can be planned for as part of the development permit submission, in consultation with the City. As per our discussion during our meeting, moving the access to the rear lane could allow for conversion of one of the on-street parking stalls to a loading zone to serve the building, or there may be space for a loading zone stall at the rear of the building. We will confirm this component of the design after community engagement.*
- How tall is the retaining wall along Cedar Street going to be? *It will be determined in concert with the geotechnical engineer as the design progresses.*
- Confirm your intention with the 6 on-street 'long-term' metred parking stalls along Cedar Street. I'm sure Council and the public will ask how that will affect the City from a parking & financial perspective. *The intent is to displace 4 of the 6 stalls ideally, as the frontage will be*





- attributed to the access to the parking garage and drop-off for the entrance. Let's discuss this when we meet.*
- At-grade residential units should have weather protection and the areas in front of the units should be designed to clearly delineate that space belongs to those units, rather than it being an extension of the public sidewalk. This can be accomplished by placing gates between the planter boxes, parallel to Front St. *The drawings show a landscape buffer between the sidewalk and concrete planter boxes, then another 2m paved area as a semi-private space for tenants which is separated from the public realm. Weather protection is a good suggestion and may be achieved by recessing the doorways slightly into the suites.*

If you have any questions, you can contact me directly at 778-401-5040.

Sincerely,

Hillary Morgan, RPP MCIP  
Manager – Interior Region

cc: M'akola Development Services – Kaela Schramm and Madelyn McPhee  
Nelson CARES – Joanne Motta



May 23<sup>rd</sup>, 2025

VIA Electronic Delivery  
City of Nelson  
310 Ward Street  
Nelson BC, V1L 5S4

**RE: Nelson CARES Society Final Requirements – 818 and 824 Front Street**

Dear Ken Bourdeau,

This letter provides the final requirements for the Nelson CARES Society (NCARES) application to amend the Zoning Bylaw and Official Community Plan (OCP). This letter summarizes the rationale for key decisions about the development and responses to themes heard through engagement. Enclosed with this letter are the following documents:

- 1) Proposed CD 10 Zone.
- 2) What We Heard Report (WWH) summarizing community feedback from the open house.
- 3) Traffic Assessment and Management Study (TAMS) completed by Bunt & Associates Engineering.

Below is a summary of the considerations for the application and the following pages provide detailed responses to key themes from engagement.

#### PROPOSED ZONING – CD10 ZONE

The subject parcels are owned by the City and RDCK and require the following amendments to the Zoning Bylaw and Official Community Plan (OCP):

- 1) Rezone from I1 Institutional to CD10 Residential and Recreation Use Zone; and
- 2) Re-designated the OCP Schedule B Land Use Designations Map from Institutional to Mixed Use Core.

A Comprehensive Development (CD) zone has been proposed in order to develop a zone that meets the specific needs of the building and project partners. The proposed CD10 Residential and Recreation Use Zone includes specific regulations that are similar to the C1 and C1A zone. The proposed CD10 zone includes significantly fewer permitted uses than the C1 and C1A zone, to reflect the vision for a development that can accommodate recreation uses and multi-unit residential uses.

The proposed CD10 zone would allow the development to be built to 0 m lot lines to align with Downtown zones and maximize opportunity for both housing and recreation. The rezoning of all four parcels will ensure that the proper zoning is in place should the RDCK pursue a future independent recreational development project or pursue a recreation development in partnership with this project.

The rezoning application provides initial design concepts that include the RDCK's proposed NDCC expansion, however, we are currently seeking direction from the RDCK to confirm if they will be proceeding with the proposed NDCC expansion as part of this development. If the RDCK does not move forward with the proposed NDCC expansion in partnership with the housing development, NCARES would

explore developing the City owned parcels for housing only and the RDCK parcel would remain available for future RDCK-led development.

#### KEY ENGAGEMENT THEMES – WHAT WE HEARD

**Recreational Facility: 23% (17) of respondents indicated concerns about the size of the NDCC expansion and 15% (11) expressed concerns about impacts on future NDCC needs and demands.**

As outlined in the proposed CD10 Zone, the rezoning of the land with 0 m lot lines is intended to support the potential for future RDCK development and the ability to maximize buildable area. To further mitigate impacts on the existing NDCC Facility, the proposed building has been designed to accommodate for Zamboni access and turn around to the arena.

Through the engagement process, some members of the public and organized recreation organizations expressed concern about the loss of land for future recreation development and the desire for a larger indoor recreation facility. The RDCK is currently in the process of deciding if the NDCC expansion will be included in the proposed development. Below are some of the factors that will be considered to inform the RDCK's decision:

- The project team has presented Class D Construction costs and estimated monthly mortgage payments to the City and the RDCK to inform their decision.
- BC Housing will consider developments that include up to 30% of the building as non-residential uses. The initial proposed design dedicates 8% (16% with the inclusion of double height ceilings) of the building to the NDCC expansion. This means that any recreation space incorporated into the development cannot exceed 30% of the overall building.
- The RDCK has led a planning and engagement process for the Recreation Campus project. The feedback gathered will be considered as part of the RDCK's decision-making process.

**Traffic and Parking Impacts: 28% (21) of all responses indicate traffic or parking concerns, including concerns about congestion on Front Street and Cedar Street and pedestrian safety crossing Front Street. Comments about parking were focused on parking for the public and not parking for tenants.**

Through the Development Permit and Building Permit approval process, NCARES will work with the City and the Ministry of Transportation and Infrastructure to confirm mitigation strategies to maintain pedestrian safety along Front Street. The current design includes studio units and landscaping designed along the Front Street to enhance pedestrian realm and create an active street frontage.

A Traffic Assessment and Management Study (TAMS) was completed by Bunt and Associates Engineering. The TAMS indicates that currently the north and southbound movements at Cedar and Front have long delays are not operating within performance thresholds. The TAMS notes that the proposed development does not change the overall performance of the intersection. To address existing conditions, the TAMS recommends mitigation strategies that include either signalizing the intersection or restricting north and southbound vehicles to right turns only. Below are additional details and the final TAMS is enclosed with this letter.

### ***EXISTING TRAFFIC CONDITIONS***

Outlined in the TAMS, the existing intersections are mostly operating well within the acceptable performance thresholds, though the northbound and southbound movements at the unsignalized Cedar Street & Front Street are observed to experience long delays particularly during the weekday afternoon peak hour. Two mitigation strategies are proposed for Cedar Street & Front Street to accommodate for the existing traffic conditions:

- a. Signalize the intersection; and
- b. Restrict the northbound and southbound vehicles to right turns only.

### ***FUTURE TRAFFIC VOLUMES AND OPERATIONS***

The intersection of Hall Street & Front Street slightly exceeds performance thresholds in the 2038 Background Traffic Scenario. The addition of the proposed development does not change the overall performance of this intersection; therefore, no mitigations are recommended.

It is estimated that the site would generate about 18 two-way vehicle trips during the AM peak hour and 20 two-way vehicle trips during the PM peak hour. Furthermore, the proposed design accommodates the required parking underground, with access off of Cedar Street to reduce traffic impacts and queuing on Front Street.

### ***VEHICLE ACCESS***

During engagement we gathered feedback to confirm if the public has a preference for access to the parking from two driveways on Cedar Street or via the rear of the property. The engagement did not indicate a strong preference and since completing the engagement we have confirmed with the design team that, due to topography, it is unlikely that we can accommodate access from the rear of the property.

The TAMS notes that the design will need to be revised to meet that the City's bylaw requirements for maximum driveway width. Through the Development Permit and Building Permit we will revise drawings as required to ensure bylaw requirements are met.

### **Need for Affordable Housing: 71% (32) of responses expressed a need for affordable housing in Nelson.**

A key theme heard during engagement is the need for affordable rental housing in Nelson. The need for affordable housing came up as a key theme for those in support as well as those with concerns or opposed to the development.

The need for affordable housing is well documented in the City of Nelson Housing Needs Report (HNR). This development represents 50 (or 10.9%) of the estimated 457 rental housing units estimated to be needed in Nelson by 2026. Table 1 below summarizes the number of rental housing units needed based on the HNR findings compared to the number of units being proposed in this development. The data confirms there is a strong need for rental housing and the proposed buildings' mix of rental rates addresses a spectrum of need in one building.





**Table 1: Number of Housing Units Needed in Nelson Compared to Proposed Development**

Rental Rates	5 Year Housing Needs Assessment Target (by 2026)	Proposed Unit Count	Percentage of Housing Needs Assessment Target
Market Housing	262	15	5.7%
Affordable/Below-Market	139	25	17.8%
Deeply Affordable	56	10	17.8%
Total	457	50	10.9%

## CONCLUSIONS

Please contact the undersigned if you have any questions or require further information.

Sincerely,

Hillary Morgan, RPP MCIP  
Regional Manager – Interior

cc: M'akola Development Services – Kaela Schramm and Madelyn McPhee  
Cover Architecture – Robert Stacey  
Nelson CARES Housing Initiative Society – Joanne Motta

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## INTRODUCTION AND CONTEXT

Nelson CARES Society (NCARES) and M'akola Development Services (MDS) hosted a Community Open House on January 27, 2025, for residents to learn about the development. Attendees were asked to share their comments with a feedback form. Feedback forms were available for two weeks, from January Monday, 27<sup>th</sup>, 2025 to Monday, February 10<sup>th</sup>, 2025. The feedback form and all information presented at the open house was posted on the NCARES website. A total of 74 responses were received, transcribed, and categorised by theme. This report summarizes key themes from the feedback.

## ABOUT THE OPEN HOUSE

The open house took place from 5:00 to 7:00 PM on Monday, January 27<sup>th</sup> at the Prestige Lakeside Resort. All participants were asked to sign-in and fill in feedback forms. NCARES staff welcomed people to the event and signed in a total of 140 people.

The open house was promoted through the following channels:

- A notification went to neighbours within 60 m radius of the proposed development (as required by the City).
- Two newspaper advertisements in the Nelson Star (January 16<sup>th</sup>, 2025 and January 23<sup>rd</sup>, 2025).
- Email invitation (including a sharable virtual invite) was sent to community groups (both those who have expressed opposition and support).
- Email invitation to Mayor and Council.
- Virtual invitation posted on NCARES' webpage.

### ***Virtual Invitation for NCARES Open House***



The virtual invitation is a flyer with a dark blue header. It contains text about the proposed building, an invitation to an open house, a date and time, a location, and a QR code for more details. It also features a small map and a photograph of the proposed building.

Nelson CARES Society is proposing a new, mixed-use building that will provide long-term affordable rental housing. This will include an expansion to the NDCC recreation facility as proposed by the RDCK.

**Please join us for an Open House to discuss the proposed project at 818-824 Front Street**

**Date:** Monday, January 27, 2025  
**Time:** 5:00 PM to 7:00 PM  
**Location:** Prestige Lakeside Resort (701 Lakeside Drive)

**All are welcome! Please scan the QR Code for more details.**

## FEEDBACK FORM RESPONSE RATE

Out of the 74 responses total, 83% (61) are homeowners, 16% (12) are renters, and 1% (1) are unspecified.

**Figure 1: Responses by Homeowner vs. Renter Status**

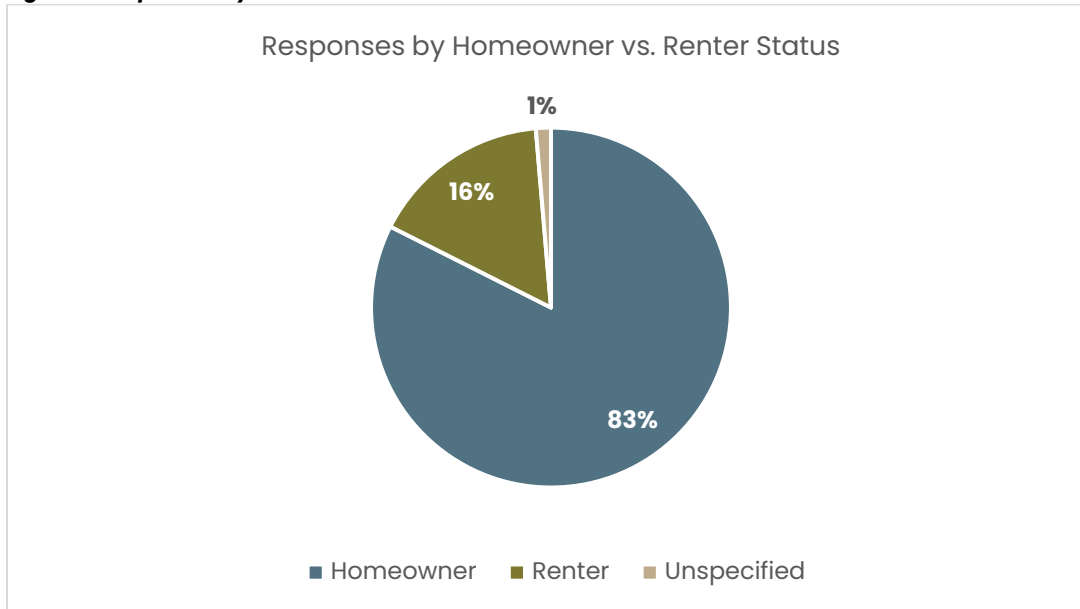
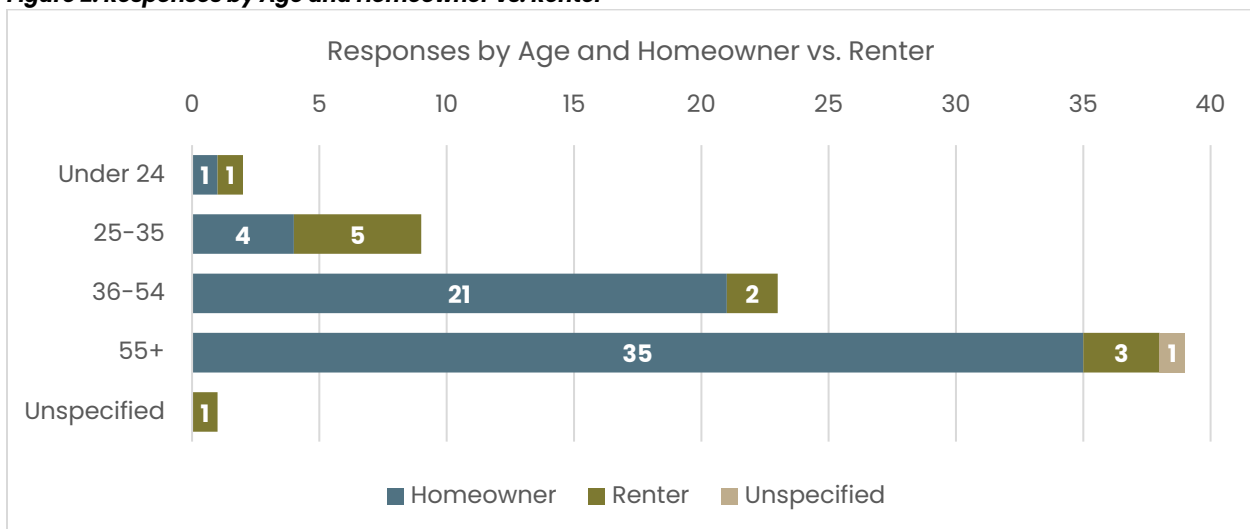


Figure 2 provides a breakdown of responses by age and homeowner vs renter status. In total, 53% (39) of respondents are over 55 years old, 31% (23) are between 31-54 years old, 12% (9) are in the 25-30 range, and 3% (2) are under 24 years old. The remaining 1% (1) did not identify their age.

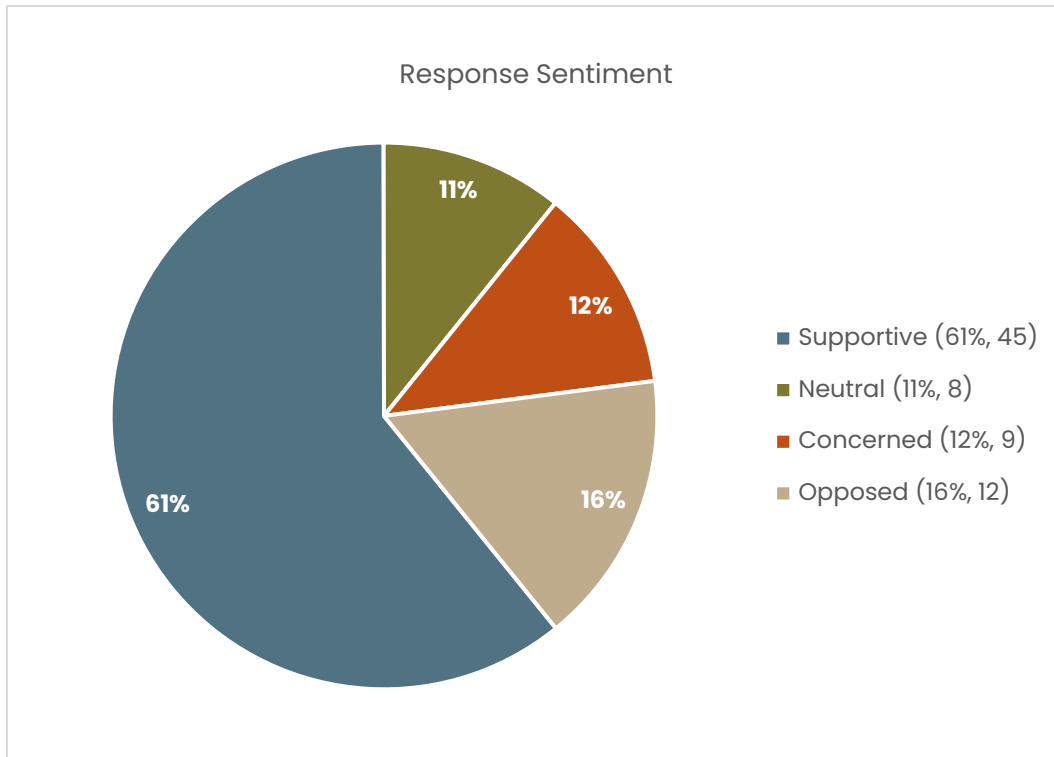
**Figure 2: Responses by Age and Homeowner vs. Renter**



## RESPONSE SENTIMENT

Respondents were asked to provide feedback on the proposed development in the feedback form. Responses were categorised as generally supportive of the development (61%, n=45), neutral (11%, n=8), concerned (12%, n=9), or opposed (16%, n=12) based on the comments received (Figure 3).

**Figure 3: Response Sentiment**



## KEY THEMES FOR ALL RESPONDENTS

In addition to general sentiment, several key themes from the responses were identified. Many responses were multifaceted and covered multiple themes. Table 1 provides an overview of the key themes identified. The top two themes are the need for affordable housing and the need for recreation facilities. The top five overarching themes include:

1. Affordable Housing
2. Recreation
3. Community Development
4. Parking/Traffic
5. Location

**Table 1: Details on the Top Five Themes**

Theme	Count (n=74)	Percentage (n=74)
<b>Affordable housing</b>	<b>39</b>	<b>53%</b>
Need affordable housing	26	35%
Support affordable housing	10	14%
Residents are being priced out	3	4%
Critical of housing targets	3	4%
<b>Recreation</b>	<b>39</b>	<b>53%</b>
Need more recreation facilities	17	23%
Like NDCC Expansion	14	19%
Concern about future recreation needs	11	15%
Questions/suggestions for use of future NDCC space	7	9%
<b>Community Development</b>	<b>27</b>	<b>36%</b>
Good for community/economy	13	18%
Like collaborative/partnership model	7	9%
Community/individual health	6	8%
Safety	6	8%
Need for additional supports/services (e.g., to promote mental health, for people with disabilities, harm reduction)	5	7%
Opportunities for local workers	3	4%
Encourages diversity	3	4%
<b>Parking/Traffic</b>	<b>21</b>	<b>28%</b>
Parking (suggestion)	8	11%
Traffic/congestion on street	7	9%
Traffic/congestion at entrances/exits	6	8%
Parking (public/street)	6	8%
Parking (reduce stalls)	2	3%
Parking (tenants)	2	3%
<b>Location</b>	<b>20</b>	<b>27%</b>
Dislike location	10	14%
Good location	10	14%
Close to amenities	3	4%

## KEY THEMES FOR RESPONSES IN SUPPORT

Table 2 breaks down the key themes among the supportive responses. The three most prevalent themes include:

1. Affordable housing – 71% of supportive responses (n=32)
2. Community development – 47% of supportive responses (n=21)
3. Recreation – 36% of supportive responses (n=16)

**Table 2: Key themes in responses in support of the development**

Theme	Count (n=45)	Percentage (n=45)
<b>Affordable housing</b>	<b>32</b>	<b>71%</b>
Need affordable housing	24	53%
Support affordable housing	8	18%
Residents are being priced out	3	7%
<b>Community Development</b>	<b>21</b>	<b>47%</b>
Good for community/economy	13	29%
Like collaborative/partnership model	7	16%
Community/individual health	3	7%
Safety	3	7%
Opportunities for local workers	3	7%
Encourages diversity	3	7%
Need for additional supports/services (e.g., to promote mental health, for people with disabilities, harm reduction)	2	4%
<b>Recreation</b>	<b>16</b>	<b>36%</b>
Like NDCC Expansion	14	31%
Questions/suggestions for use of future NDCC space	3	7%
<b>Parking/Traffic</b>	<b>11</b>	<b>24%</b>
Parking (suggestion)	7	16%
Traffic/congestion at entrances/exits	4	9%
Traffic/congestion on street	2	4%
Parking (public/street)	2	4%
Parking (reduce stalls)	2	4%
Parking (tenants)	2	4%
<b>Location</b>	<b>10</b>	<b>22%</b>
Good location	10	22%
Close to amenities	3	7%
Infrastructure/Transportation	8	18%
Public transit/active transportation	7	16%
Pedestrian improvements	2	4%
Infrastructure capacity	1	2%
Design	7	16%

Like design	4	9%
More artwork/colour in final design	3	7%
Don't like design	2	4%
Like mixed use	6	13%
Family units	3	7%
Sustainability	3	7%
Public consultation	2	4%

## KEY THEMES FOR RESPONSES IN OPPOSITION

Table 3 details the key themes identified in the responses opposed to the development. The top three themes include:

1. Recreation Needs – 100% of opposed responses (n=12)
2. Disliked Location – 58% of opposed responses (n=7)
3. Lack of Public Consultation – 42% of opposed responses (n=5)

**Table 3: Key themes in responses opposed to the development**

Theme	Count (n=12)	Percentage (n=12)
<b>Recreation</b>	<b>12</b>	<b>100%</b>
Need more recreation facilities	11	92%
Concern about future recreation needs	2	17%
<b>Location</b>	<b>7</b>	<b>58%</b>
Dislike location	7	58%
<b>Public Consultation</b>	<b>5</b>	<b>42%</b>
Public consultation	5	42%
Community Recreation Campus Resident Survey results	2	17%
<b>Affordable housing</b>	<b>4</b>	<b>33%</b>
Critical of housing targets	2	17%
Need affordable housing	1	8%
Support affordable housing	1	8%
Community Development	3	25%
Community/individual health	1	8%
Safety	2	17%
Need for additional supports/services (e.g., to promote mental health, for people with disabilities, harm reduction)	2	17%
Parking/Traffic	3	25%
Traffic/congestion on street	2	17%
Parking (public/street)	1	8%
Infrastructure/Transportation	3	25%
Infrastructure capacity	3	25%
Wary of attracting new residents	3	25%



## KEY THEMES FOR RESPONSES WITH CONCERNS

Table 4 breaks down the key themes among the concerned responses. The three most prevalent themes include:

1. Recreation – 100% of concerned responses (n=9)
2. Parking/Traffic – 44% of concerned responses (n=4)
3. Public Consultation – 33% of concerned responses (n=3)

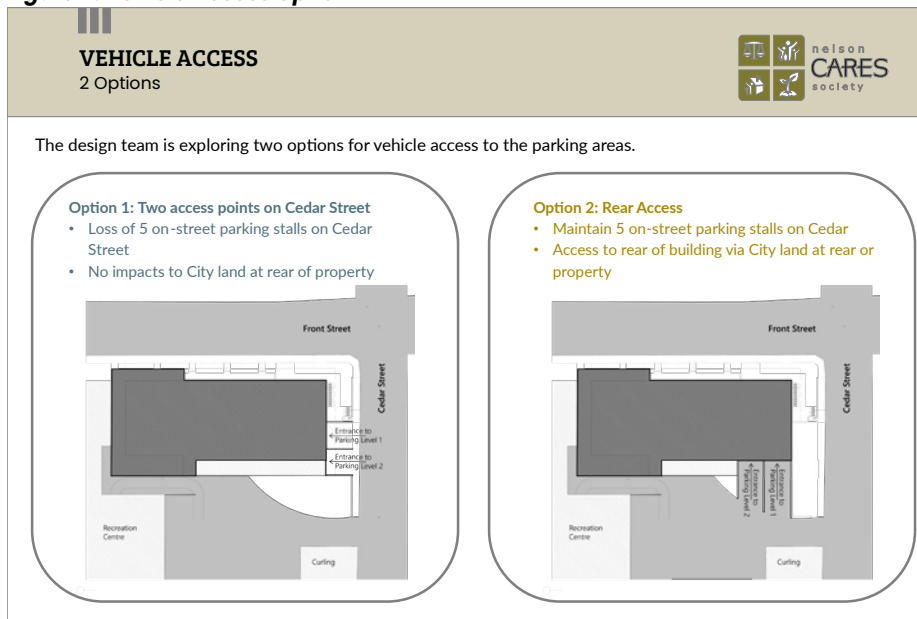
**Table 4: Key themes in responses concerned with the development**

Theme	Count (n=9)	Percentage (n=9)
<b>Recreation</b>	<b>9</b>	<b>100%</b>
Concern about future rec needs	8	89%
Need more recreation facilities	6	67%
Questions/suggestions for use of future NDCC space	2	22%
<b>Parking/Traffic</b>	<b>4</b>	<b>44%</b>
Traffic/congestion on street	3	33%
Parking (public/street)	2	22%
Traffic/congestion at entrances/exits	1	11%
<b>Public Consultation</b>	<b>3</b>	<b>33%</b>
Public consultation	3	33%
Community Recreation Campus Resident Survey results	2	22%
<b>Location</b>	<b>3</b>	<b>33%</b>
Dislike location	3	33%
<b>Affordable housing</b>	<b>3</b>	<b>33%</b>
Need affordable housing	1	11%
Support affordable housing	1	11%
Critical of housing targets	1	11%
<b>Design</b>	<b>2</b>	<b>22%</b>
Don't like design	2	22%
Wary of attracting new residents	2	22%
<b>Community Development</b>	<b>1</b>	<b>11%</b>
Community/individual health	1	11%

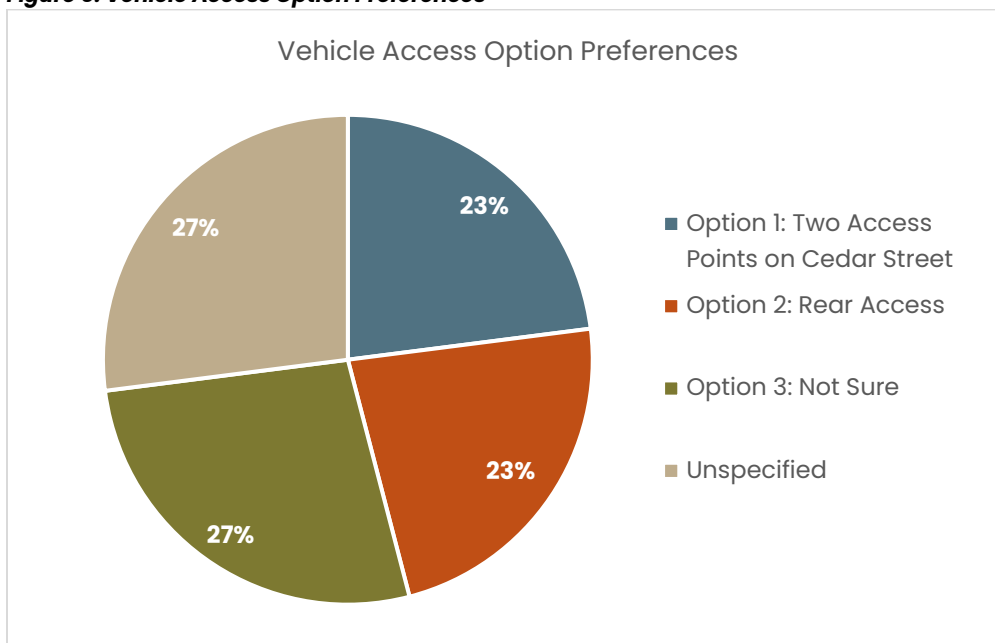
## PARKING ACCESS

The feedback form included a question about the preferred access for the development. Figure 4 illustrates Option 1 (Double Driveway Access off Cedar) and Option 2 (Rear Lane Access). Respondents were also asked to choose which vehicle access option they prefer (Figure 5). Responses were evenly split between Options 1 and 2, with 23% of respondents (n=17) preferring each. 27% of responses (n=20) indicating they were not sure and a further 27% (n=20) did not respond to the question.

**Figure 4: Vehicle Access Option**



**Figure 5: Vehicle Access Option Preferences**



## **APPENDIX A – FEEDBACK FORM RESPONSES**

Feedback forms are enclosed. Personal information has been redacted.

**APPENDIX A – FEEDBACK FORM RESPONSES**

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
1	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street		N/A
2	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	It seems to be that it would be safer to have the access to the parking spaces to be at the back of the building rather than off of cedar street.	Neutral
3	Unspecified	Renter	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	Like to ensure that deeply affordable units can still access some parking stalls, even though they'll be less likely to have a vehicle.	Supportive
4	25-35	Renter	3-Not Sure	-the development needs more than 1 bike storage per unit, especially in 2-3 bed units. -more family units too! Grossly underrepresented -after this point I read the housing needs assessment piece but I do think thought should be had for growing families. The assessment indicates young folks need support but those people might want to start a family in the future. -I think we need less near market options because that is quite a high threshold. Personally, most of my friends fit in this category. -I fully support more initiatives like this. We need mixed options in Nelson to keep our community diverse. My only comment would be to consider the design. It currently doesn't represent our community well and I'd prefer if it were more like the houses already in town. Give it some charm!	Supportive
5	55+	Renter	1-Access to level 1 & 2 from Cedar Street	As with anything Nelson CARES undertakes – well thought out and with the most concern for our fellow citizens in need of housing. We need to do this. All affordable spaces fill quickly. This can't wait. Thanks for the thoughtful presentation and information.	Supportive
6	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	Looks like a solid, well researched plan. Housing continues to be an issue – glad there are plans to accommodate different income levels so Nelson can be diverse as possible.	Supportive
7	36-54	Homeowner		Recreation only. This is NOT the space for housing. STOP shortchanging our youth & recreation facilities. STOP!	Opposed
8	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	Hi! It seems to make sense to enter the parking garage right off of Cedar. I drive by 2X a day and never see any congestion there. Keep it simple. The building looks GREAT! I really like the portion of the building that is an extension of the recreation centre. I find it interesting and thoughtful that there are studio units right off the sidewalk – usually those spots are for posh townhouses. I like the idea of those units being accessible to those with disabilities (having mobility issues in the past makes this important to me) and that the units can change for tenants needs (again, changes in health). Great location and an important development for the community. To keep Nelson vibrant, we need places (secure, beautiful, functional) for all to live. Hopefully the building includes cooling systems for the residential units to keep everyone safe in the hot weather.	Supportive
9	25-35	Renter	1-Access to level 1 & 2 from Cedar Street	I'm in desperate need of housing.	Supportive
10	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I agree with the proposed plan including added space for the NDCC. Although I think its better for option 1, parking access from Cedar, I think it's best not to lose public street parking. I vote Option 2 access.	Supportive
11	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street		N/A
12	55+	Renter	1-Access to level 1 & 2 from Cedar Street	It is exciting to see this cooperative approach for additional housing. As a 77 year old, I have been waiting over two years for affordable housing such as Hall St. This offers hope for being able to live downtown and access to amenities without having a car. The need is also great for people who work in low and moderate paying jobs who need close access to their work. I appreciate that there is always controversy and as this world changes, the need to provide basics such as affordable housing is increasing. Wishing you all the best!	Supportive
13	36-54	Homeowner	3-Not Sure	-So glad to see an affordable housing project!! -I like the inclusion of the 3 bedroom units -The crosswalk at Cedar and the highway is very dangerous and will require an upgrade to make this development access safe -also like the recreation addition	Supportive
14	36-54	Homeowner	3-Not Sure	My concerns are primarily with the fact that the recreational component is inadequate to provide support or solutions to the present recreational priorities of the RECREATIONAL COMMUNITY and its user groups. The Rec. Commission is a political body that does not actually represent the interests of the local Rec. groups. It is largely a political entity. We (Nelson Hoops Association) have concerns about why the RDCK Reed Campus Survey Results are not going to inform this project. It seems as though this project will be on track for proceeding before the Rec Survey results are made public. I also have concerns that more of the Rec. campus land will be annexed for housing leaving less long-term options for future rec. needs of the community. The Rec component of this project would not be adequate for NHA needs.	Concerned
15	36-54	Homeowner	3-Not Sure	I am not happy with this project proceeding before the results of the recreational community survey are completed. Nelson is a growing community with growing recreational needs. The fact that there is a recreation space in the plan with no plan as to the purpose means that there is little chance it will fit the needs of the community. You are trying to put a square peg in a round hole. This is the last recreation space available and once gone there is little chance that we can expand recreation services. There is other land available that can be used to provide housing. This doesn't have to be it. A small recreation space will only further increase competition between user groups and will not solve current issues/concerns. Healthy community also include recreation for all.	Concerned
16	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	Important to increase affordable housing in Nelson. Need is great for affordable housing for overall well being of the community. Unlikely that the Regional District will use property to develop that small parcel of land if this project does not go ahead. Fully support project.	Supportive
17	19-24	Renter	3-Not Sure	I strongly support the re-zoning in order to increase housing available in Nelson. Front & Cedar is an ideal location for housing, as it is within walking distance of all major amenities and many workplaces. As a young person, I am particularly impacted by unaffordable housing and believe this rezoning would provide a benefit to young people (workers) in our community. Without places for workers to live, our local small businesses and Nelson as a whole cannot thrive.	Supportive
18	55+	Homeowner		It's a great project BUT how can we as parents push CLBC to include a staffed residential model such as Hall St place into this new build. I will continue to advocate with CLBC but it would be important to include this. Or alternative using one of the 3 bed apartments. This is such an important opportunity to address the inclusive model of housing.	Supportive
19	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I think this is a good use of the land. Thank you for all the careful planning and for giving us an opportunity to contribute. It's great to see some more solutions to the lack of housing issue. Thank you. I'm glad to see recreation space included, and environmental housing/EV consideration taken into account.	Supportive
20	55+	Homeowner	3-Not Sure	This is a great idea – rec and housing. Perfect funding idea and it ticks the boxes for a healthy community. Full support.	Supportive
21	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I would prefer not to lose parking spaces as they are at a premium in Nelson, especially the long term spots on Cedar.	Neutral
22	55+	Homeowner	3-Not Sure	Strongly support this project. Nelson desperately needs the affordable housing. The NLC expansion is a bonus.	Supportive
23	55+	Homeowner		-concern about additional traffic in area – entrances -lack of parking which is already a problem -not enough space for recreation area – this is a growing city and there won't be any more space to expand! -I do not think the location is a good one. -will this housing be for Nelson residents only? -will it bring more people to Nelson that need affordable housing? Or serve those who are here already? -is this part of a sustainable tax base for everyone in Nelson? We don't have a Celgar or Cominco... -Please make it prettier	Concerned
24	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	Traffic flow – Front St is busy now Help or hinder tax base? Will this be for Nelson residents or attract more outsiders? What will be in recreation area? To be determined... Question? Sq. footage of units? The design is boxy	Concerned



**APPENDIX A – FEEDBACK FORM RESPONSES**

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
25	55+	Homeowner	3-Not Sure	1. Parking entrance/exit access is a concern. Having cars scooting down Edgewood is a concern. 2. The proposed design is, respectfully, not very attractive. Thanks for all the work and involvement! Also, will the added sq ft of rec area meet the needs of the userbase?	Neutral
26	25-35	Homeowner	3-Not Sure	I like that you have identified private car ownership as an unaffordable transportation mode. It is also unsustainable. I support even fewer stalls and increased carshare stalls, a 4-season bus stop, and other similar/affordable, low carbon transportation options! Thanks!	Supportive
27	36-54	Renter	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	This is a great initiative. Thank you for you hard work.	Supportive
28	55+	Homeowner	3-Not Sure	I question site selection, given rec. centre future needs – quite possibly, they would need this site. November 2022 I took part in rock physical therapy program – post heart surgery – it was not pleasant having to do program in arena area – concrete tools. Has CARES prepared an inventory of other potential sites? As to your annual report – dating is missing, other than 2023-2024. Letter from board chair/exec director – undated Further, appears current board not same as board pictured in annual report.	Concerned
29	55+	Homeowner	3-Not Sure	My priority for the proposed recreation space is that an appropriately heated studio room is available and accessible for classes aimed at people with disabilities like post stroke and post cardiac surgery patients.	Neutral
30	55+	Homeowner		The City does not have enough space for the recreational needs of current residents. We need more facilities for the current population, not a bigger population. Please put the needs of existing residents – at this location, on the recreational campus – before adding more housing.	Opposed
31	55+	Homeowner		The 818-824 Front St. property intended for use as part of the recreation campus, not housing! The housing requirement being addresses should be located elsewhere in the city – other properties need to be explored. As a taxpayer, it seems that this proposal has been snowballed and the wool pulled over the taxpayers’ eyes! Keep the recreation campus in tact!	Opposed
32	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	I'm supportive of this project overall. Kudos on adding 50 units to Nelson! I just hope the building would have a more varied exterior – looks a bit institutional in the drawings. Thanks, Nelson CARES leadership!	Supportive
33	55+	Homeowner		Shame! Do I disagree with affordable housing – of course not! But to use land that is perfectly situated for recreation is ridiculous. If you can't afford to build on the land now, then wait. This project needs to stop until the RDCK and City get together and actually come up with viable information and vision. Infrastructure – Infrastructure – we don't have it.	Opposed
34	55+	Unspecified		-Did Nelson CARES Front/Hall St. influence the decision to offer Front/Cedar Lot? -Was/is Nelson CARES concerned re: future recreational use of 818-824 Front St? -Did Nelson CARES attend the Recreation Public Engagement Meetings? If so, did Nelson CARES revive its plans to line with public feedback? -Will Nelson CARES allow the Community Recreation Plan to be completed before rezoning? -How does/would the housing project fit into the Community Recreation Plan? -Traffic impact assessment/parking study – who will conduct the study? I have a concern with potential Cedar/Front intersection congestion, especially that it is a component of the highway system. -City council Dec meeting – confusion expressed by some councillors that 20/30/50% for this housing initiative doesn't align with city's housing report to the province.	Concerned
35	36-54	Homeowner	3-Not Sure	100% in support of this – rezone and redesignation. Why so many single bedroom and studio units? Where do families get to live?	Supportive
36	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I fully support this project and additional housing for all – senior, individuals, and families.	Supportive
37	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I support this project 100%! Affordable housing has consistently been a key issue and concern for Nelson residents for a long time now. Id like to see more residential development of this kind in Nelson generally and on the Rec Centre site specifically.	Supportive
38	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I like the three levels of rental market, income based and deep subsidy. It is good to build community by having diversity. I think saving 5 parking spots might be smart. I wonder what kind of recreation will be in the recreation space.	Supportive
39	25-35	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I think that the multipurpose use of the site is a great way to provide 2 much needed benefits for the community. It's a bold proposal that brings together a bunch of different groups and it would be great to see it happen. I like the proposed design, it suits the site and connects well to the NDCC and is an appropriate scale/height for Front Street. The balconies will have great views and provide nice outdoor space for the occupants. Nelson is a colourful place so I hope that some colour is incorporated into the final design.	Supportive
40	36-54	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	The proposed design is consistent with the rhythm, scale and proportion of Front Street. The City desperately needs additional affordable housing and the partnership to expand the NDCC is sensible. The building's appearance is very encouraging and appealing. It is a nice departure from “colonial flavored” architecture. The masonry base makes sense for durability, metal up top for affordability and the pop of colour is very pleasant. Some wood finished in the lobby would warm up the appearance of the building from Front Street. So far it looks so much better than the other (Nelson CARES Society) building down the street. Great work! Keep going and thank you for advocating for the members of are community who are less fortunate.	Supportive
41	55+	Homeowner		While not opposed to affordable housing, I feel that the property would be better utilized as recreation designation, even/or an expansion to the existing recreation center. Just to be clear, this is not for me, but for future generations.	Concerned
42	Under 18	Homeowner	3-Not Sure	I think it would be a great idea and everyone is doing great and keep doing it. This is a great idea.	Supportive
43	36-54	Renter	3-Not Sure	I think this is an exciting proposal! I hope BC Housing approves. No real concerns at this time. Thank you to Nelson CARES for working on this proposed development.	Supportive
44	36-54	Homeowner	3-Not Sure	I'm pleased to see a thoughtful densification project that provides a response to a clear municipal and regional priority, while also attending to increased recreational space. I appreciate the partnership model and congratulate the RDCK in taking this important step. Many towns don't have the skills, experience, and capacity that Nelson CARES brings to the table and I'm so glad they are willing and able to take on another project of this size. Economies being what it is, I'm glad that BC Housing recognizes the strength of the proposal and is also willing to invest in housing in Nelson. If there is any way to augment the initiative with development that provides opportunities to engage local trades/subtrades and engage apprentices/training that would be most excellent.	Supportive
45	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I'm pleased with the development of more affordable housing. I work with a group of students (adults) who have diversabilites and the prospect of more affordable housing in this area of town is ideal and really appeals to that unique group of individuals. Although this location is tight and high density, it is a great location for those with diversabilities and Nelson CARES Society will be a supportive and essential agency as a housing provider/landlord. There is a housing need. We need more affordable housing and I'm happy to see this come forward!	Supportive
46	36-54	Homeowner	3-Not Sure	I think this proposed affordable housing and recreation facility is awesome. As a home owner that is fortunate to have stable shelter, I see many of my friends struggling in the community with the affordability crisis. Housing prices and rents have sky rocketed and people who have grown up here are having a difficult time remaining in the community they grew up in. In fact, I think Nelson needs more social zero barrier housing with greater access to mental health and addictions supports and harm reduction facilities.	Supportive
47	36-54	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	Nelson's charm comes from it's heritage. How will this project support the work already done to support the historic themes and values of quality building for generations	Neutral
48	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I think mixed use would be great on this site. Preserving some recreation use on main floor, and addressing affordable housing needs on other floors. Thank you for the energy and work put into the project so far, and keep up the momentum!	Supportive
49	36-54	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I'm concerned that the rec centre is over-capacity and this proposed expansion is insufficient for our growing community's recreational needs. The weight room is currently operating at a dangerously high capacity. Will this project hinder a proper expansion of the NDCC?	Concerned
50	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	Do it!	Supportive
51	36-54	Homeowner		Terrible idea! Area should be 100% rec	Opposed
52	36-54	Homeowner		N/A	N/A

APPENDIX A – FEEDBACK FORM RESPONSES

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
53	55+	Homeowner	3-Not Sure	-Reserve the land for expansion of recreation as land is already zoned for -Please release results of community survey -Have Cover Architecture draw up plan (for comparison) of a multipurpose recreational facility	Opposed
54	36-54	Homeowner		I opposed this zoning amendment. This property should be reserved for community recreation. Downtown areas should not and do not need to be the only location for low income housing. Once Nelson CARES builds this complex, there is no longer any community control of what they do with the property. Our downtown is turning into a violent and drug infested slum, and Nelson CARES and the city are not addressing the problems they are causing. The City should retain ownership of any facility and not give up control/amenity decision making.	Opposed
55	36-54	Homeowner	3-Not Sure	I am deeply concerned that Nelson has become unsafe for my family. I no longer feel safe taking my two young children downtown during the day, and certainly not after dark. We need to focus on the impact that new developments have on our community services like policing. How will Nelson CARES address increased policing needs? NPD does not have the capacity to address speeding, etc. because they are fully responding to overdoses (230+ calls in a year). What is going to be done to address traffic? The city and Nelson CARES does not seem to consider the majority of residents. Please keep in mind that young children frequent the NDCC and this space needs to be maintained as a safe place to go. We have already been pushed out of downtown. More people requires more policing. It's time Nelson CARES contributes to the NPD budget!	Opposed
56	55+	Homeowner		I opposed this development. The property needs to be maintained as city owned and used for recreation!	Opposed
				I do not object to residential units (low income and low market) on this site.	Supportive
57	55+	Homeowner		My comments are solely about rezoning this site and not a change to the OCP generally. I favour the creation of low-income and possibly low market units. Nelson needs more housing to accommodate people with long-term connections to Nelson who are getting priced out of their home community. It is especially sad when seniors are forced out of their long term rentals.	Supportive
58	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	-Since the units are small – need to ensure good size windows and light. -It's a very plain building – I would like to suggest a beautiful mural – to be approved not only by the city but more importantly the residents of the building. I think parking lot access would be better off the alley to prevent traffic backup on Cedar.	Supportive
59	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I am supportive of this project and think it is a great use of space. What I would like to see, and anticipate the big issues is, how this will affect vulnerable road users (pedestrians, cyclists, wheelchair users) and welcome any active transportation improvements to the Front/Cedar intersections and path to the mall and waterfront. If traffic consultants on Ministry of Transportation have proposal for what to do, I hope they consult with local user groups before construction.	Supportive
60	25-35	Renter		Looks good to me! Transit and the reduction of the total number of cars would be my strongest suggestion. I suspect that this is a bylaw or code requirement, but if there's any way to reduce the number of parking spots, that would encourage transit usage. Parking spots encourage the presence of more cars, which creates more traffic, which perpetuates the problem. Reduce car counts and encourage the transit build up!	Supportive
61	25-35	Renter		I think the location is great and the opportunity to increase NDCC programming space will be a great asset to the community. I hope that this building will integrate aesthetically with the bright, colourful, and playful design of the recreation centre it will be connected to. The render looks like it will be a great contemporary addition to Nelson's architectural landscape. I like that the entrances face cedar and front street. I think this building and entrances will go a long ways to activate this area. It would be great if the NDCC space had a ceiling high enough for volleyball or other court sports. Exciting project! Would love to see some yellow or brightness on the exterior of the building.	Supportive
62	25-35	Renter	3-Not Sure	I would really like to live here with 1 cat as I rent and it is very expensive for me. I think the location is great because I don't have a car and have mobility issues. If there is a no pet policy I would still like to live here.	Supportive
63	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	I think it's great for the community to have more affordable housing and support the rezoning and OCP changes. Concern I have is parking – not just for the tenants but for visitors. How is this being addressed?	Supportive
64	55+	Homeowner		1. Overall, our community deserves better than this. At the first rec planning consultation meeting, attendees were told that this land was one asset to be considered as part of an overall park & recreation. The council has made a mockery of the consultation process and this is not okay! Work on this housing project should stop. 2. I support and value Nelson CARES, however... I have read about 5-6 new housing projects, in addition to what we already have. That is a huge number of units for a city of 11000 people. Has work been done that ensures there is a need for this much housing? Has consideration been given to impact on infrastructure? Access to doctors? Access to services? Are these units for people in Nelson currently in need of housing or are they to attract new residents? What kind of regional planning is being done? Trail, Castlegar, Rossland need to be included and potential may be better sites for new builds.	Opposed
65	55+	Renter		824 Front Street.  Following a series of housing meetings which I have attended: -city council "housing workshop" - City of Nelson Housing Report to the province -city council meeting re NelsonCares first request for financial assistance -city council meeting re NelsonCares second request for financial assistance -NelsonCares' OpenHouse -January 27th.  I have various observations and questions.  -in response to a question from the Open House meeting; what city owned lands were offered for housing development, Kevin Cormack stated the Fell Street and Front Street lots. In a previous meeting with the CAO re the availability of the 10th Street city owned property for recreational use, Kevin indicated that some of the property is to be allocated to Selkirk College with those lands -field beyond Mary Hall- will be retained for housing including the slope along the roadway. The exception is the lot previously allocated for the new climbing facility. Was this land offered for the Front Street housing initiative? -in response to another meeting question re: how many affordable housing units have been and are to be built in Nelson relative to Trail, Castlegar, it seemed that Nelson's numbers were considerable beyond other communities, including Cranbrook. Could you please share such data? I understand from Trail that they are experiencing difficulties obtaining approval from BC Housing for their projects. -a follow-up to the above-mentioned question, I asked a city councillor for clarity, they responded "how many \$1,000,000 properties are in Nelson?" When I responded that I didn't know, they implied that there is a provincial formula consisting of the number of high-value properties and affordable housing units. Is this the case? -Parking has been a stressor on the Recreation Campus for many years. During a 2024 Recreation Commission meeting the Commission once again deliberated heavily over parking, I suggested that the Commission utilize the Front Street lot for multi-level parking to which the Mayor strongly responded, via zoom, that parking will never occur on the lots. SO NOW two levels will be parking. How does the Mayor and NelsonCares reconcile this conflict? The lot can be utilized to accommodate housing whereas months earlier the Mayor would not entertain parking to accommodate recreation and	Opposed
66	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I have no comments or concerns. Green light.	Supportive



APPENDIX A – FEEDBACK FORM RESPONSES

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
67	55+	Homeowner		<p>-I support the construction of more subsidized housing in Nelson. The Front Street location seems like an obvious choice. I am pleased to see that the building is intended for a mix of tenant income levels from well below market to near or at market. However, I do wish that the terminology of the taxation subsidized housing industry would be more transparent and black and white. Some housing forms, for some residents of our society need to be directly subsidized by those lucky enough to be able to do so financially. I would appreciate having the terminology for different public rental housing forms transparently stated in black and white terms. A little less 'planner speak' and a lot more explicit, non-judgemental terminology would be most welcome.</p> <p>-The parkade vehicle access should be determined by optimizing the building architectural program dictates and a traffic study. I assume that the entry onto Cedar street is best if conducted further south and uphill on the existing lane access, as this will reduce traffic congestion at the Cedar Street - Front Street intersection. The access should also take into consideration Fire Department access for this Nelson Cares proposed building and the existing recreation campus, including that required for a new Fire Ladder truck which can access six storey buildings (slope gradients and vehicle axle weights).</p> <p>CITY of NELSON</p> <p>-Nelson is experiencing the construction or proposed construction of six storey buildings, which will change the Fire Department emergency response requirements. Presumably, the City of Nelson Fire Department will request a new ladder truck to access buildings of this height. From a brief conversation had with the City Manager during the open house, it seems that the existing ladder truck replacement is anticipated, but as six storey buildings are driving (pun not intended) a replacement with an appropriate ladder engine, the City should communicate, adjunct to the open house feedback: anticipated replacement date, budget, existing reserve balance. The City should also clarify whether or not the existing firehall location will be suitable for a ladder engine that can access six storey buildings. If not, then other capital budget considerations such as firehall replacement should also be clarified with the most specific detail available, including taxation impacts.</p> <p>-I would appreciate Nelson Cares, the City of Nelson and the Ministry of Highways clarifying construction impacts of the proposed construction project on the Front Street, Hall, Hendryx and Cedar Street intersections. I would also ask the City to clarify, how existing water, sewer and storm sewer infrastructure will be affected. The existing sewer plant at Grohman Narrows is at or near end of life replacement. Can the existing plant sustain the additional loads directed towards it from</p>	Supportive
68	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	<p>I know we need more housing – of course.</p> <p>We also need more recreational opportunities for the broader community e.g., indoor basketball courts, bowling lands, curling rink</p> <p>As a frequent user of NDCC, I know parking is already a big issue. I am concerned about how this will be addressed in the proposed development.</p>	Concerned
69	55+	Homeowner		<p>I respectfully ask that Nelson Cares withdraws this proposal. The project is highly commendable, but not on this site. The OCP should not be amended without the capacity for the public to more fully weigh in on the matter. One open house where we could not freely ask questions was not that opportunity. That was a PR opportunity for your project only. The last recreation survey was 2014. A lot has changed since then. This project should not use land currently zoned for recreation unless the recreational plan has been updated. We do not have data from the 2024 survey. If the city pushes through proposals without 360* consultation it will create more divisiveness for the community which is not upholding the values of inclusivity and collaboration. Population of Nelson is now growing more rapidly. We may need more facilities.</p>	Opposed
70	36-54	Homeowner		<p>As a taxpaying Nelson resident, I am writing to voice my objection to the proposed long term affordable housing project at 816-824 Front Street. I do NOT support the rezoning of this property and would like to see the property in its entirety be devoted and dedicated to enhancement, expansion and development of much needed recreational infrastructure for Nelson and area residents. Over the years Nelson Cares has been instrumental in developing much needed affordable housing projects in this community. The need is great and your contributions have been incredible, however, this is NOT the site for additional housing. The youth of this community lack access to sufficient recreational infrastructure to keep them engaged in sport, committed to sport, learning and focused on the betterment of their selves, so that they can become functioning, healthy and contributing members to this community and society. Housing can be developed on a wide ranges of properties, on hills or further out of the immediate city core. Recreational facilities cannot, they require flat land, proximity to amenities and transportation routes, and access to parking. Regional communities like Salmo, Castlegar, Grand Forks, etc. etc. can begin to prioritize affordable housing for the Kootenays, it does not all need to happen in Nelson. Nelson is home to incredible youth and adults who deserve as taxpayers, to have a say in how their communities are developed. This is why we have an OCP and Zoning already established for this area. The community has loudly stated that they want and need more recreational infrastructure on this property. As a resident trying to raise a family in this community, I wholeheartedly echo this sentiment. I do not want this prime piece of property and the neighbouring roads situated adjacent to the existing NDCC to be further congested with vehicles belonging to owners in another affordable housing building, nor do I want any of my tax dollars to be used to support any development of housing on this site or for any ongoing utility or maintenance costs of said housing. I want the existing community taxpayers to have access to additional recreational infrastructure that meets the demonstrated and stated needs of the community. This is NOT the location for additional affordable housing in Nelson.</p>	Opposed
71	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	<p>-The partnership – City, RDCK, Chamber – is a brilliant way to increase both housing and recreation</p> <p>-The mix of housing seems practical and contributes to affordable housing</p> <p>-The “green” aspects – heat pumps, future of EV plug-ins – is great</p>	Supportive
72	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	<p>I am in full support of the proposed development, and the necessary re-zoning and OCP amendment to facilitate this.</p> <p>At this time, I believe the creation of affordable, adequate, secure housing should be the top priority.</p> <p>Let's be part of the solution to tackling this every growing housing crisis, which directly or indirectly affects us all.</p>	Supportive
73	25-35	Homeowner	3-Not Sure	<p>I think that having an affordable housing development for low and even no income folks is by far the best use of this land. Housing costs in Nelson have become so high that many people can't afford to rent, and the vacancy rate is so low that it's very difficult to even find somewhere to live.</p> <p>Housing is a human right and a basic need, so the City of Nelson should be doing everything it can to work on housing the homeless folks in our community, while not providing any barriers to that housing. I know that this lot will be used for mixed-income housing, with some market rate housing as well, but everything possible should be done to ensure that tenants don't have to pay more than 30% of their income to live there. Preferably less.</p>	Supportive
74	25-35	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	<p>I strongly support the creation of this affordable housing development. It is a vital need of our community to increase access to affordable housing, and I think it is a clever use of both city and RDCK land to build housing in walkable distance to the recreation campus, along with other shops and amenities. This offers a great benefit to the low income tenants who will have access to the low cost recreation at the NDCC.</p> <p>I also urge Nelson CARES to support the creation of a tenants association so that there is a democratic body to address governance issues, interpersonal issues, and to collectively bargain with the landlord. This is an essential part of ensuring this housing remains truly affordable, accessible, and democratic. Please support this crucial facet of tenants rights.</p>	Supportive

### Concept 1:



- Concept drawings are examples of what could be built under proposed CD10 Zone.
  - Two options depending on involvement of RDCK:
    - Mixed-Use development (residential and recreation in same building)
    - Stand-alone residential development
- In both cases, concepts:
  - 50 Multi-Unit Residential Units
  - 6 storey design
  - Underground parking with access from Cedar Street
  - Would comply with motor-vehicle, bicycle and electric vehicle parking requirements

### Concept 2:





## Attachment 4

### 9.10 CD10 Residential and Recreation Use Zone

#### 1. Purpose

The purpose is to designate and preserve land for the orderly development of a building that includes a mix of residential and recreational uses.

#### 2. Permitted Uses

The following uses of land, buildings and structures and no others shall be permitted to the CD10 Residential and Recreation Use Zone:

- a) Multi-Unit Residential
- b) Off-Street Parking
- c) Participant Recreation Services, Indoor
- d) Professional and Business Offices
- e) Public Administration
- f) Public Assembly

#### 3. Conditions of Use

- a. Exterior, unenclosed storage of goods or materials is not permitted.

#### 4. Minimum Lot Area and Minimum Lot Width

- a. The minimum lot area shall be not less than 278 sq. m.
- b. The minimum lot width shall not be less than 7.6 m.

#### 5. Minimum Setback and Maximum Height

Minimum Setback	
Front lot line	0 m
Rear lot line	0 m
If lot is not served by a constructed rear lane	1.5 m
Exterior side lot line	0 m
Interior side lot line	0 m
Maximum Height	
Principal Building	18 m
Accessory Building	4.5 m

- 6. Waste and Recycling requirements shall comply with applicable requirements of section 1.2.9. of Schedule "A".
- 7. Amenity Areas for Multi-Unit Residential dwelling units shall comply with applicable requirements of section 1.2.4. of Schedule "A".

## Attachment 4

8. Parking and loading shall comply with the requirements of Off-Street Parking and Landscape Bylaw 3274, 2013, with the exception of Part 8 – Loading Spaces.
9. Landscaping shall comply with applicable requirements of Off-Street Parking and Landscape Bylaw 3274, 2013.

DRAFT

# Attachment 4

## Schedule B

Map of a 529.8 square metre portion of: LOT B DISTRICT LOT 95 KOOTENAY  
DISTRICT PLAN NEP83303, PID: 027-011-151



# A COMMUNITY RECREATION CAMPUS THE HEART OF NELSON, AREAS F & DEFINED E

Situated in downtown Nelson, is the Community Recreation Campus. This Campus is the regional centre for indoor recreation and is literally and figuratively the heart of the community.

## WHAT IS INCLUDED IN THE COMMUNITY RECREATION CAMPUS?

### NELSON CIVIC CENTRE

(owned by the City of Nelson)

• Includes:

- 1.** Civic Arena (operated by RDCK)
- 2.** Indoor Soccer Facility (leased to Nelson Soccer Association)
- 3.** Movie Theatre (leased to Nelson Civic Theatre Society)
- 4.** Gymnasium (leased to Glacier Gymnastics)
- 5.** Dance studio (leased to Dance Umbrella)
- 6.** Nelson Seniors Centre
- 7.** Nelson Curling Rink & Lounge (owned by the City of Nelson but leased to the Nelson Curling Club)
- 8.** Empty Lot (824 Front Street)



### NELSON & DISTRICT COMMUNITY COMPLEX

(owned by the RDCK)

• Includes:

- |                          |                               |
|--------------------------|-------------------------------|
| <b>9.</b> Aquatic centre | <b>11.</b> Fitness facility   |
| <b>10.</b> NDCC Arena    | <b>12.</b> Multipurpose rooms |





**ACTIVE EARTH**

**METRO VANCOUVER**

201 – 3989 Henning Drive  
Burnaby, BC V5C 6P8

**FRASER VALLEY**

304 – 2600 Gladys Avenue  
Abbotsford, BC V2S 0E9

**VANCOUVER ISLAND**

968 Meares Street  
Victoria, BC V8V 3J4

10 – 321 Wesley Street  
Nanaimo, BC V9R 2T5

**OKANAGAN**

201 – 13201 Victoria Road North  
Summerland, BC V0H 1Z0

**KOOTENAY**

304 – 625 Front Street  
Nelson, BC V1L 4B6

**AE PROJECT NUMBER**

**4233**  
October 2024  
Version 1.1

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

**818 & 824 Front Steet, Nelson, BC**

**PREPARED FOR**

**Nelson CARES Society**  
107-731 Station Avenue  
Victoria, BC V8B 5R5



Lloyd Lybbert, B.Sc.  
Environmental Technician



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Environmental Team Lead



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Senior Project Manager

## PHASE I ENVIRONMENTAL SITE ASSESSMENT

818 & 824 Front Street, Nelson,  
BC

AE PROJECT NUMBER: 4233  
October 2024  
Version 1.1

Prepared by:  
Active Earth Engineering Ltd.

This document contains privileged and confidential information that is subject to the conditions and limitations specified throughout.

## EXECUTIVE SUMMARY

This report summarizes the results of a Phase I Environmental Site Assessment (Phase I ESA) for the properties located at 818 & 824 Front Street, Nelson, BC (the “Site”).

The Phase I ESA was prepared for Nelson CARES Society by Active Earth in order to assess the level of environmental risk associated with current or past uses of the Site and surrounding properties. The Phase I ESA evaluated the likelihood of soil, soil vapour, groundwater and/or sediment contamination based upon a review of readily accessible historical information and completion of a site visit.

## SUMMARY OF FINDINGS

Summary of Findings	Yes/No
BC Contaminated Sites Regulation (CSR) Schedule 2 uses identified?	<b>No</b>
Areas of Potential Environmental Concern (APECs) identified?	<b>No</b>
Further investigation recommended at this time?	<b>No</b>

No APECs were identified within our assessment, as such no further investigation is recommended at this time.

This Executive Summary is subject to the same general limitations as contained within the report and must be read and understood in conjunction with the entire report.

## LIMITATIONS

The use of this report by anyone is subject to the following conditions and limitations:

1. This report has been prepared at the request of the client and for the specific use referred to herein. Nelson CARES Society, BC Housing, Canada Mortgage and Housing Corporation (CMHC), Columbia Basin Trust (CBT), and the local government may rely on this report. It is not reasonable for any other party to rely on the contents of this report without first obtaining written authorization from the client and Active Earth Engineering Ltd. (Active Earth).
2. Liability is expressly denied to any person other than the parties indicated above and those who obtain written consent. Accordingly, Active Earth does not accept responsibility for any damage suffered by any such person as a result of decisions made or actions based on this report. Diligence by all intended users is assumed.
3. This report is believed to provide a reasonable representation of the general environmental condition at the Site as of the date of this report. The conclusions made in this report reflect Active Earth's best judgment in light of the information available at the time of reporting. Should additional information become available or Site conditions change, the conclusions and recommendations of this report may be subject to change. For any party to rely on this report in the future, supplemental investigation may be necessary to verify the Site conditions at that time.
4. Active Earth has agreed to conduct an assessment and prepare this report as requested by the client named in the report for the use specified by the client, which is stated in the report. The client has agreed that the performance of this work and the report format are appropriate for the intended use.
5. Written consent from Active Earth must be obtained before any part of the report can be used for any purpose by anyone other than the client and other intended users identified in the report. Liability to any other party or for any other use is expressly denied regardless of who pays Active Earth's fee. Written consent and approval of Active Earth must also be obtained before the report (or any part of it) can be altered or conveyed to other parties or the public through prospectus, offering memoranda, advertising, public relations, news, sales or other media.



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**ATTACHMENTS****LIST OF ACRONYMS****FIGURES**

Figure 1	Location Plan & Surrounding Land Use Plan
Figure 2	Site Plan
Figure 3	Environmental Context Plan

**PHOTOGRAPHS**

Photographs	Photos 1 to 16
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**APPENDICES**

Appendix A	Reference: Low, Medium, and High-Risk Activities
Appendix B	Current Legal Titles and Lot Plans
Appendix C	Air Photos
Appendix D	BC Site Registry Search Results
Appendix E	Reference: Special Attention Items
Appendix F	Zoning Map

## 1 INTRODUCTION

Active Earth was retained by Nelson CARES Society (the Client) to complete a Phase I Environmental Site Assessment (Phase I ESA) for the properties located at and between 818 & 824 Front Steet, Nelson, BC (the "Site"). This work was requested to support a property redevelopment involving the Site.

The objective of this Phase I ESA was to assess the likelihood of environmental contamination at the Site. The scope of work included:

- A review of readily available and relevant databases and historical records.
- A review of any readily available and relevant environmental or geotechnical reports.
- A site visit.

Any issues considered to present a moderate or high risk of contamination to the Site would be considered to be Areas of Potential Environmental Concern (APECs). Further investigation in the form of a Phase II ESA would typically be recommended for all APECs. No further investigation would be recommended for issues considered to present a low risk of contamination to the Site (i.e., issues that were not considered to be APECs). Our protocol for assessing relative risk levels is provided in Appendix A.

Definitions for various acronyms and terms are attached.

## 2 SITE DESCRIPTION

The Site location is shown on Figure 1. The following table summarizes the Site location details and general physical description:

### LOCATION AND PHYSICAL DESCRIPTION

Address	Current Civic Address(es)	818 & 824 Front Steet, Nelson, BC
	Historical Civic Address(es)	None identified.
Location and Dimensions	Cartographic Coordinates	49°29'46.1"North 117°17'27.1"West
	Approximate Surface Coverage	Total 0.13Ha (1,300m <sup>2</sup> )

The following table summarizes the Site PIDs, legal descriptions and current zoning for the Site:

# Attachment 6

## LEGAL DESCRIPTION AND ZONING

Address	PID	Legal Description	Current Zoning	Ownership
818 Front Street, Nelson, BC	013-691-171	LOT 8 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)	I-1 (Institutional)	City of Nelson, 502 Vernon Street, Nelson BC V1L 4E8
	013-691-198	LOT 9 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)		
No Civic Address	013-691-341	LOT 10 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)		
824 Front Street, Nelson, BC	007-487-231	LOT 11 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)		
	007-487-240	LOT 12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)		

The current land title(s) and legal lot plan(s) are provided in Appendix B.

Municipal zoning for the Site and surrounding lands are presented in Appendix F.

## 3 RECORDS REVIEW

### 3.1 Previous Relevant Reports

No previous relevant reports were made available for review by Active Earth. If any such reports become available, these should be provided so that we may review and amend this report, if warranted.

### 3.2 Physical Setting Records

The following table summarizes our findings. Additional information has been appended where noted below.

#### PHYSICAL SETTING DESCRIPTION

Hydrogeology	Anticipated Regional Groundwater Flow (Figures 1 and 3)	Generally westerly based on local topography and nearby Kootenay River (see Figure 3). Shallow groundwater may be influenced by utility corridors and building foundation drains.
Area Water Uses	Nearest Surface Water Body	The Kootenay River, approximately 360m to the west (down-gradient).
	Historical Streams	None identified

(Figure 3)	Mapped Water Wells	One mapped well was identified within 500m of the Site as shown on Figure 3. The use of the wells was not determined.
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### 3.3 Historical & Database Records

The following historical records and information sources were reviewed:

- Historical Air Photographs (included as Appendix C).
- BC Site Registry Search Results (included as Appendix D).
- Historical information obtained during the completed interview(s).
- Historical City Directories.
- Historical Fire Insurance Plans.

#### 3.3.1 Site Schedule 2 Uses

Schedule 2 of the CSR lists a number of commercial and industrial uses that could result in contamination. Anywhere in BC (excluding federal lands), a Site Disclosure Statement must be provided when an application is made to local government for permits for zoning, subdivision, development, or building (where soil disturbance is likely to occur). The Site Disclosure Statement asks a number of questions about the history of a site, in particular Schedule 2 uses. When such activities have occurred on a site and there are no valid exemptions for submission of the SDS to local government, then ENV approval will be required to facilitate these permits. Typical ENV approvals include Instruments (e.g. Certificates of Compliance, Determinations, or Approvals in Principle) and Releases.

No Schedule 2 uses were identified at the Site, and therefore ENV approval should not be required to facilitate the indicated local government permits. Any relocation of non-waste soil from the Site will not be subject to the characterization and notification requirements provided in ENV Protocol 19: *Site Investigation and Reporting*.

#### 3.3.2 BC Online Site Registry Records

BC Online maintains a Site Registry on behalf of ENV. Any sites that have had ENV involvement after 1988 are listed on the Site Registry. Not all sites listed in the Registry are considered to be contaminated; rather, some have only been investigated or have received ENV approvals for remediation. The Site Registry also includes sites for which a Site Profile or Site Disclosure Statement has been submitted to ENV, regardless of whether or not environmental concerns were subsequently identified.

A Site Registry search was completed by Active Earth on October 14, 2024 (see Appendix D). The database was searched based on the Site PIDs, and identified the following:

## SITE PID REGISTRY SEARCH

Address	PID	Results
824 Front Steet, Nelson, BC	007-487-240	Not listed.
	007-487-231	Not listed.
No Civic Address	013-691-341	Not listed.
818 Front Street, Nelson, BC	013-691-198	Not listed.
	013-691-171	Not listed.

The database was also searched on the basis of geographic location within 0.5km radius of the centre of the Site (see Figure 3 for registered site locations). The area search identified numerous records, most of which were located a large distance from the Site (greater than 100m), and/or were situated down-gradient or cross-gradient with respect to the inferred direction of groundwater flow.

No records were identified adjacent to the Site, or within 100m of the Site in an up-gradient orientation. As such, no detailed reports were obtained.

## 3.3.3 Site History

Our review identified the following historical uses at the Site:

## HISTORICAL SITE USES

Address	Approximate Date Range	Land Use	Comments
818 & 824 Front Steet, Nelson, BC	1994 to present	Vacant Residential	No buildings visible in the air photos, alternating as vacant and unlisted from 1980 to present.
	1968 to 1994	Residential	One small building visible in the air photos, listed as residential addresses in the city directory. Building only visible on the eastern portion of the Site.
	1939 to 1968	Vacant Residential	No buildings visible on the air photos.

The historical Site uses that were considered to be potential sources of contamination are presented **in bold** in the table above.

None of the identified historical site uses were considered to be potential sources of contamination.

Although no evidence of current or former heating oil ASTs or USTs was identified on-Site (see Section 4), it is possible that heating oil ASTs or USTs previously existed on-Site, given the historical residential uses documented above.

### 3.3.4 Surrounding Properties History

Our review identified historical surrounding land uses that were considered to present a potential risk of contamination to the Site, as summarized in the table below. Any identified historical surrounding land uses not identified in the table below were considered to not present a meaningful risk of contamination to the Site.

#### HISTORICAL OFF-SITE ACTIVITIES OF POTENTIAL CONCERN

Direction (Orientation)	Address	Approximate Date Range	Historical Activity
North / Northwest (cross-gradient)	801 Front Street	1975 to 1985	Auto Repair Garage

Though no evidence of heating oil usage was observed on surrounding lands (see Section 4), it is possible that heating oil ASTs or USTs previously existed on surrounding properties, due to the age of the buildings.

## 4 SITE VISIT & INTERVIEWS

### 4.1 Site Current Conditions

On October 23, 2024, a representative from Active Earth completed a site visit to review current conditions.

An interview was conducted with Sam Ellison on October 23, 2024, who has worked for the City of Nelson for 7 years and is currently the Facility Manager.

All information provided below regarding the current use of the property were based on the site visit and interview.

The following tables summarize the site visit and interview findings:

#### CURRENT USAGE – GENERAL OBSERVATIONS

Overall Property Uses Observed	Vacant with no buildings. A small house was once located on the east half of the Site but has since been demolished.
--------------------------------	--

# Attachment 6

Storage Tanks	During the site visit no evidence of ASTs was observed, such as visible tanks or mounting pads. No evidence of USTs observed such as vent pipes or brackets, fill caps, distribution lines, or suspect patches/depressions. According to Mr. Ellison, when the house was demolished a gas line was also removed, and no ASTs or USTs were observed at the time of demolition. This suggests the house was heated using natural gas.
Other Storage Containers (chemicals, fuels, oils, wastes, etc.)	Four pails of calcium hypochlorite tablets were observed immediately west of the Site, adjacent to the community center. The pails were in good condition.
Other Hazardous Materials or Wastes	None observed.
Strong, Pungent, or Noxious Odours	None observed.
Potable Water Supply Source	Municipal piped water.
Polychlorinated Biphenyls (PCBs) Sources (See Appendix E)	No buildings/equipment present on-Site. Therefore, PCBs are not considered to be a potential hazard.
Asbestos-Containing Materials (ACMs) (See Appendix E)	No buildings present on-Site. Therefore, ACMs are not considered to be a potential hazard. According to Mr. Ellison, asbestos abatement was completed on the house prior to demolition.
Lead (See Appendix E)	No buildings present on-Site. Therefore, lead-based paints are not considered to be a potential hazard. According to Mr. Ellison there was lead paint removal completed on the house at the time of demolition.
Ozone-Depleting Substances (ODS) (See Appendix E)	No buildings present on-Site. Therefore, ODS are not considered to be a potential hazard.
Urea Foam Formaldehyde Insulation (UFFI) (See Appendix E)	No buildings present on-Site. Therefore, UFFI are not considered to be a potential hazard.
Other Special Attention Items (radon, mould, noise, electric and magnetic fields, vibration) (See Appendix E)	Signs on the property indicated that Clearview and 24D have been applied for spot treatment of invasive plants.

## CURRENT USAGE – EXTERIOR OBSERVATIONS

Existing Boreholes, Monitoring Wells, or other Wells	Water well cap observed along the west property line adjacent to the community center building.
Sewage Disposal (septic field/tank, municipal sewage service connection, etc.)	None (no buildings present).

# Attachment 6

Pits and Lagoons	None observed.
Exterior Stains (soil, asphalt, etc.)	None observed.
Stressed Vegetation	Stressed vegetation observed on the southern portion of the property near the herbicide signs.
Evidence of Imported Fill	None observed based on surface grade of the Site and surrounding lands.
Waste Water or other Liquid Discharges	None observed.
On-Site Watercourses, Ditches, or Standing Water	None observed.
Roads, Parking Facilities, and Rights of Way	None observed.

A discussion of the potential for current Site features to present an environmental risk is provided in Section 5.

Relevant Site details are shown on Figure 2, attached. Legal lot boundaries are approximated on all attached Figures.

## 4.2 Surrounding Properties Current Conditions

During the site visit, Active Earth conducted a visual inspection of the surrounding properties from publicly accessible areas. The properties were inspected for potential sources of contamination, including heating oil tanks. The following table outlines our observations:

### CURRENT SURROUNDING LAND USE

Direction (Orientation <sup>1</sup> )	Current Usage / Observations
North (cross-gradient)	Commercial uses across Front Street / Highway 3a (801 Front Street - Pet Supply Store and 901 Front Street – Physician)
East (up -gradient)	Commercial and single family residential across Cedar Street
South (cross-gradient)	Community center (Nelson and District Community complex building and paved parking area)

<sup>1</sup> Up-gradient refers to the direction from which groundwater would flow. Down-gradient refers to the direction toward which groundwater would flow. Cross-gradient refers to directions that are perpendicular to groundwater flow.



# Attachment 6

Pits and Lagoons	None observed.
Exterior Stains (soil, asphalt, etc.)	None observed.
Stressed Vegetation	Stressed vegetation observed on the southern portion of the property near the herbicide signs.
Evidence of Imported Fill	None observed based on surface grade of the Site and surrounding lands.
Waste Water or other Liquid Discharges	None observed.
On-Site Watercourses, Ditches, or Standing Water	None observed.
Roads, Parking Facilities, and Rights of Way	None observed.

A discussion of the potential for current Site features to present an environmental risk is provided in Section 5.

Relevant Site details are shown on Figure 2, attached. Legal lot boundaries are approximated on all attached Figures.

## 4.2 Surrounding Properties Current Conditions

During the site visit, Active Earth conducted a visual inspection of the surrounding properties from publicly accessible areas. The properties were inspected for potential sources of contamination, including heating oil tanks. The following table outlines our observations:

### CURRENT SURROUNDING LAND USE

Direction (Orientation <sup>1</sup> )	Current Usage / Observations
North (cross-gradient)	Commercial uses across Front Street / Highway 3a (801 Front Street - Pet Supply Store and 901 Front Street – Physician)
East (up -gradient)	Commercial and single family residential across Cedar Street
South (cross-gradient)	Community center (Nelson and District Community complex building and paved parking area)

<sup>1</sup> Up-gradient refers to the direction from which groundwater would flow. Down-gradient refers to the direction toward which groundwater would flow. Cross-gradient refers to directions that are perpendicular to groundwater flow.

Direction (Orientation <sup>1</sup> )	Current Usage / Observations
West (down-gradient)	Community center (Nelson and District Community Complex) adjacent to the Site, Front Street / Highway 3a and Commercial uses <b>OK Tire Shop and NAPA Auto Parts</b>

Based on the limited visual inspection, the surrounding buildings appear to be serviced by natural gas. No indications of current or historical USTs or ASTs were observed on the surrounding lands.

Any identified current off-Site uses that were considered to be potential sources of contamination are presented **in bold** in the table above. The potential for these uses to have impacted the Site is discussed in Section 5. If nothing is bolded above, then no current off-Site uses were considered to be potential sources of contamination.

## 5 SUMMARY OF FINDINGS & DISCUSSION

The key findings of this Phase I ESA are summarized below.

### 5.1 Site

No on-Site issues were identified that were considered to present a moderate or high risk of contamination. As such, no on-Site APECs were identified.

### 5.2 Surrounding Properties

No off-Site issues were identified that were considered to present a moderate or high risk of contamination to the Site. The off-Site historical auto repair shop and OK Tire Shop, with civic address 801 Front Street, located to the west of the Site in a down-gradient direction is considered to present a low risk of contamination. As such, no off-Site APECs were identified.

## 6 CONCLUSIONS

This Phase I ESA was conducted to assess the likelihood of soil, soil vapour, groundwater, and/or sediment contamination based upon a review of readily accessible historical information and completion of a site visit.

No issues were identified that were considered to present a moderate or high risk of contamination to the Site. As such, no APECs were identified.

No further investigation is recommended at this time.

Based on the current and historical activities identified at the Site, ENV approval would likely not be required to facilitate future local government permits for zoning, subdivision, development and/or building (where soil disturbance is likely to occur).

## 7 PROFESSIONAL STATEMENT & QUALIFICATIONS

This Phase I ESA has been completed in general compliance with CSA Standard Z768-01 – *Phase I Environmental Site Assessment*.

The key persons involved in this assessment have demonstrable experience in assessing the types of potential contamination sources identified in this report, for the types of properties that are relevant to this report. The major participants in this assessment included:

- Lloyd Lybbert, B.Sc., Mr. Lybbert has more than 2 years of experience conducting environmental site investigations and reporting, including numerous sites and projects that involved activities, land uses, and environmental contamination risks similar to those identified in this report. Lloyd was the primary report author.
- Rob Wilson, AScT, PMP, Mr. Wilson has 25 years of experience conducting environmental site investigations and reporting, including numerous sites and projects that involved that involved activities, land uses, and environmental contamination risks similar to those identified in this report. Mr. Wilson provided senior project support and report review.
- Dave Kettlewell, M.Sc., P.Geo., CSAP, Mr. Kettlewell has 30 years of experience conducting environmental site investigations and reporting, including numerous sites and projects that involved that involved activities, land uses, and environmental contamination risks similar to those identified in this report. Mr. Kettlewell was the senior reviewer.



## **LIST OF ACRONYMS**

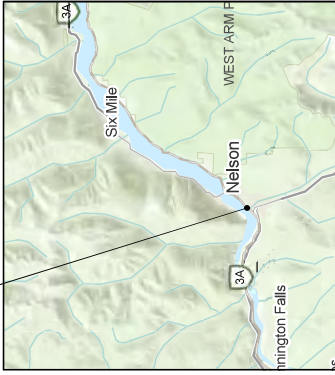
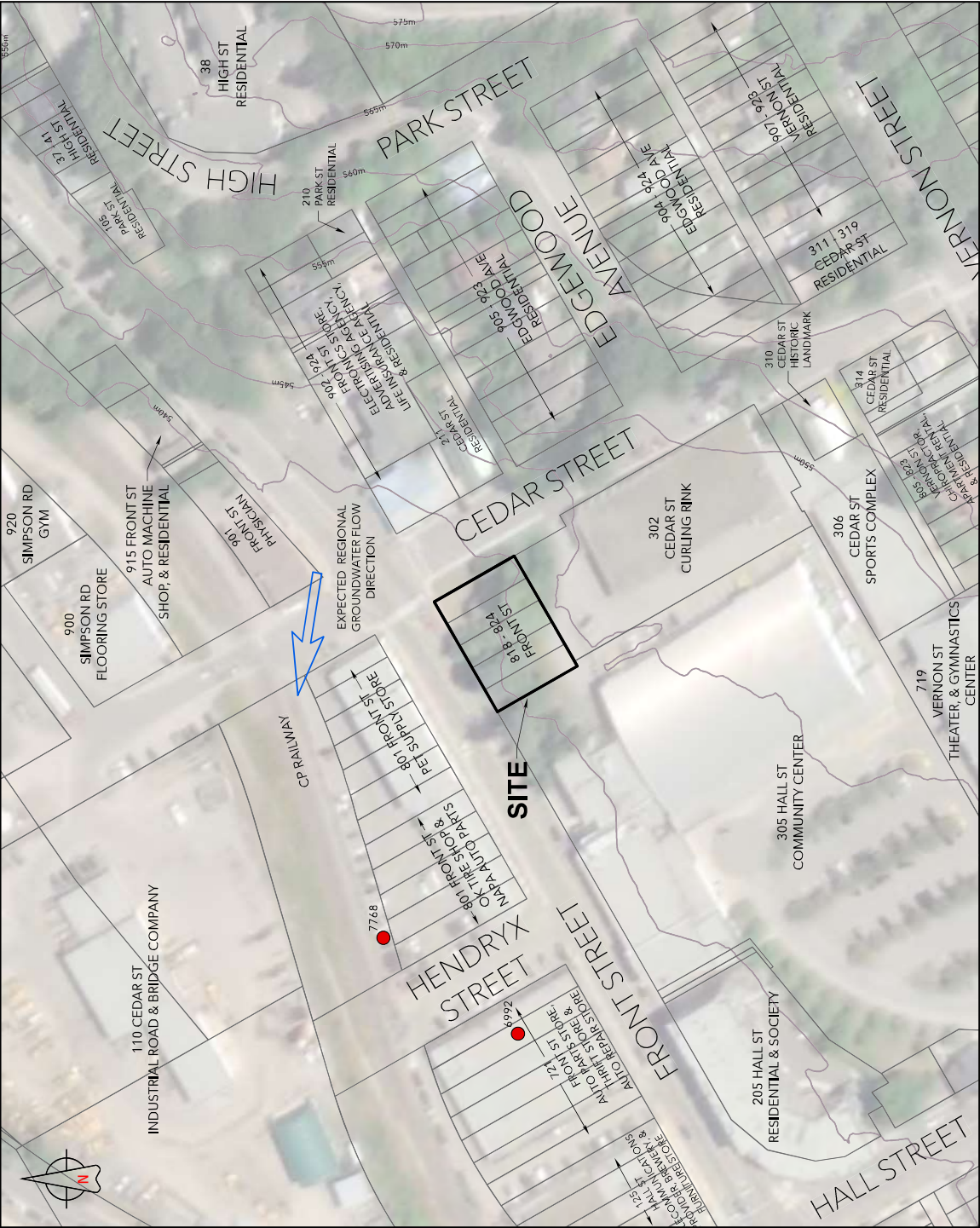
## LIST OF ACRONYMS

AEC	Area of Environmental Concern
AiP	Approval in Principle
AL	Agricultural Land Use Standards (CSR), or Agricultural Guidelines/Standards (CCME CSQG or CWS)
APEC	Area of Potential Environmental Concern
AST	Above Ground Storage Tank
AWfw/m	Aquatic Life Standards (CSR) (fw – freshwater, m – marine)
BCWQG	British Columbia Water Quality Guidelines
BTEXS	Benzene, Toluene, Ethylbenzene, Xylenes, and Styrene
CCME	Canadian Council of Ministers of the Environment
CL	Commercial Land Use Standards (CSR), or Commercial Guidelines/Standards (CCME CSQG or CWS)
CoC	Certificate of Compliance
COC	Contaminant of Concern
CSM	Conceptual Site Model
CSQG	Canadian Soil Quality Guidelines (CCME)
CSR	Contaminated Sites Regulation
CWS	Canada Wide Standards (CCME)
DSI	Detailed Site Investigation
DW	Drinking Water Standards (CSR)
ENV	BC Ministry of Environment & Climate Change Strategy
EPHw	Extractable Petroleum Hydrocarbons (w – water)
ESA	Environmental Site Assessment
GCDWQ	Guidelines for Canadian Drinking Water Quality
HBM	Hazardous Building Materials
HDPE	High-Density Polyethylene
HEPHs	Heavy Extractable Petroleum Hydrocarbons (s – soil)
HWR	BC Hazardous Waste Regulation
IL	Industrial Land Use Standards (CSR), or Industrial Guidelines/Standards (CCME CSQG or CWS)
IW	Irrigation Water Standards (CSR)
LEPHs/w	Light Extractable Petroleum Hydrocarbons (s – soil, w – water)
LW	Livestock Watering Standards (CSR)
MDL	Method Detection Limit
MTBE	Methyl Tertiary Butyl Ether (also referred to as Methyl Tert-Butyl Ether)
NIR	Notification of Independent Remediation
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCOC	Potential Contaminant of Concern
PERC	Tetrachloroethylene
Phase I	Phase I Environmental Site Assessment
Phase II	Phase II Environmental Site Assessment
PL	Urban Park Land Use Standards (CSR), or Parkland Guidelines/Standards (CCME CSQG or CWS)
PSI	Preliminary Site Investigation
RL	Residential Guidelines/Standards (CCME CSQG or CWS)
RLld	Residential Low-Density Land Use Standards (CSR)
RLhd	Residential High-Density Land Use Standards (CSR)
Stage 1	Stage 1 Preliminary Site Investigation
Stage 2	Stage 2 Preliminary Site Investigation
TCE	Trichloroethylene
VOC	Volatile Organic Compounds
VHw	Volatile Hydrocarbons (w – water)
VPHs/w/v	Volatile Petroleum Hydrocarbons (s – soil, w – water, v – vapour)
UST	Underground Storage Tank
WLn	Wildlands Natural Land Use Standards (CSR)
WLr	Wildlands Reverted Land Use Standards (CSR)
WTN	Well Tag Number





## FIGURES

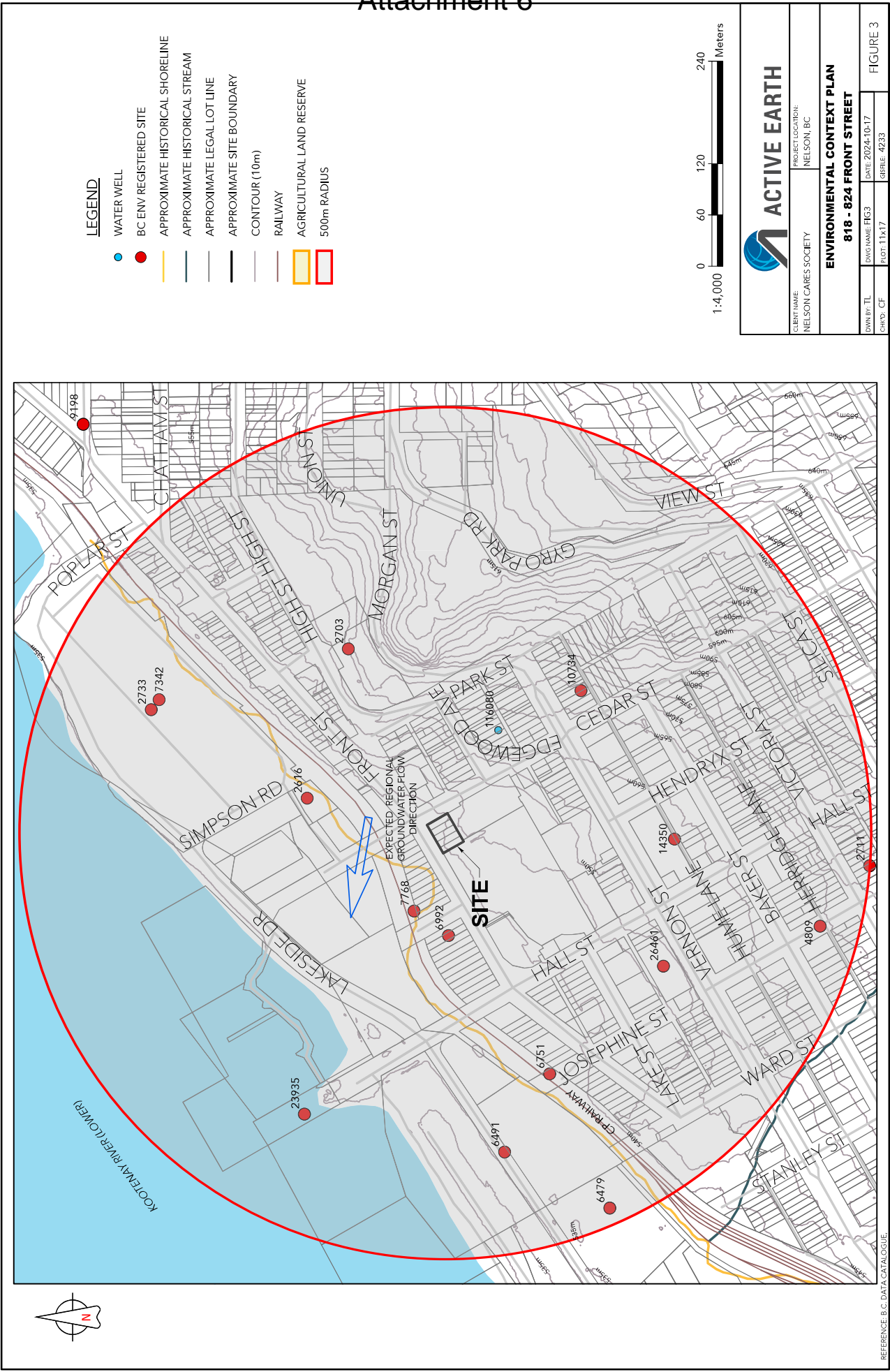


<b>ACTIVE EARTH</b>	
CLIENT NAME: NELSON CARES SOCIETY	PROJECT LOCATION: NELSON, BC
<b>LOCATION PLAN &amp; SURROUNDING LAND USE PLAN</b>	
<b>818 - 824 FRONT STREET</b>	
DRAWN BY: TL	DWG NAME: FIG1
CHECKED: CF	DATE: 2024-10-29
	SHEET: 4233
FIGURE 1	











# PHOTOGRAPHS



## -PHOTOGRAPHS

**Photo 1:** View of northern portion of the Site from the northeast. Highway 3a north of Site visible.



**Photo 2:** View of southern portion of the Site from the southwest.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024

# PHOTOGRAPHS

**Photo 3:** View of eastern portion of the Site from the southeast. Commercial buildings across Highway 3a visible.



**Photo 4:** View of western portion of the Site from the northwest. Community centre west of Site visible.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024



# PHOTOGRAPHS

**Photo 5:** View of central portion of the Site from the east.



**Photo 6:** View of central portion of the Site from the southwest.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024

# PHOTOGRAPHS

**Photo 7:** View of central portion of the Site from the southwest.



**Photo 8:** View of eastern portion of the Site from the southwest. Cedar Street east of Site visible.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024



# PHOTOGRAPHS

**Photo 9:** View of southern portion of the Site from the southeast.



**Photo 10:** View of herbicide notice (front) on the southern portion of the Site.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024

# PHOTOGRAPHS

**Photo 11:** View of herbicide notice (back) on the southern portion of the Site.



**Photo 12:** View of stressed vegetation on the southern portion of the Site adjacent the herbicide notice.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024



# PHOTOGRAPHS

**Photo 13:** View of well cap on the western portion of the Site.



**Photo 14:** View of materials located adjacent community centre west of the Site.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024

# PHOTOGRAPHS

**Photo 15:** View of materials located adjacent community centre west of the Site.



**Photo 16:** View of community centre located south of the Site.



Client Name	Site Location	Project No.	Date
Nelson CARES Society	818-824 Front Street, Nelson, BC	4233	October 2024





## **APPENDIX A**

### **Reference: Low, Medium, and High-Risk Activities**

## REFERENCE: LOW, MEDIUM AND HIGH-RISK ACTIVITIES

---

### 1 INTRODUCTION

This document summarises the process and criteria used by Active Earth for evaluating the relative risk of contamination posed by various site uses and activities, during a Phase I Environmental Site Assessment (Phase I ESA). In this context, “contamination” refers to the presence of one or more regulated parameter at concentrations exceeding an applicable standard or guideline in a regulated media (e.g., soil, water, sediment, vapour, etc.).

The assessment of relative risks is based on our review of relevant information identified during the course of the Phase I ESA, and our professional experience.

### 2 RISK LEVELS

Relative contamination risk levels are generally defined by Active Earth as follows:

- **Low Risk:** The activity is unlikely to result in contamination, and/or, if the activity has resulted in contamination, the extent of contamination is unlikely to be appreciable for the purpose of evaluating environmental liabilities.
- **Medium Risk:** The activity presents a moderate risk of appreciable contamination, which if present, could reasonably result in meaningful environmental liabilities.
- **High Risk:** The activity presents a significant risk of appreciable contamination, which if present would likely reasonably result in meaningful environmental liabilities.

Any issues that are determined to present a moderate or high risk of contamination to the subject site are typically but not always classified by Active Earth as Areas of Potential Environmental Concern (APECs). Further discussion is provided in the Phase I ESA report if warranted.

### 3 TYPICAL EVALUATION CRITERIA

The criteria are typically considered when determining relative risk levels include but are not limited to:

- The type of activity.
- The duration of the activity.
- The period of time in which the activity occurred (e.g., activities that occurred during a time that typically pre-dated robust environmental protection practices may present a relatively higher risk).
- Potential for the activity to result in contamination to the subsurface (e.g. presence of secondary containment structures or other barriers that would limit contaminant migration/infiltration, etc.).

- Written evidence of previously confirmed contamination or suspected contamination, such as in historical records or reports.
- Oral and/or anecdotal evidence of potential contamination, such as through interviews.
- Written or oral evidence of waste management practices and/or general site management practices.
- Site visit observations that may be indicative of potential contamination, such as surface staining, poor waste storage/handling practices, etc.
- If the activity is located off-site, consideration is also given to the distance and orientation relative to the subject site (e.g. up-gradient or down-gradient relative to the anticipated groundwater flow).





## **APPENDIX B**

### **Current Legal Title & Lot Plan**

# Attachment 6

## TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$38,000

2024-10-08, 09:42:48

Requestor: Maria Hernandez

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

### Land Title District

Land Title Office

NELSON

NELSON

### Title Number

From Title Number

W9064

1911961

### Application Received

1987-05-15

### Application Entered

1987-05-22

### Registered Owner in Fee Simple

Registered Owner/Mailing Address:

CITY OF NELSON  
502 VERNON STREET  
NELSON, BC  
V1L 4E8

### Taxation Authority

Nelson, The Corporation of the City of

### Description of Land

Parcel Identifier:

007-487-231

Legal Description:

LOT 11 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL  
A (SEE 272251)

### Legal Notations

NOTICE OF TAX EXEMPTION, LOCAL GOVERNMENT ACT, SECTION 340,  
SEE KR165773

### Charges, Liens and Interests

NONE

### Duplicate Indefeasible Title

NONE OUTSTANDING

### Transfers

NONE

### Pending Applications

NONE

# Attachment 6

## TITLE SEARCH PRINT

2024-10-08, 09:42:48

File Reference: 4233

Requestor: Maria Hernandez

Declared Value \$SEE W9064

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

### Land Title District

Land Title Office

NELSON

NELSON

### Title Number

From Title Number

W9065

1911961

### Application Received

1987-05-15

### Application Entered

1987-05-22

### Registered Owner in Fee Simple

Registered Owner/Mailing Address:

CITY OF NELSON  
502 VERNON STREET  
NELSON, BC  
V1L 4E8

### Taxation Authority

Nelson, The Corporation of the City of

### Description of Land

Parcel Identifier:

007-487-240

Legal Description:

LOT 12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL  
A (SEE 272251)

### Legal Notations

NOTICE OF TAX EXEMPTION, LOCAL GOVERNMENT ACT, SECTION 340,  
SEE KR165773

### Charges, Liens and Interests

NONE

### Duplicate Indefeasible Title

NONE OUTSTANDING

### Transfers

NONE

### Pending Applications

NONE



# Attachment 6

## TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$N/A

2024-10-14, 15:17:30

Requestor: Celina Fujita

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

<b>Title Issued Under</b>	SECTION 188 LAND TITLE ACT
<b>Land Title District</b> Land Title Office	NELSON NELSON
<b>Title Number</b> From Title Number	XC8945 Q11786
<b>Application Received</b>	1989-04-27
<b>Application Entered</b>	1989-05-03
<b>Registered Owner in Fee Simple</b> Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8
<b>Taxation Authority</b>	Nelson, The Corporation of the City of
<b>Description of Land</b> Parcel Identifier: Legal Description:	013-691-171 LOT 8 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)
<b>Legal Notations</b>	NONE
<b>Charges, Liens and Interests</b> Nature: Registration Number: Registration Date and Time: Registered Owner:  Remarks:	RESERVATION 19203D 1932-04-20 14:50 THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY INTER ALIA SEE 34009I
<b>Duplicate Indefeasible Title</b>	NONE OUTSTANDING
<b>Transfers</b>	NONE

Attachment 6

TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$N/A

2024-10-14, 15:17:30  
Requestor: Celina Fujita

Pending Applications

NONE

# Attachment 6

## TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$N/A

2024-10-14, 15:17:30

Requestor: Celina Fujita

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

<b>Title Issued Under</b>	SECTION 188 LAND TITLE ACT
<b>Land Title District</b> Land Title Office	NELSON NELSON
<b>Title Number</b> From Title Number	XC8946 Q11786
<b>Application Received</b>	1989-04-27
<b>Application Entered</b>	1989-05-03
<b>Registered Owner in Fee Simple</b> Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8
<b>Taxation Authority</b>	Nelson, The Corporation of the City of
<b>Description of Land</b> Parcel Identifier: Legal Description:	013-691-198 LOT 9 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)
<b>Legal Notations</b>	NONE
<b>Charges, Liens and Interests</b> Nature: Registration Number: Registration Date and Time: Registered Owner:  Remarks:	RESERVATION 19203D 1932-04-20 14:50 THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY INTER ALIA SEE 34009I
<b>Duplicate Indefeasible Title</b>	NONE OUTSTANDING
<b>Transfers</b>	NONE

## Attachment 6

### TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$N/A

2024-10-14, 15:17:30

Requestor: Celina Fujita

### Pending Applications

NONE

# Attachment 6

## TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$N/A

2024-10-14, 15:17:30

Requestor: Celina Fujita

**\*\*CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN\*\***

<b>Title Issued Under</b>	SECTION 188 LAND TITLE ACT
<b>Land Title District</b> Land Title Office	NELSON NELSON
<b>Title Number</b> From Title Number	XC8947 Q11786
<b>Application Received</b>	1989-04-27
<b>Application Entered</b>	1989-05-03
<b>Registered Owner in Fee Simple</b> Registered Owner/Mailing Address:	CITY OF NELSON 502 VERNON STREET NELSON, BC V1L 4E8
<b>Taxation Authority</b>	Nelson, The Corporation of the City of
<b>Description of Land</b> Parcel Identifier: Legal Description:	013-691-341 LOT 10 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500, EXCEPT PARCEL A (SEE 27225I)
<b>Legal Notations</b>	NONE
<b>Charges, Liens and Interests</b> Nature: Registration Number: Registration Date and Time: Registered Owner:  Remarks:	RESERVATION 19203D 1932-04-20 14:50 THE COLUMBIA AND KOOTENAY RAILWAY AND NAVIGATION COMPANY INTER ALIA SEE 34009I
<b>Duplicate Indefeasible Title</b>	NONE OUTSTANDING
<b>Transfers</b>	NONE

## Attachment 6

### TITLE SEARCH PRINT

File Reference: 4233

Declared Value \$N/A

2024-10-14, 15:17:30

Requestor: Celina Fujita

### Pending Applications

NONE



Status: Filed

Plan #: NEP9500 App #: N/A Ctrl #: (Altered)

RCVD: 1998-02-05 RQST: 2024-10-08 09.52.59







## APPENDIX C

### Air Photos



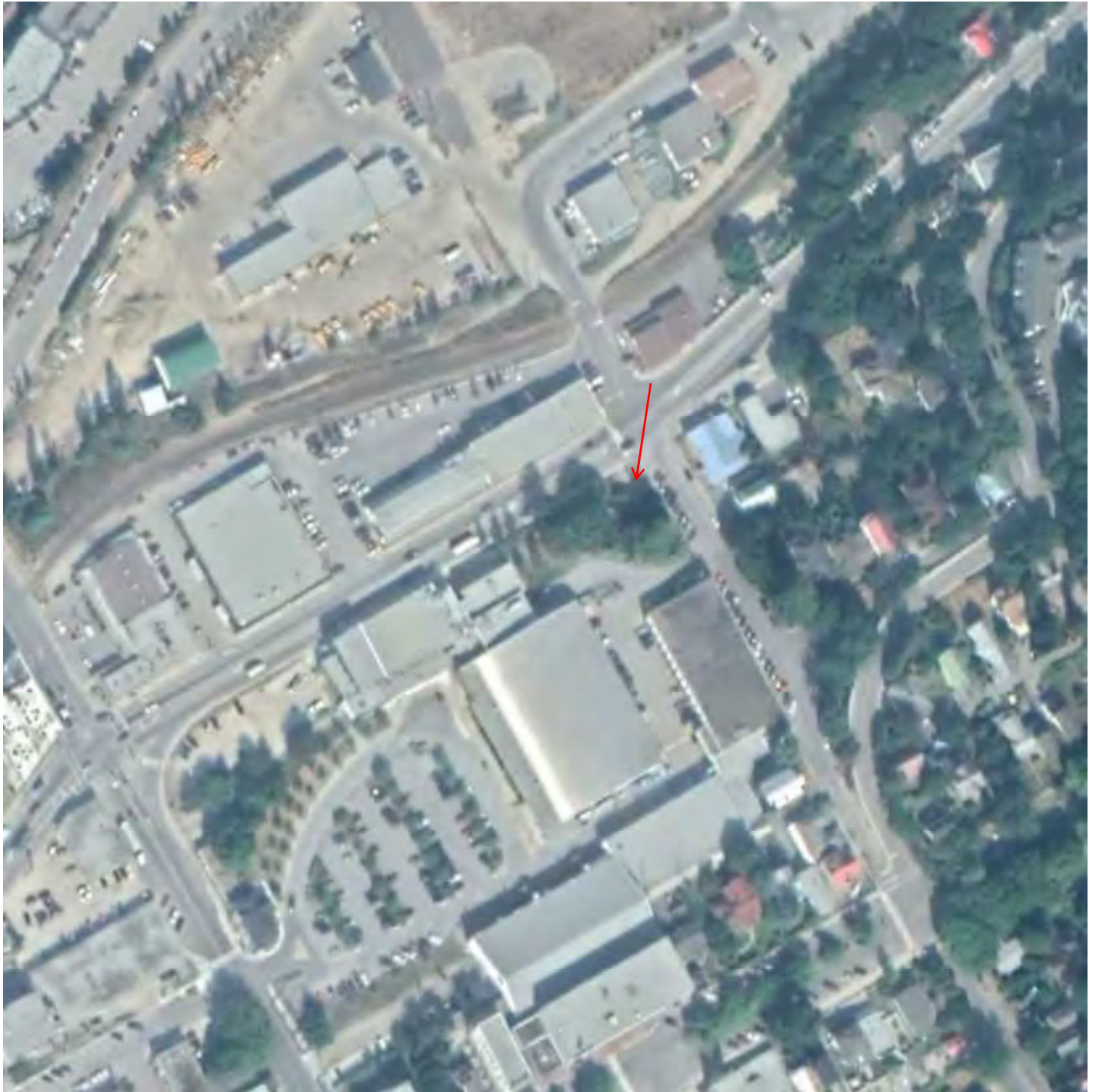
## 2022 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

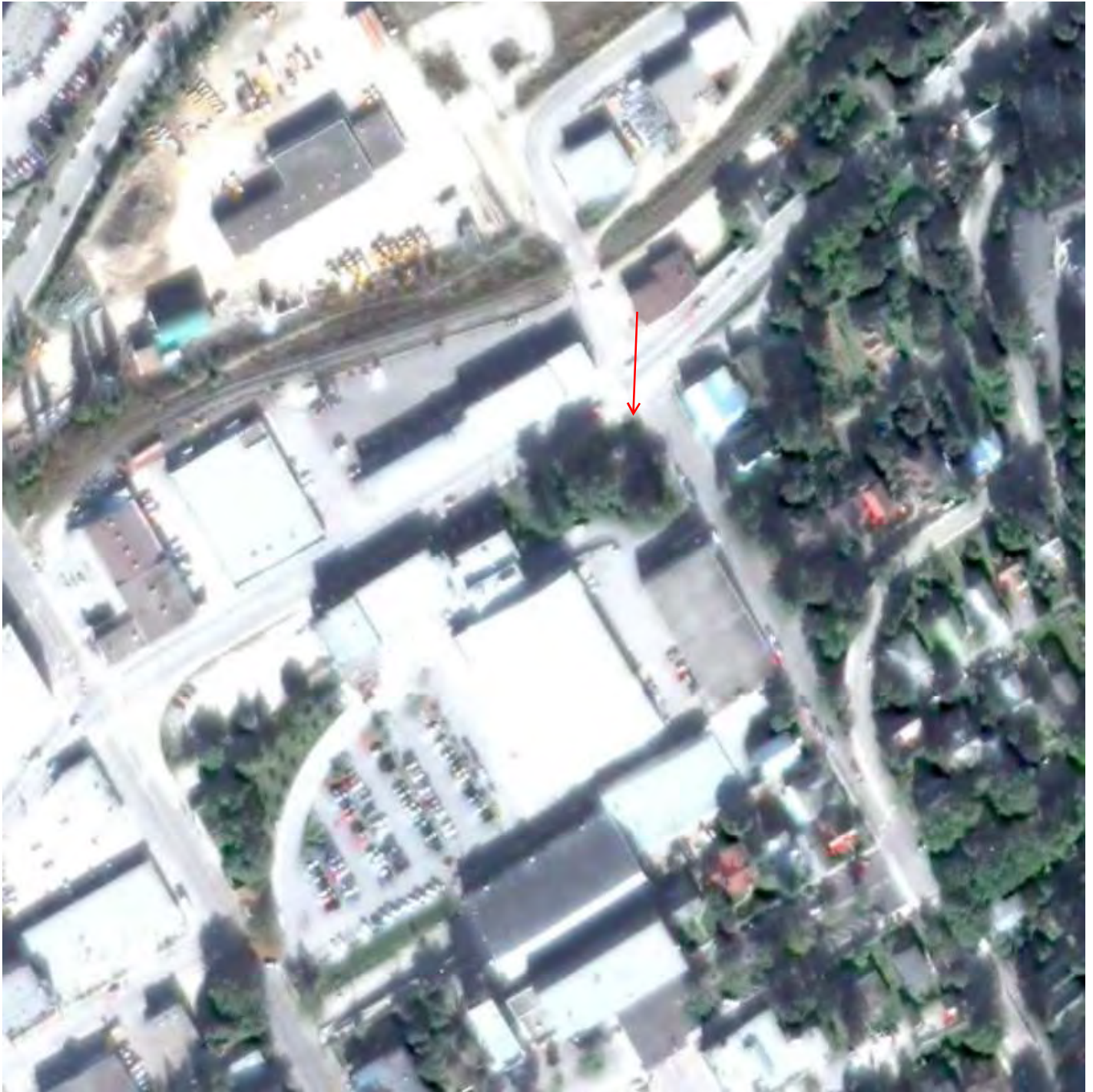


## 2017 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

## 2009 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233



## 2002 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233



# 1994 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

# 1988 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233



# 1983 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

# 1979 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

# 1975 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233



# 1968 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

# 1958 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233



# 1951 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233

# 1945 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233



## 1939 AERIAL PHOTOGRAPH



Client Name	Site Location	Project No.
Nelson CARES Society	818-824 Front Street, Nelson	4233





## APPENDIX D

# BC Site Registry Search Results

Attachment 6

# Site Registry - Land Title Parcel Identifier (PID) Search

## BC Registries and Online Services

---

No records from the Site Registry that match the search criteria provided:

Folio: 4233

Land Title PID: 013691171

You have been charged for this information.

---

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address, or Crown Lands File Number.

Disclaimer: Site Registry information has been filed in accordance with the provisions of the *Environmental Management Act*. While we believe the information to be reliable, BC Registries and Online Services and the Province of British Columbia make no representation or warranty as to its accuracy or completeness. Persons using this information do so at their own risk.

Attachment 6

# Site Registry - Land Title Parcel Identifier (PID) Search

## BC Registries and Online Services

---

No records from the Site Registry that match the search criteria provided:

Folio: 4233

Land Title PID: 007487231

You have been charged for this information.

---

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address, or Crown Lands File Number.

Disclaimer: Site Registry information has been filed in accordance with the provisions of the *Environmental Management Act*. While we believe the information to be reliable, BC Registries and Online Services and the Province of British Columbia make no representation or warranty as to its accuracy or completeness. Persons using this information do so at their own risk.

Attachment 6

# Site Registry - Land Title Parcel Identifier (PID) Search

## BC Registries and Online Services

---

No records from the Site Registry that match the search criteria provided:

Folio: 4233

Land Title PID: 007487240

You have been charged for this information.

---

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address, or Crown Lands File Number.

Disclaimer: Site Registry information has been filed in accordance with the provisions of the *Environmental Management Act*. While we believe the information to be reliable, BC Registries and Online Services and the Province of British Columbia make no representation or warranty as to its accuracy or completeness. Persons using this information do so at their own risk.

Attachment 6

# Site Registry - Land Title Parcel Identifier (PID) Search

## BC Registries and Online Services

---

No records from the Site Registry that match the search criteria provided:

Folio: 4233

Land Title PID: 013691198

You have been charged for this information.

---

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address, or Crown Lands File Number.

Disclaimer: Site Registry information has been filed in accordance with the provisions of the *Environmental Management Act*. While we believe the information to be reliable, BC Registries and Online Services and the Province of British Columbia make no representation or warranty as to its accuracy or completeness. Persons using this information do so at their own risk.



Attachment 6  
**Site Registry - Land Title Parcel Identifier (PID) Search**  
**BC Registries and Online Services**

---

No records from the Site Registry that match the search criteria provided:

Folio: 4233

Land Title PID: 013691341

You have been charged for this information.

---

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, address, or Crown Lands File Number.

Disclaimer: Site Registry information has been filed in accordance with the provisions of the *Environmental Management Act*. While we believe the information to be reliable, BC Registries and Online Services and the Province of British Columbia make no representation or warranty as to its accuracy or completeness. Persons using this information do so at their own risk.

# Attachment 6



## Site Registry Search Results

From BCOLHELP@gov.bc.ca <BCOLHELP@gov.bc.ca>

Date Mon 2024-10-14 3:20 PM

To Celina Fujita <celina@activeearth.ca>

### Site Registry - Area Search

BC Registries and Online Services

These are the records from the Site Registry that match the search criteria provided:

Folio: 4233

Latitude: 49deg 29min 45.5sec

Longitude: 117deg 17min 28.1sec

Radius: 0.5km

Site ID:	Address/City:	Last Updated:
0000002616	920 SIMPSON ROAD, NELSON	2021-03-22
0000002703	38 HIGH STREET, NELSON	1998-04-01
0000002711	606 VICTORIA STREET, NELSON	2003-03-07
0000002733	1150 LAKESIDE DRIVE, NELSON	2001-10-05
0000004809	556 JOSEPHINE, NELSON	1998-02-03
0000006479	402 LAKESIDE DRIVE, NELSON	2010-09-23
0000006491	202 LAKESIDE DRIVE, NELSON	2013-09-25
0000006751	606 LAKESIDE DRIVE, NELSON	2004-04-06
0000006992	110 CEDAR STREET & 801 FRONT STREET, NELSON	2022-08-17
0000007342	1150 LAKESIDE DRIVE & 1223 FRONT STREET, NELSON	2010-09-23
0000007768	NORTH OF 801 FRONT STREET, NELSON	2004-03-22
0000010734	908 VERNON STREET, NELSON	2008-01-11
0000014350	708 VERNON STREET, NELSON	2016-08-19
0000023935	CITY OF NELSON WHARF RENOVATION PROJECT, NELSON	2021-03-25
0000026461	611 VERNON STREET, VERNON	2023-03-22

### End of Search Results

Disclaimer: Site Registry information has been filed in accordance with the provisions of the *Environmental Management Act*. While we believe the information to be reliable, BC Registries and Online Services and the Province of



## APPENDIX E

### Reference: Special Attention Items

## REFERENCE: SPECIAL ATTENTION ITEMS

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### 1 INTRODUCTION

This document summarises key information that is considered by Active Earth during a Phase I Environmental Site Assessment (Phase I ESA), for evaluating the risks presented by Special Attention Items.

### 2 POLYCHLORINATED BIPHENYLS

In Canada, polychlorinated biphenyls (PCBs) were prohibited from being used in products, equipment and machinery, electrical transformers and capacitors that were manufactured or imported into the country after 1977. Legislation has allowed PCB containing equipment to remain in use until the end of its service life. If during a Phase I ESA site visit, any equipment or machinery is observed by Active Earth to likely contain PCBs based on the age and type of equipment or machinery, these findings will be noted in our report. A detailed Hazardous Materials Building Inspection (HMBI) would be required to further assess the presence or absence of PCBs in any equipment or machinery.

### 3 ASBESTOS-CONTAINING MATERIALS

Asbestos use in building material peaked in the 1970's and was gradually discontinued from use in various products in Canada between the late 1970s / mid 1980s, however stocks of asbestos containing building material were permitted to remain in circulation and buildings constructed prior to 1990 may potentially contain some building material with asbestos. Asbestos was not banned completely in Canada until 2018, regardless buildings constructed after 1990 and before 2018 are considered to be virtually asbestos free.

During a Phase I ESA, the assessment of the potential for ACMs would be based primarily on the age of the current buildings and our review of any historical available HBMI reports. A detailed HMBI would be required to further assess the presence or absence of ACMs.

In BC, Asbestos in the workplace is defined as a Designated Substance under the Occupational Health and Safety Regulation (OHSR). The OHSR governs the safe handling of asbestos-containing materials (ACMs) in the workplace. This regulation requires owners to notify workers of the presence of friable ACMs once their presence has been confirmed. The OHSR also requires the implementation of an Asbestos Management Plan under all ACMs have been removed from the building.

## 4 LEAD-BASED PAINTS

Lead use in interior paints was first restricted in the 1960s. Lead in commercial paint was further restricted in 1976 to 0.5% (5000 mg/kg), in 1991 to 0.06% (600 mg/kg) and again in 2010 to 0.009% (90 mg/kg). With the exception of select industrial paints, consumer grade paints are considered to be virtually lead free after 1991. With regard to sensitive receptors (pregnant women and children), consumer paint is considered to be lead free after 2010.

During a Phase I ESA, the assessment of the potential for lead-based paints would be based primarily on the age of the current buildings and our review of any historical available HBMI reports. A detailed HBMI would be required to further assess the presence or absence of lead-based paints.

In BC, lead-based paint in the workplace is defined as a Designated Substance under the OHSR. This regulation requires owners to notify workers of potential airborne lead exposure once the presence of lead has been confirmed. The OHSR also requires implementation of an exposure control plan if workers are, or may be, exposed to lead in excess of 50% of the exposure limits, or if exposure through any route of entry could result in elevated lead body-burdens.

## 5 OZONE-DEPLETING SUBSTANCES

An ozone-depleting substance (ODS) refers to any substance containing chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), halon or any other material capable of destroying ozone in the atmosphere. ODSs have been used in refrigerators, freezers, rigid polyurethane foam and insulation, laminates, aerosols, air conditioners, fire extinguishers, cleaning solvents and sterilization of medical equipment. Federal regulations, introduced in 1995, require the elimination of production and import of CFCs by January 1, 1996 (subject to certain essential uses) and a freeze on the production and import of HCFC-22 by this same date. These regulations also required the complete elimination of HCFC-22 by the year 2020.

If, during a Phase I ESA site visit, any equipment is observed by Active Earth to likely contain ODS based on the age and type of equipment or machinery, these findings will be noted in our report. A detailed HBMI would be required to further assess the presence or absence of ODS.

## 6 UFFI

Urea Formaldehyde Foam Insulation (UFFI) is a type of insulation that was widely used in the 1970's. UFFI has been prohibited in Canada under item 34, Part I of Schedule I to the Hazardous Products Act since December 1980. UFFI may emit formaldehyde gas which has been identified as a potential carcinogen.

A Phase I ESA site visit does not involve any destructive visual inspections (e.g. inspection of insulation within wall cavities, etc.), and therefore our ability to identify UFFI during a Phase I ESA



is typically very limited. During a Phase I ESA, the assessment of the potential for UFFI would be based primarily on the age of the current buildings and our review of any historical available HBMI reports. A detailed HBMI would be required to further assess the presence or absence of UFFI.

## **7 OTHER SPECIAL ATTENTION ITEMS**

### **7.1 Radon**

Radon is a radioactive gas formed by naturally occurring radioactive breakdown of uranium in soil, rocks and groundwater. Radon may accumulate within confined spaces such as buildings. Health Canada has developed guidelines for acceptable levels of radon in buildings and has indicated that radon levels should not exceed 200 Becquerel per cubic metre (Bq/m<sup>3</sup>); however, there are currently no regulations governing acceptable levels of radon within buildings, and no requirements for testing or mitigation if levels are found to exceed the current Health Canada guidelines.

The BC Centre for Disease Control (BC CDC) has identified five exposure regions (Northern, Interior, Vancouver Coastal, Vancouver Island and Fraser) and four levels of radon exposure: Very low (0-100 Bq/m<sup>3</sup>), Low (100-200 Bq/m<sup>3</sup>), Medium (200-600 Bq/m<sup>3</sup>) and High (>600 Bq/m<sup>3</sup>).

Radon levels are not measured by Active Earth during Phase I ESA site visits. As such, elevated Radon would only be identified if this information was included in other documentation reviewed by Active Earth. Radon testing would need to be conducted to assess actual Radon levels.

### **7.2 Mercury**

Mercury may be found in thermostats, switches and vapour lamps. Mercury was banned in most products in 2015 in Canada. Mercury may still be found in small amounts in fluorescent light (4mg per lamp), dental amalgam, neon signs (100mg/2.44m) and scientific thermometers. Mercury use in thermostats significantly declined after 2004, however the production of thermostats with Mercury continued until 2015.

The BC Hazardous Waste Regulation recognizes mercury as a potentially hazardous waste based on its leachability and volume for transport.

If, during a Phase I ESA site visit, any equipment is observed by Active Earth to likely contain Mercury based on the age and type of equipment or machinery, these findings will be noted in our report. A detailed HBMI would be required to further assess the presence or absence of Mercury sources.

### 7.3 Mould

Mould is recognized as an occupational hazard for indoor workers as well as outdoor workers who work in warm, humid environments. Certain types of mould can cause adverse health effects. Mould requires moisture to grow and can affect building components such as walls, floor coverings, windows, ventilation systems, and structural elements.

If any indicators of potential mould are observed by Active Earth during the Phase I ESA site visit, these observations will be noted in our report. However, we note that a Phase I ESA site visit does not involve any destructive visual inspections (e.g. below flooring, behind trim, etc.) or visual inspections behind or under equipment, furniture, etc. Therefore, our ability to identify mould during a Phase I ESA is typically limited. A detailed HMBI would be required to further assess the presence or absence of mould.

### 7.4 Noise, Vibration, and Electric and Magnetic Fields

Elevated levels of noise, vibration, electric fields, and/or magnetic fields may warrant special attention on a case-by-case basis due to heightened public concern and/or relevant environmental legislation.

If particularly elevated noise or vibration are observed by Active Earth during a Phase I ESA site visit, these observations will be noted in our report. Electric or magnetic fields are not measured by Active Earth during Phase I ESA site visits and would therefore only be identified if this information was included in other documentation reviewed by Active Earth.

# Attachment 6

## TOPOGRAPHIC SURVEY PLAN OF: LOTS 8-12 BLOCK 59 DISTRICT LOT 95 KOOTENAY DISTRICT PLAN 9500 EXCEPT PARCEL A (SEE 272251)

SCALE 1:200  
0 5 10 15 20  
This plan shows horizontal ground level distances in metres.  
The intended plot size of this plan is 854mm in width by  
569mm in height (D size) when plotted at a scale of 1:200.  
This plan lies within Integrated Survey Area No.3, City of  
Nelson, MDS (CNS) 4.0.0.0.1.

Elevations are geodetic based on the benchmark TH1001  
which has an elevation of 543.954m.  
The orthometric height (COG25(1/2.0)) of 543.954m was  
used to derive the geodetic height of 543.954m. The  
plan was processed using CSRS-PPP online processing  
provided by Natural Resources Canada.

This plan is based on Land Title and Survey Authority of BC  
plans NEP83303, NEP83304, and NEP83305. Registered interests have  
not been included or considered.

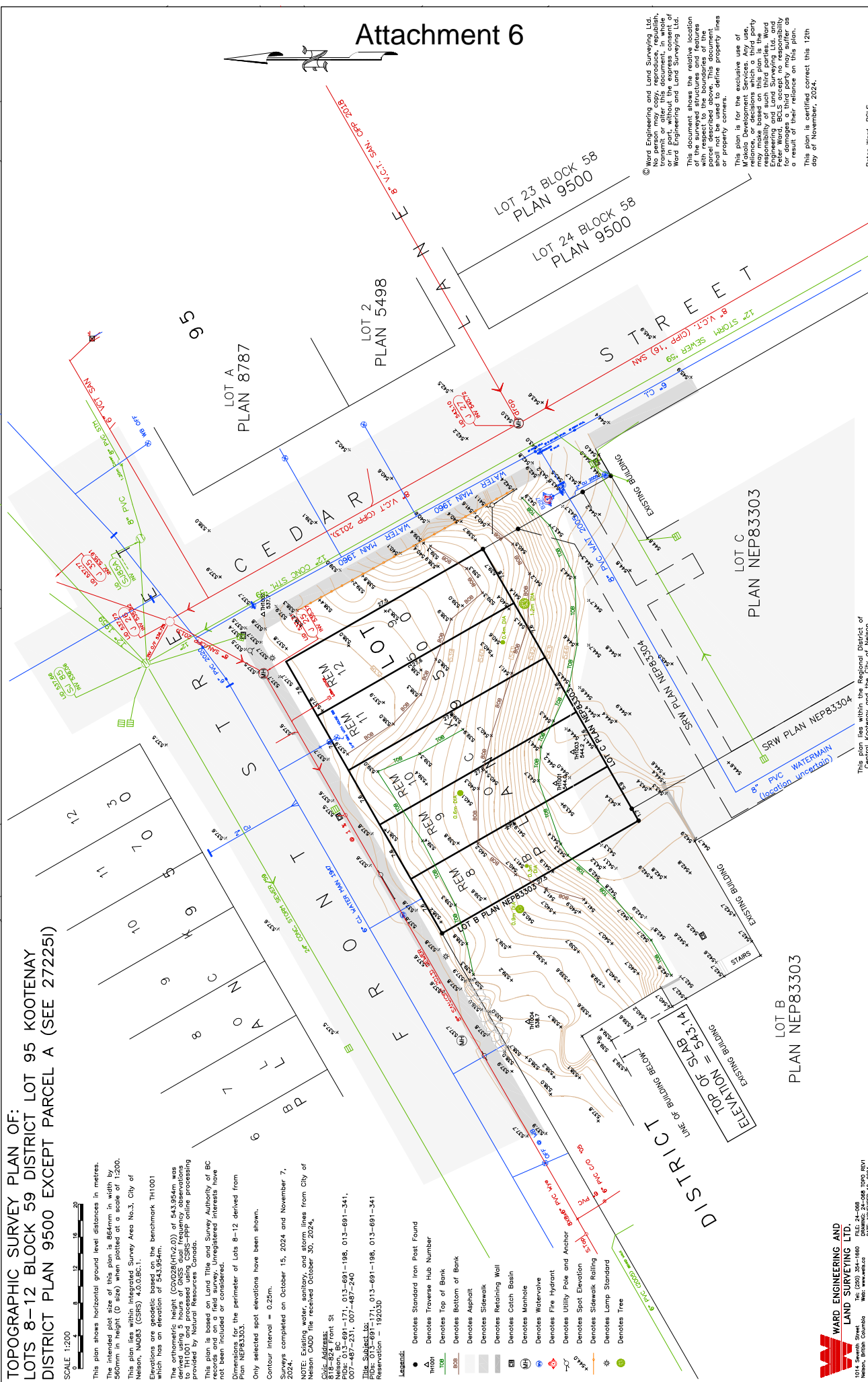
Dimensions for the perimeter of Lots 8-12 derived from  
Plan NEP83303.  
Only selected spot elevations have been shown.  
Contour Interval = 0.25m.

Surveys completed on October 15, 2024 and November 7,  
2024.  
NOTE: Existing water, sanitary, and storm lines from City of  
Nelson CAD file received October 30, 2024.

City Address:  
Nelson, BC V1L 1G1  
Phone: 250-341-1911, 013-691-198, 013-691-341,  
007-497-231, 007-497-240  
This Subject to:  
FIDR: 013-691-171, 013-691-198, 013-691-341  
Reservation - 192030

### Legend:

- Denotes Standard Iron Post Found
- ▲ Denotes Traverse Hub Number
- Denotes Top of Bank
- Denotes Bottom of Bank
- Denotes Asphalt
- Denotes Sidewalk
- Denotes Retaining Wall
- Denotes Catch Basin
- Denotes Manhole
- Denotes Water Valve
- Denotes Fire Hydrant
- Denotes Utility Pole and Anchor
- Denotes Spot Elevation
- Denotes Sidewalk Railing
- Denotes Lamp Standard
- Denotes Tree



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It is to be used for the purpose for which it was prepared and for no other purpose.  
This document shows the relative location of the property boundaries and the location of the easements and other interests in the property.  
It is not to be used to define property lines or property corners.  
This plan is for the exclusive use of M'Kee Development Services. Any use, reproduction, or distribution of this plan without the written consent of M'Kee Development Services is prohibited.  
Peter Ward, BCLS accept no responsibility for damages or third party may suffer as a result of their reliance on this plan.  
This plan is valid until the 12th day of November, 2024.

Peter Ward, BCLS

WARD ENGINEERING AND  
LAND SURVEYING LTD.  
1014 Seventh Street  
Nelson, British Columbia  
V1L 1G1  
Phone: 250-341-1911  
Fax: 250-341-1980  
Web: www.welco.ca

This plan lies within the Registered District of  
Central Kootenay and the City of Nelson.



**MAKOLA**  
DEVELOPMENT  
SERVICES

Attachment 6

## ATTACHMENT J: SUSTAINABILITY CHECKLIST



# Sustainability Checklist

## RESIDENTIAL CONSTRUCTION

### FOR BC BUILDING CODE PART 9 AND PART 3 BUILDINGS (CLIMATE ZONES 5 TO 7A)

**Attention to sustainability** in planning and building your residential project will create a quality building with reduced long-term utility costs. Use this checklist to help plan, design and build with goals of sustainability and energy-efficiency.

The RDCK encourages energy efficiency measures and renewable energy technologies in new residential construction and retrofits. This supports regional goals of sustainability and energy reduction objectives as outlined in the Strategic Community Energy and Emissions Plan.

**Please return the completed checklist with your building permit application package.**

Property Owner/ Project Manager Name

Property Address

Project Description

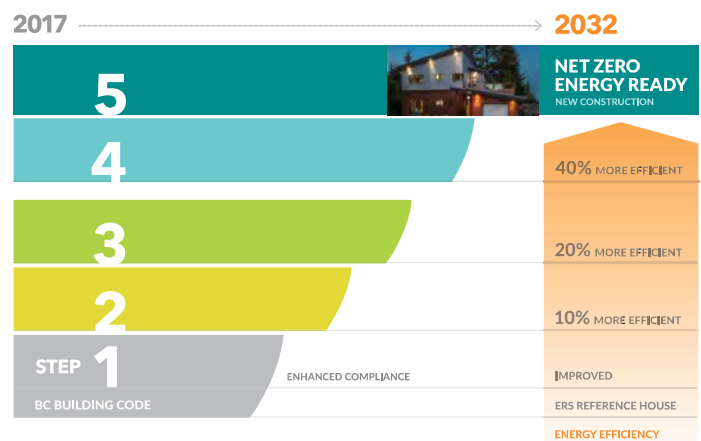
- ☒ New residential construction
- ☐ Addition to existing residence
- ☐ Structural or building envelope renovation
- ☐ Other

#### Consider each item and check those applicable to your project: (also see reverse)

- ☒ Take a holistic approach to building and reap the reward: energy efficiency, shade trees, solar exposure, attention to building practice detail, etc.
- ☒ Find an Energy Advisor through **BC Home Performance Stakeholder Council** or **Natural Resources Canada** service provider listings.
- ☒ Check for updated energy advice and incentives at <https://efficiencybc.ca>
- ☒ Work with an Energy Advisor from initial project design. Plan to meet a minimum **Step 3** of the BC Energy Step Code
- ☒ Review BC Energy Step Code guidelines. Examples of green labels include ENERGY STAR® for New Homes or R-2000 home
- ☒ Review utility rebates and savings offers as applicable:
  - <https://efficiencybc.ca>
  - <https://www.fortisbc.com/Rebates/RebatesOffers/Pages/default.aspx>
  - <https://www.bchydro.com/powersmart/residential/savings-and-rebates.html>

#### Notes on BC Energy Step Code

The BC Energy Step Code is a voluntary provincial standard that provides a consistent approach to achieving more energy-efficient buildings. Builders work with an energy advisor, who uses software to analyze construction plans and determine building energy efficiency. During construction, pay special attention to air sealing, walls, windows, doors and insulation to achieve energy model performance. Regardless of the BC Energy Step Code step chosen, the ultimate building comfort and reduced utility bills will reward the future homeowner / building occupant.





# SUSTAINABILITY CHECKLIST INSTRUCTIONS: Attachment 6

**The intent of** this Checklist is not to “pass” or “fail”, but rather to assist applicants and the Building Department to work together to develop high quality residential buildings and promote energy efficient building practice in our region. Please review and consider all items on the checklist.

## Site consideration

- ☒ Optimum solar orientation and use natural geographic/ecological features in building siting.
- ☒ Compact development and minimum disturbed site area considered.
- ☒ Surface water management: permeable lot, permanent erosion controls and/or roof run-off management.
- ☒ Landscape plan: shade trees, fire-smart varieties, low irrigation demand, drought tolerant plants, no invasive plants.
- ☒ Plan for site erosion control during construction.
- ☒ Make your property FireSmart

## Building Energy Efficiency (BC Energy Step Code)

- ☒ Work with a **Certified** Energy Advisor.
- ☐ Review building energy efficiency and EnerGuide home evaluations
- ☒ Use efficient hot water distribution/domestic hot water equipment.
- ☒ Install hot water pipe insulation.
- ☒ Use appropriate sized & high efficiency HVAC equipment; minimal losses from heating and cooling distribution system.
- ☒ High performance envelope; including exterior or enhanced insulation.
- ☒ Build for minimal envelope leakage and maintain strict attention to air sealing detail during construction.
- ☒ Install enhanced performance windows and doors.
- ☒ Install external window blinds / shades
- ☒ Use efficient ENERGY STAR® lighting options.
- ☒ Install ENERGY STAR® water efficient appliances, e.g., washing machine.
- ☒ Investigate renewable energy system, e.g., air source heat pump with electric or natural gas backup.
- ☒ Investigate drain water heat recovery.
- ☐ Install solar photovoltaic system, or make ready for future retrofit.

## Waste Management

- ☒ Plan for recyclables, compost and waste storage on site.
- ☒ Use environmentally preferred products.
- ☒ Practice material efficient framing (order waste factor limit, detailed framing documents, detailed cut list and lumber order, framing efficiencies, off-site fabrication).
- ☒ Use construction waste management and reduction practice.

## Active and Low Carbon Transportation

- ☒ Clear and safe pedestrian access and pathways.
- ☒ Bicycle storage or racks.
- ☒ Electric vehicle charging infrastructure placement (make ready for easy retrofit of “level 2” charger).

## Indoor Environmental Quality (BC Building Code)

- ☒ Review combustion venting measures.
- ☒ Review moisture load control.
- ☒ Install outdoor air ventilation.
- ☒ Install local exhaust vents.
- ☒ Consider enhanced energy efficiency performance for distribution of space heating and cooling.
- ☒ Install high quality air filters.
- ☒ Choose low-VOC or zero-VOC (volatile organic compounds) paint.
- ☒ Use radon resistant construction practices.
- ☒ Ensure garage pollutant protection.

## Water Conservation

- ☒ High efficiency fixtures and fittings (low flush toilets, low flow showerheads, tap aerators).
- ☐ Rainwater harvesting system.
- ☐ If available, graywater reuse system.
- ☒ Maintain xeriscape or low irrigation needs (e.g. consider native plants, fire-smart varieties) or high efficiency irrigation system.
- ☒ Ability to monitor occupant water usage. (i.e., install water meter)

## Awareness and Education

- ☒ Be familiar with energy efficiency practices and efficient use of heating /cooling /ventilation building controls (and teach all residents of home).
- ☒ Be familiar with BC Energy Step Code

Date Checklist completed

Signature

Property Owner/Project Manager



Area A

Area B

Area C

Area D

Area E

Area F

Area G

Area H

Area I

Area J

Area K



M'akola Nelson CARES

# Transportation Assessment and Management Study

Version 01

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Prepared for

M'akola Development Services

Date

May 21, 2025

Project No.

07-24-0062

*Bunt & Associates acknowledges and respects the Traditional Territories upon which our work spans, and from which we benefit. We are grateful for the unique cultures and histories of Indigenous Peoples that enrich our understanding and connection to the lands we call home. We honour learning, listening, and truth in our journey to reconciliation.*



May 21, 2025  
07-24-0062

Madelyn McPhee  
Development Planner  
M'akola Development Services  
107-731 Station Avenue  
Victoria, BC  
V9B 5R5

Dear Ms. McPhee:

**Re: 818-824 Front Street  
Transportation Assessment and Management Study**

Please find attached our Transportation Assessment and Management Study for the proposed development at 818-824 Front Street in Nelson, BC. This study reviews the proposed development in regard to traffic operations impact, parking bylaw compliance, and outlines a Transportation Demand Management (TDM) Plan to support multi-modal transportation options for future residents.

We trust this study will be helpful in the development rezoning application. Please do not hesitate to contact us if you have any questions.

Yours truly,  
**Bunt & Associates**



Ian Hancock, EIT  
Transportation Analyst



Jason Potter, M.Sc. PTP  
Senior Transportation Planner

cc: Hillary Morgan, M'akola Development Services





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Telephone: +1 604 685 6427  
Facsimile: +1 604 685 6579

Date: 2025-05-21  
Project No. 07-24-0062

Approved By: Yulia Liem, P.Eng., PTOE  
Principal

*Written with respect and gratitude for the Traditional Territories upon which we work and live.*

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# 1. INTRODUCTION

## 1.1 Study Purpose & Objectives

M'akola Development Services (MDS) and the Nelson CARES Society (NCARES) are working towards the redevelopment of the site at 818-824 Front Street in Nelson, BC. Bunt and Associates Engineering Ltd. (Bunt) was brought on to prepare a Transportation Assessment and Management Study (TAMS) report to fulfill the transportation related tasks required by the City of Nelson (City), including an assessment of traffic impacts, a review of off-street parking requirements, a site plan review, and Transportation Demand Management (TDM) recommendations.

## 1.2 Study Scope & Area

Terms of Reference (ToR) were established in consultation with the City, which are attached as **Appendix A**. Key tasks identified in the ToR include a review of the existing transportation network, data collection, analysis of existing conditions, forecasting and assessment of future conditions, and site design review.

The study area discussed with the City includes the following key intersections, shown in **Exhibit 1.1**:

- Front Street & Hall Street;
- Front Street & Cedar Street;
- Lake Street + Park Street & Cedar Street;
- Lake Street & Hall Street; and,
- Vernon Street & Cedar Street + Edgewood Avenue.

The analysis time periods are assumed to include:

- Weekday AM Peak Hour; and,
- Weekday PM Peak Hour.

A preliminary review of background traffic indicates that background traffic growth is anticipated to be a typical linear growth of 1%. The site is expected to be completed in 2028. Traffic analysis scenarios were agreed to include:

- Existing Conditions;
- Background Opening Day (2028);
- Background Opening Day + 10 Years (2038);
- Total Opening Day (2028); and,
- Total Opening Day + 10 Years (2038).



## Exhibit 1.1 Site Location & Study Area

07-24-0062

M'akola Nelson CARES  
March 2025

### 1.3 Organization of Report

- **Section 1** introduces the purpose and scope of the study, including a description of the proposed development;
- **Section 2** describes the existing transportation network conditions and analyzes the existing traffic volumes;
- **Section 3** presents the proposed development in detail and forecasts future traffic volumes;
- **Section 4** presents the future traffic operations;
- **Section 5** evaluates the planned parking supply;
- **Section 6** reviews potential Transportation Demand Management considerations; and,
- **Section 7** concludes the report and summarizes Bunt's findings.

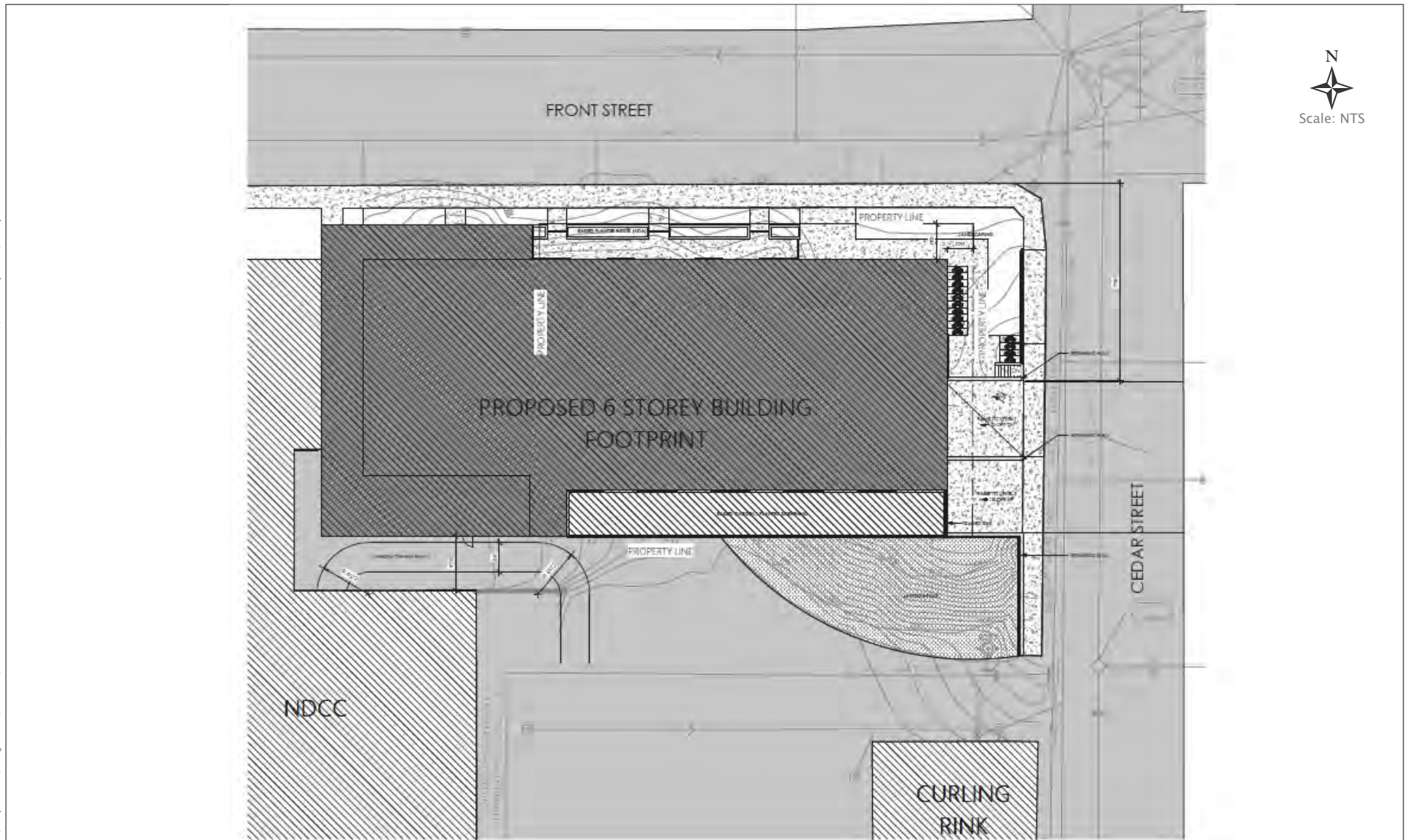
### 1.4 Proposed Development

The proposed development is a 6-storey building and will rezone from the Institutional (I1) zoning to Comprehensive Development (CD10) zoning to construct a building for the use of residential housing, with approximately 500 square metres designated as an extension of the existing Nelson & District Community Centre (NDCC). A breakdown of the residential unit types is provided in **Table 1.1** and **Exhibit 1.2** illustrates the overall site plan.

**Table 1.1: Residential Breakdown**

UNIT TYPES	DENSITY (DWELLING UNITS)
Studio	14 DU
One-Bedroom	32 DU
Two-Bedroom	2 DU
Three-Bedroom	2 DU
<b>TOTAL</b>	<b>50 DU</b>





Adapted from M'akola "2025-01-09 NCARES\_Front St Rezoning\_ARCH\_For Review"

## Exhibit 1.2 Site Plan

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March 2025

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## 2. EXISTING CONDITIONS

### 2.1 Land Use

The proposed development site, located in the heart of downtown and adjacent to the existing NDCC facility, is currently zoned for Institutional land use (I1). The site is currently undeveloped and unoccupied, and the proposed development is designed to improve the underutilized corner at Front Street and Cedar Street. The site is accessible from the east and west via Front Street, as well as from the north and south via Cedar Street. It is also directly connected to the City's transit routes and is within a 10-minute walk from the waterfront and a 3-minute drive from Kootenay Lake Hospital. In addition to the NDCC, Nelson Curling Club, Sports Field, and Civic Theatre, which are near the site and bounded by Cedar Street, Vernon Street, Hall Street, and Front Street, the site is predominantly surrounded by residential and commercial buildings.

Notably, a sizable commercial shopping area to the northeast of the site has one vehicle ingress and egress route via the north leg of the Front Street & Cedar Street intersection.

### 2.2 Existing Transportation Network

#### 2.2.1 Road Network

The proposed development is bounded by Front Street, Cedar Street, Lake Street, and Park Street, where Front Street functions as arterial roads, Cedar Street functions as collector roads, and both Lake Street and Park Street function as local roads. To the south of the site Cedar Street intersects Vernon Street, which acts as a collector road. To the west of the site Front Street intersects Hall Street, which acts as a collector road. According to community reports provided by the City of Nelson, a long-standing blanket speed limit of 40 km/h is in place. There are also several road signs limiting the speed limit to 30 km/h along Hall Street and Edgewood Avenue. Furthermore, there is a parking lot along Lake Street designated for the NDCC fitness centre, with an entrance at the intersection of Hall Street and Lake Street. Although the parking lot does not have any speed limit signs due to its private status, a speed limit of 10 km/h to 15 km/h will be applied to Lake Street for this study.

**Table 2.1** provides the existing street characteristics of the surrounding road network. As the City of Nelson does not provide official road classification information, road classifications provided have been assigned based on connectivity and engineering judgement.

**Table 2.1: Existing Street Characteristics**

STREET	CLASSIFICATION	NUMBER OF TRAVEL LANES	POSTED SPEED	PARKING FACILITIES
Front Street	Arterial	4	40 km/h	Prohibited adjacent to site
Cedar Street	Collector	2	40 km/h	Street Parking
Hall Street	Collector	2	30 km/h	Starts at parking lot for NDCC fitness centre and terminates at site
Vernon Street	Collector	2	40 km/h	Street Parking
Lake Street	Local	2	10-15 km/h	Street Parking
Park Street	Local	1	10-15 km/h	Prohibited
Edgewood Ave	Local	2	30 km/h	Prohibited

**Exhibit 2.1** illustrates the surrounding road network, and the existing laning & traffic control of the study intersections.

### 2.2.2 Transit Network

The Fairview bus route (#002) is a loop that originates in downtown Nelson, turns around at the Mountain Lake Seniors Community, and then after a short stint of backtracking returns downtown along a northern route. This results in the site having several bus stops within a 5-minute walk (400 m) of the site, which all ultimately function identically in providing service from downtown to the northeastern part of the city including Chahko Miko Mall, LV Rogers Secondary School, Selkirk College, and Mountain Lakes Senior Community.

The North Shore Line (#010) shares the majority of stops that the #002 loop uses on its route from the site to Downtown Nelson and Chahko Mike Mall but has the additional utility of crossing the Nelson Bridge and servicing approximately 31 kilometres worth of stops along Highway 3A before terminating at the community of Balfour.

The Nelson Airport Line (#004), which starts in Downtown Nelson and terminates at Nelson Airport, is accessible within a ten-minute walk from the site via stop #160376. The stop is located near the intersection of Baker Street and Ward Street and is shared with the #001, #003, #004, #014, and #099 lines.

Within a 10-minute walk (800 m), commuters can access transit lines such as the Uphill Line (#001) which serves the eastern parts of Nelson, the Rosemont Line (#003) which serves the southern parts of Nelson, the Blewett Line (#014), and the Kootenay Connector Line (#099). Both the #014 and #099 lines extend approximately 16 kilometers and 45 kilometers southwest to Central Kootenay and the City of Castlegar, respectively. Commuters can transfer to these lines via the #002, #004, and #010 lines to minimize walking distance. It is noted that although stop #160313 falls within the 800-metre radius, reaching the

uphill Kootenay Lake Hospital requires a walk of more than 20 minutes (approximately 1.1 km) due to the steep slope and lack of a direct developed pathway. Commuters must travel along Cedar Street to the intersection with Carbonate Street, then continue along View Street.

**Table 2.2** summarizes the transit stops within 800 metres (or a 10-minute walk) of the site. **Exhibit 2.2** illustrates the bus stops within 400 metres (5-minute walk) and 800 metres (10-minute walk) of the site.

**Table 2.2: Transit Stops within 800m Walking Distance of Site**

STOP LOCATION	DIRECTION	STOP #	AMENITY	ROUTES SERVICED	WALKING DISTANCE (METRES)
Front Street and Hall Street	Downtown	160350	-	#002, #004, #010	160
Front Street and Hall Street	Fairview/Balfour	160351	-	#002, #004, #010	140
Vernon Street and Hall Street	Fairview/Balfour	160358	-	#002, #010	300
Baker Street and Ward Street	Uphill/Rosemont/Nelson Airport /Blewett/Castlegar	160376	Shelter, Bench	#001, #003, #004, #014, #099	600
Carbonate Street and Cedar Street	Uphill	160299	-	#001	800

**Table 2.3** summarizes the existing transit service frequency of routes at nearby stops. The headways, or time between buses at the stop, are approximate values based on the current transit schedules.

**Table 2.3: Existing Transit Service Frequency**

ROUTE		STOP	WEEKDAY SERVICE SPAN		HEADWAY (MIN.)				
#	DIRECTION		START	END	AM	MID-DAY	PM	EVENING	WEEKEND
001	To Uphill	160376	7:24	18:41	30	30	60	-	420
002	To Fairview	160350	6:25	21:11	60	30	30	60	60
002, 004, 010	To Downtown	160351	07:14	22:09	180	30	30	60	45
003	To Rosemont	160376	7:22	10:47	30	60	60	60	60
004	To Airport	160376	11:05	14:36	120	60	-	-	- <sup>1</sup>
010	To Balfour	160350	8:44	20:39	180	120	60	120	180
014	To Blewett	160376	7:45	17:55	180	300	105	-	-
099	To Castlegar	160376	5:58	17:07	105	180	-	-	240

1. Only one bus per day during weekends, starting at 14:03

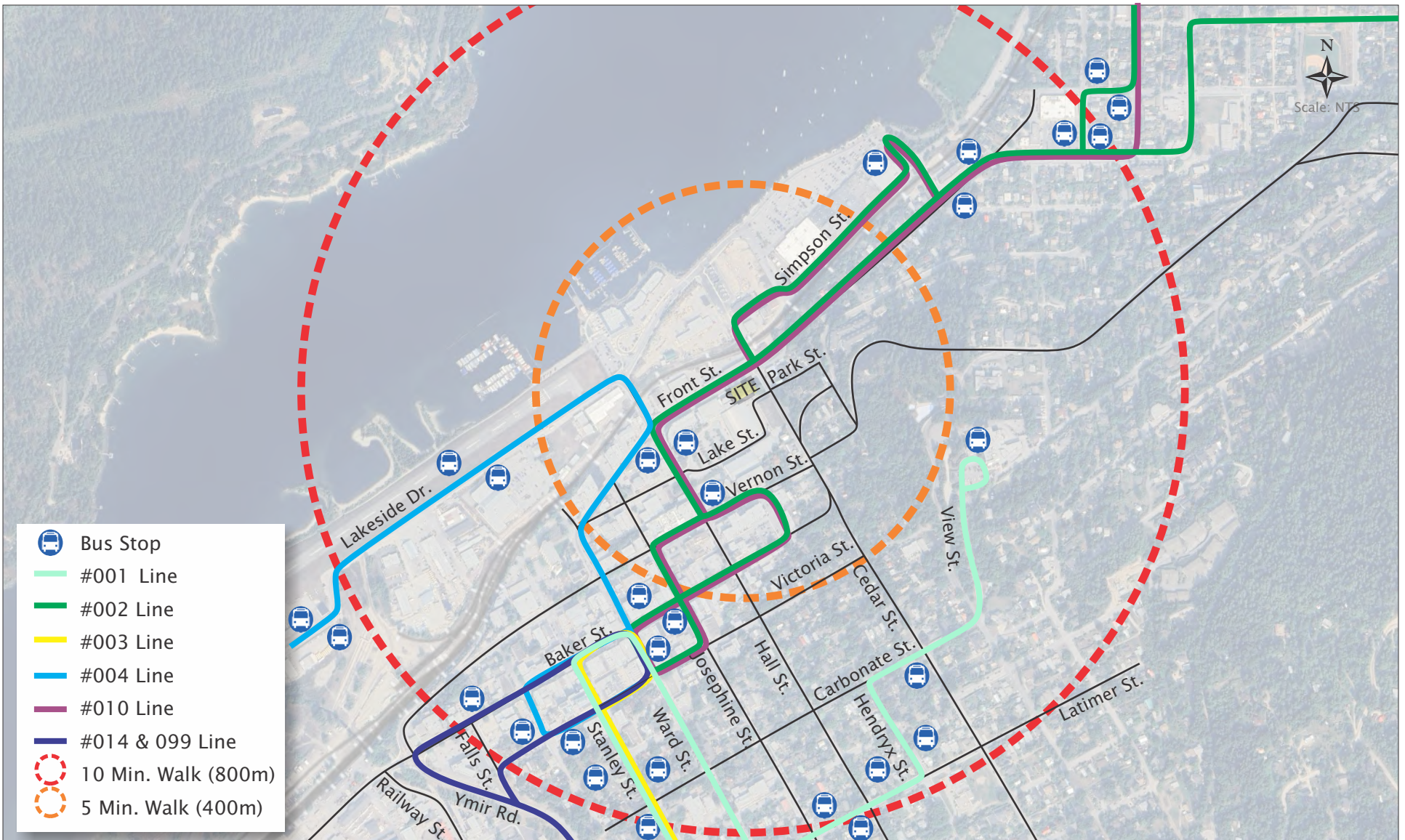


## Exhibit 2.1 Existing Laning & Traffic Control

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## Exhibit 2.2 Transit Routes & Stops

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### 2.2.3 Cycling & Pedestrian Networks

The City of Nelson has marked out designated cycling routes, though there is a lack of physical signage, pavement markings, or dedicated lanes indicate it. Steep grades in this region also pose a challenge to cyclists. However, with the reduced speed limit of 30 km/h along Hall Street and 40 km/h within the city to accommodate the surrounding area being relatively higher volume residential and commercial uses, the road network around the site is within typical criteria for cyclists to use the roads as a shared route with vehicles.

As shown in **Exhibit 2.3**, the City's Active Transportation Master Plan outlines an official Cycle Circle Tour where the site has access to that along Vernon Street within 400m radius. The formalization of this route will provide a valuable connection that allows commuters to bypass the steep grades and lack of cyclist infrastructure in downtown areas.

**Exhibit 2.3** illustrates the cycling and pedestrian facilities within close proximity of the site, respectively.

## 2.3 Existing Traffic Volumes

### 2.3.1 Traffic Data Collection Program

Traffic collection was conducted before snowfall occurred and is hence believed to be representative of typical weekday traffic volumes. Traffic data is provided in **Appendix B** and **Table 2.4** provides a summary of the data collection program.

**Table 2.4: Summary of Available and Counted Traffic Data**

INTERSECTION	SOURCE	DATE OF COUNT	PEAK HOURS	
			AM	PM
Hall Street & Front Street	Bunt	November 6 <sup>th</sup> , 2024	8:00-9:00	3:15-4:15
Hall Street & Lake Street	Bunt	November 6 <sup>th</sup> , 2024	8:00-9:00	3:15-4:15
Cedar Street & Front Street	Bunt	November 6 <sup>th</sup> , 2024	8:00-9:00	4:15-5:15
Cedar Street & Park Street	Bunt	November 6 <sup>th</sup> , 2024	8:00-9:00	4:15-5:15
Cedar Street & Vernon Street	Bunt	November 6 <sup>th</sup> , 2024	8:00-9:00	3:15-4:15
OVERALL STUDY AREA PEAK HOUR			8:00-9:00	3:15-4:15

Notably, though signage indicates that southbound left turn movement at the Cedar Street & Vernon Street intersection are not permitted, the traffic count found that in the AM and PM peak hours that a respective 5 and 7 vehicles made a left turn. As this is a relatively minor number of trips, these were ignored for the purposes of the following analysis.

## Exhibit 2.3 Cycling Facilities & Pedestrian Facilities

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### 2.3.2 Peak Hour Traffic Volumes

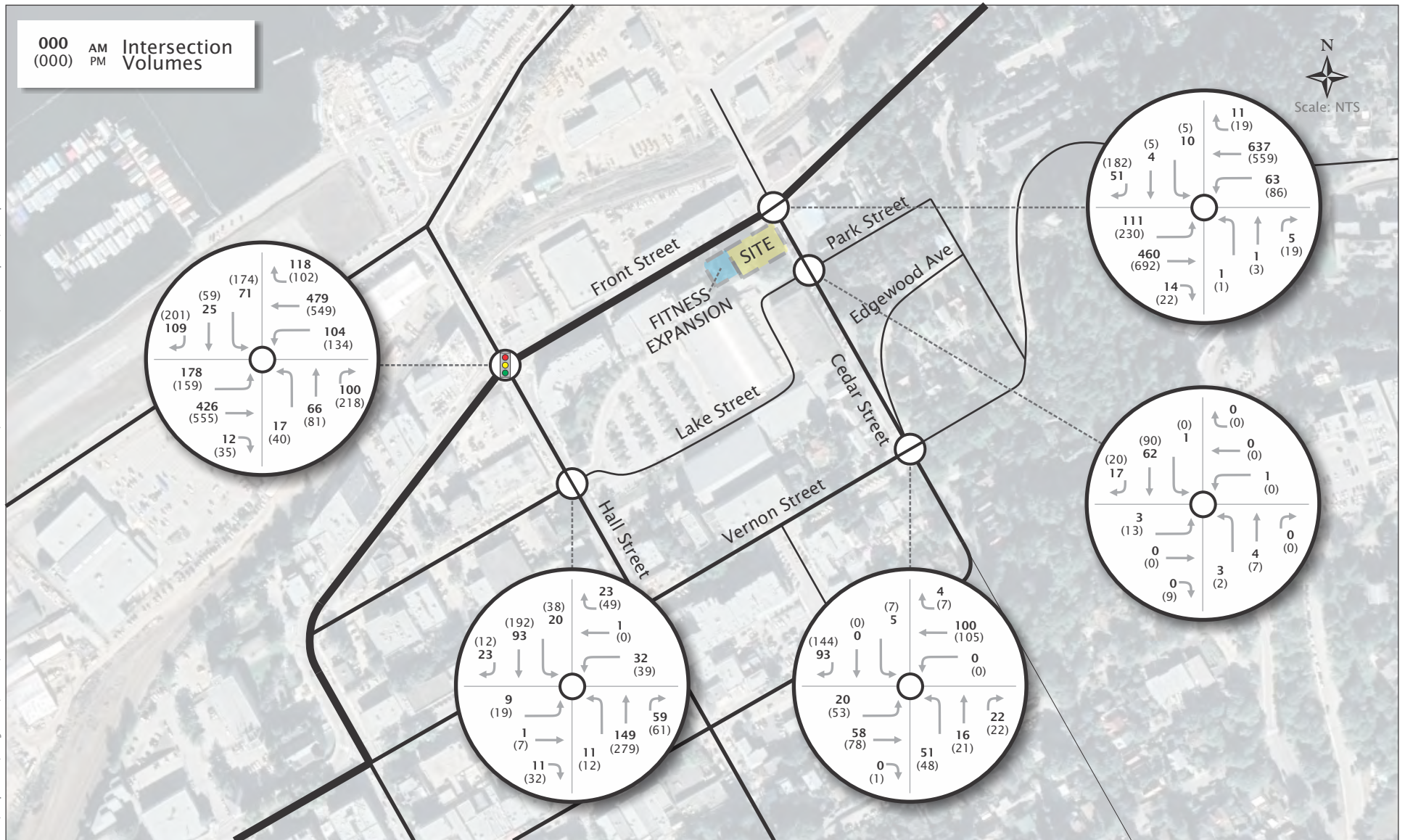
From the collected traffic data, the overall study peak hours were determined to be 7:00 – 8:00 AM and 3:15 – 4:15 PM. Existing peak hour vehicle traffic volumes are illustrated in **Exhibit 2.4**, and existing peak hour pedestrian and cyclist traffic volumes are illustrated in **Exhibit 2.5**. **Table 2.5** presents a summary of the two-way peak-hour vehicle movements for the streets in the study area.

**Table 2.5** presents a summary of the two-way peak-hour vehicle movements for the streets in the study area.

**Table 2.5: Existing Peak Hour Roadway Link Volumes**

ROAD LINK	PEAK LINK TWO-WAY VOLUMES (VEH/HR)	
	AM	PM
Hall Street (North of Front Street)	567	776
Hall Street (Between Front Street and Park Street)	324	589
Hall Street (South of Park Street)	355	615
Cedar Street (North of Front Street)	188	444
Cedar Street (Between Front Street and Park Street)	88	136
Cedar Street (Between Park Street and Vernon Street)	138	232
Cedar Street (South of Vernon Street)	89	92
Front Street (West of Hall Street)	1,221	1,539
Front Street (Between Hall Street and Cedar Street)	1,298	1,732
Front Street (East of Cedar Street)	1,186	1,380
Lake Street (West of Hall Street)	56	82
Lake Street (Between Hall Street and Cedar Street)	136	194
Park Street (East of Cedar Street)	2	0
Vernon Street (West of Cedar Street)	322	429
Vernon Street (East of Cedar Street)	189	119



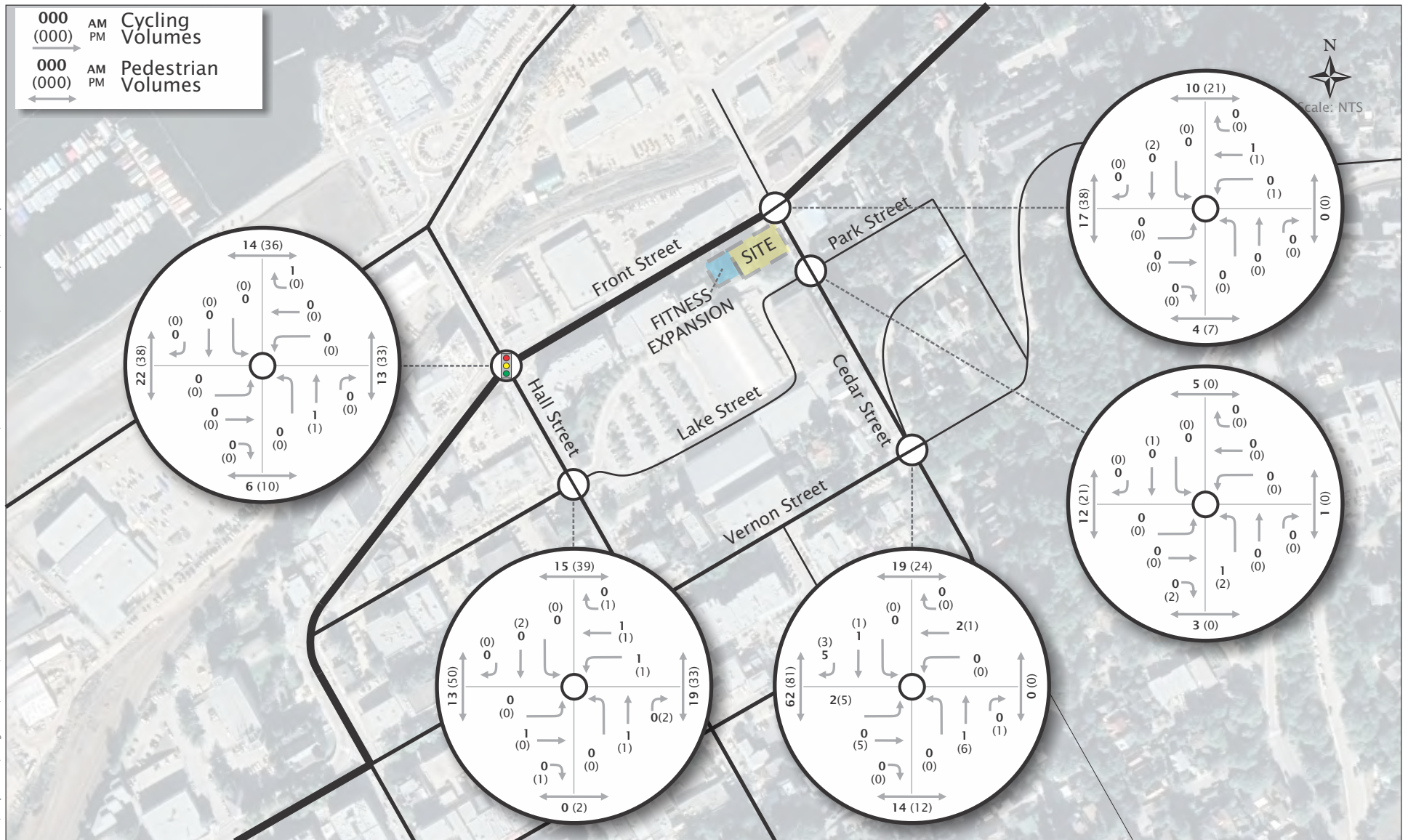


## Exhibit 2.4 Existing Peak Hour Vehicle Traffic Volumes

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## Exhibit 2.5 Existing Peak Hour Pedestrian & Cycling Traffic Volumes

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## 2.5 Existing Operations

### 2.5.1 Performance Thresholds

The existing operations of study area intersections and access points were assessed using the methods outlined in the 2000 Highway Capacity Manual (HCM), using the Synchro 11 analysis software. The traffic operations were assessed using the performance measures of Level of Service (LOS) and volume-to-capacity (V/C) ratio.

The LOS rating is based on average vehicle delay and ranges from “A” to “F” based on the quality of operation at the intersection. LOS “A” represents optimal, minimal delay conditions while a LOS “F” represents an over-capacity condition with considerable congestion and/or delay. Delay is calculated in seconds and is based on the average intersection delay per vehicle.

**Table 2.6** below summarizes the LOS thresholds for the six Levels of Service, for both signalized and unsignalized intersections.

**Table 2.6: Intersection Level of Service Thresholds**

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: Highway Capacity Manual

The volume to capacity (V/C) ratio of an intersection represents ratio between the demand volume and the available capacity. A V/C ratio less than 0.85 indicates that there is sufficient capacity to accommodate demands and generally represents reasonable traffic conditions in suburban settings. A V/C value between 0.85 and 0.95 indicates an intersection is approaching practical capacity; a V/C ratio over 0.95 indicates that traffic demands are close to exceeding the available capacity, resulting in saturated conditions. A V/C ratio over 1.0 indicates a very congested intersection where drivers may have to wait through several signal cycles. In downtown and Town Centre contexts, during peak demand periods, V/C ratios over 0.90 and even 1.0 are common.

The performance thresholds that were used to trigger consideration of roadway or traffic control improvements to support roadway or traffic control improvements employed in this study are listed below:

Signalized Intersections:

- Overall intersection Level of Service = LOS D or better;
- Overall intersection V/C ratio = 0.85 or less;

- Individual movement Level of Service = LOS E or better; and,
- Individual movement V/C ratio = 0.90 or less.

#### Unsignalized Intersections and Roundabouts:

- Individual movement Level of Service = LOS E or better, unless the volume is very low in which case LOS F is acceptable.
- Individual movement V/C ratio = 0.90 or less.

In interpreting of the analysis results, note that the HCM methodology reports performance differently for various types of intersection traffic control. In this report, the performance reporting convention is as follows:

- For signalized intersections: HCM 2000 output for overall LOS and V/C as well as individual movement LOS and V/C is reported. 95th Percentile Queues are reported as estimated by Synchro 11;
- For unsignalized two-way stop-controlled intersections: HCM 2000 LOS and V/C output is reported just for individual lanes as the HCM methodology does not report overall performance.

The performance reporting conventions noted above have been consistently applied throughout this document and the detailed outputs are provided in **Appendix C**.

### 2.5.2 Existing Conditions Analysis Assumptions

#### *Signal Timing:*

The Front Street & Hall Street intersection, the only signalized intersection in the scope of the study area, was analyzed using existing Signal Timing Plans acquired from the Ministry of Transportation and Transit (MoTT). This signal is not coordinated with adjacent intersections and uses the same timing plan throughout the day.

#### *Synchro Parameters*

Peak hour factors were inputted for the overall intersections, and heavy vehicle percentages were inputted for each movement as per the collected traffic data. Speed limits were adjusted to match the existing signage and road slopes were inputted to the nearest 3%. Pedestrians and cyclists were also inputted to the model.

### 2.5.3 Existing Operational Analysis Results

The existing conditions operational analysis results are presented in **Table 2.7**. The signalized intersection at Hall Street & Front Street sees high usage, notably at the westbound through movement in the PM peak hour but accommodates the existing traffic within acceptable parameters.

Table 2.7: Existing Traffic Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.61	-	B	0.78	-
	NB LT	C	0.41	25	C	0.33	30
	NB R	C	0.07	10	C	0.15	15
	SB TL	C	0.57	30	C	0.75	35
	SB R	C	0.08	15	C	0.14	0
	EB L	A	0.39	20	B	0.44	20
	EB TR	A	0.39	45	A	0.55	80
	WB L	B	0.29	25	B	0.47	35
	WB T	B	0.64	95	C	0.84	135
	WB R	A	0.09	10	B	0.07	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.03	0
	EB LTR	B	0.04	0	C	0.15	5
	WB LTR	B	0.12	5	C	0.22	5
Cedar Street & Front Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	D	0.04	0	F	0.31	10
	SB LTR	D	0.34	10	F	0.89	60
	EB L	A	0.14	5	B	0.27	10
	EB TR	A	0.30	0	A	0.45	0
	WB L	A	0.06	0	B	0.11	5
	WB TR	A	0.41	0	A	0.37	0
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.00	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.00	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.18	5	A	0.00	0
	SB R	B	0.14	5	A	0.00	0
	EB LT	A	0.02	0	A	0.04	0
	WB TR	A	0.07	0	A	0.00	0

The north-south movements on Cedar Street were observed to experience long delays with the stop controls, specifically in the afternoon peak hour, due to heavy east-west traffic with separate left turn lanes. Given these operational issues in the existing condition, the future traffic conditions in this section

are presented with two modified configurations in line with Bunt's recommendations for potential mitigation measures. These two potential mitigation scenarios from a vehicle operation perspective are:

1. Signalize the Cedar Street & Front Street intersection; and,
2. Restrict vehicles approaching the intersection from the north and south (from Cedar Street) to right turns only.

Bunt conducted a TAC Signal Warrant analysis based on the existing volumes at Front Street & Cedar Street. The warrant analysis, provided in **Appendix D**, shows that a traffic signal is warranted.

The other three unsignalized intersections are found to have no operational concerns.

### 3. FUTURE TRAFFIC VOLUME FORECASTS

Two Front Street & Cedar Street scenarios were considered for the future traffic conditions:

1. Signalized: signalize the Cedar Street & Front Street intersection; and,
2. Right Turn: restrict vehicles approaching the intersection from the north and south (from Cedar Street) to right turns only.

#### 3.1 Background Traffic Forecasts

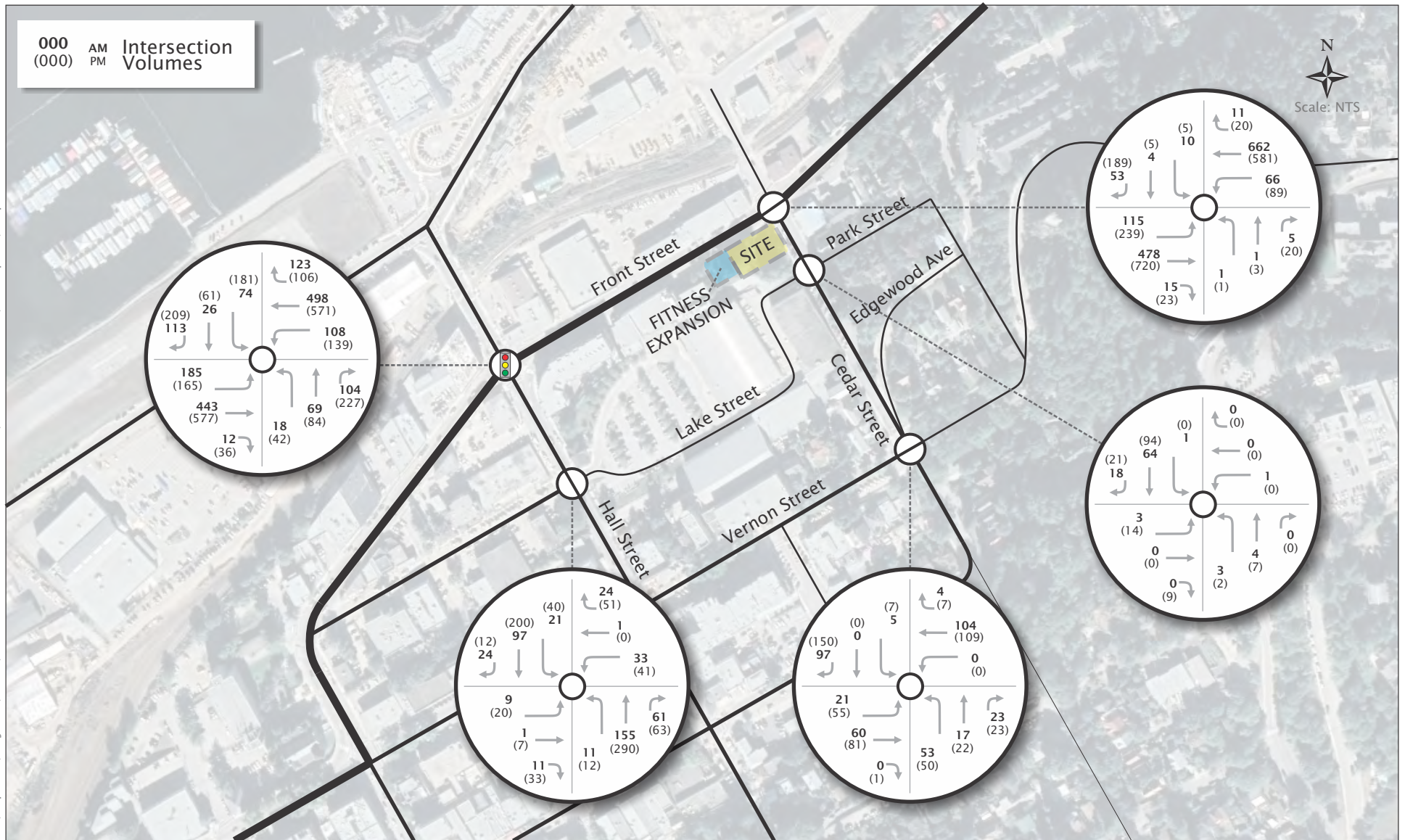
Background traffic is traffic that would be present on the road network if the site did not redevelop. The industry standard yearly growth rate of 1% for populations that have not reached high densities was used for the analysis.

To account for the right turn scenario, background volumes were redistributed as follows:

- SBT and SBL movements were eliminated.
  - It is assumed that these existing vehicle movements were departing from the commercial area to the northeast of this intersection. With these movements removed, it is assumed that these vehicles would be best suited to exiting this area from other exits outside of the study network.
- NBL movements were rerouted to take a left at the Cedar Street & Park Street intersection, right at the Hall Street & Lake Street intersection, and left at the Hall Street & Front Street intersection.
- NBT movements were rerouted to take a left at the Cedar Street & Park Street intersection, right at the Hall Street & Lake Street intersection, right at the Hall Street & Front Street intersection, and left at the Cedar Street & Front Street intersection.

**Exhibits 3.1** and **3.2** illustrate the Opening Day Background (2028) traffic forecasts with Front Street & Cedar Street signalized and right turn restricted, respectively. **Exhibits 3.3** and **3.4** illustrate the Opening Day + 10 Years (2038) Background traffic forecasts with Front Street & Cedar Street signalized and right turn restricted, respectively.



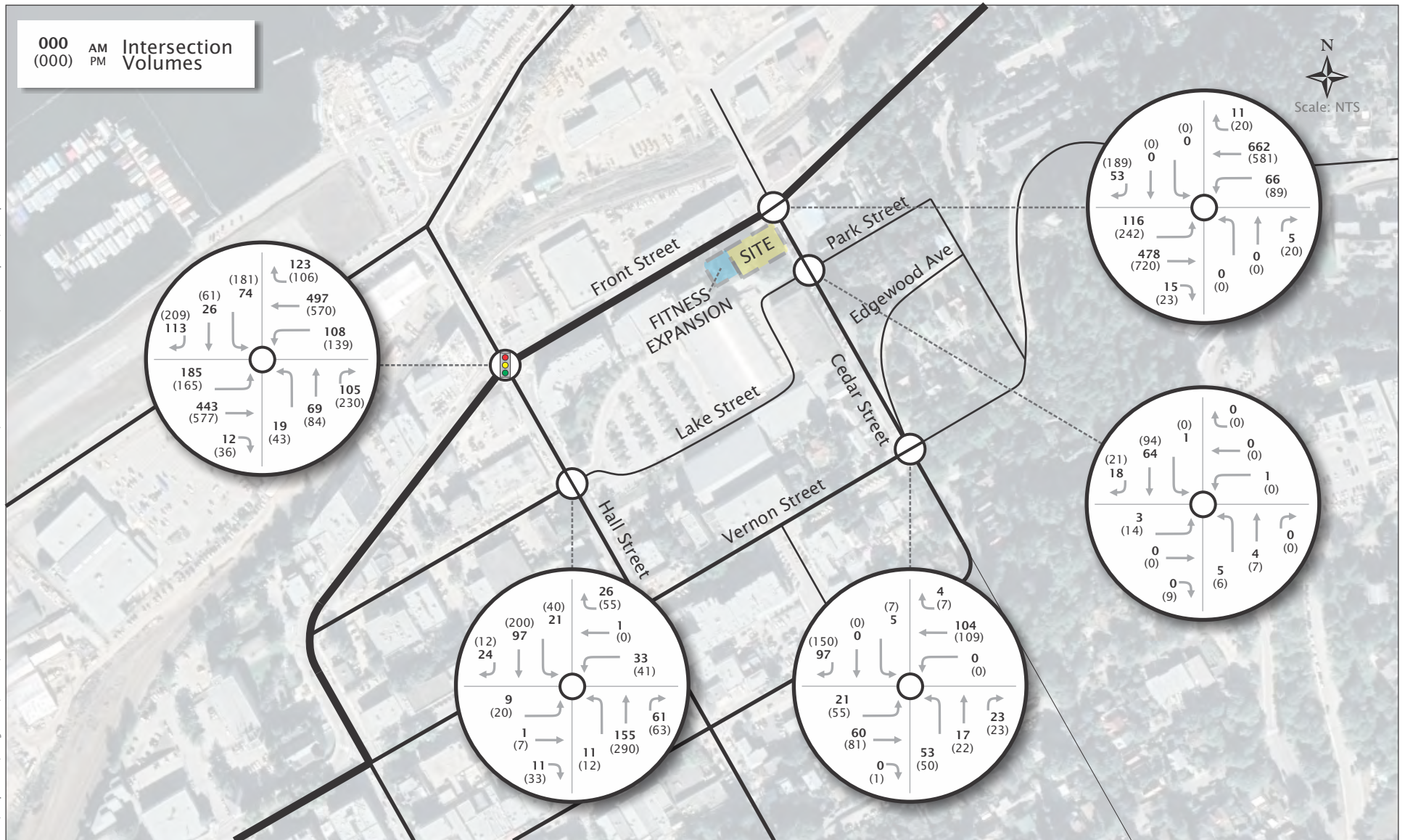


## Exhibit 3.1 Opening Day Background Traffic Forecasts - Signalized

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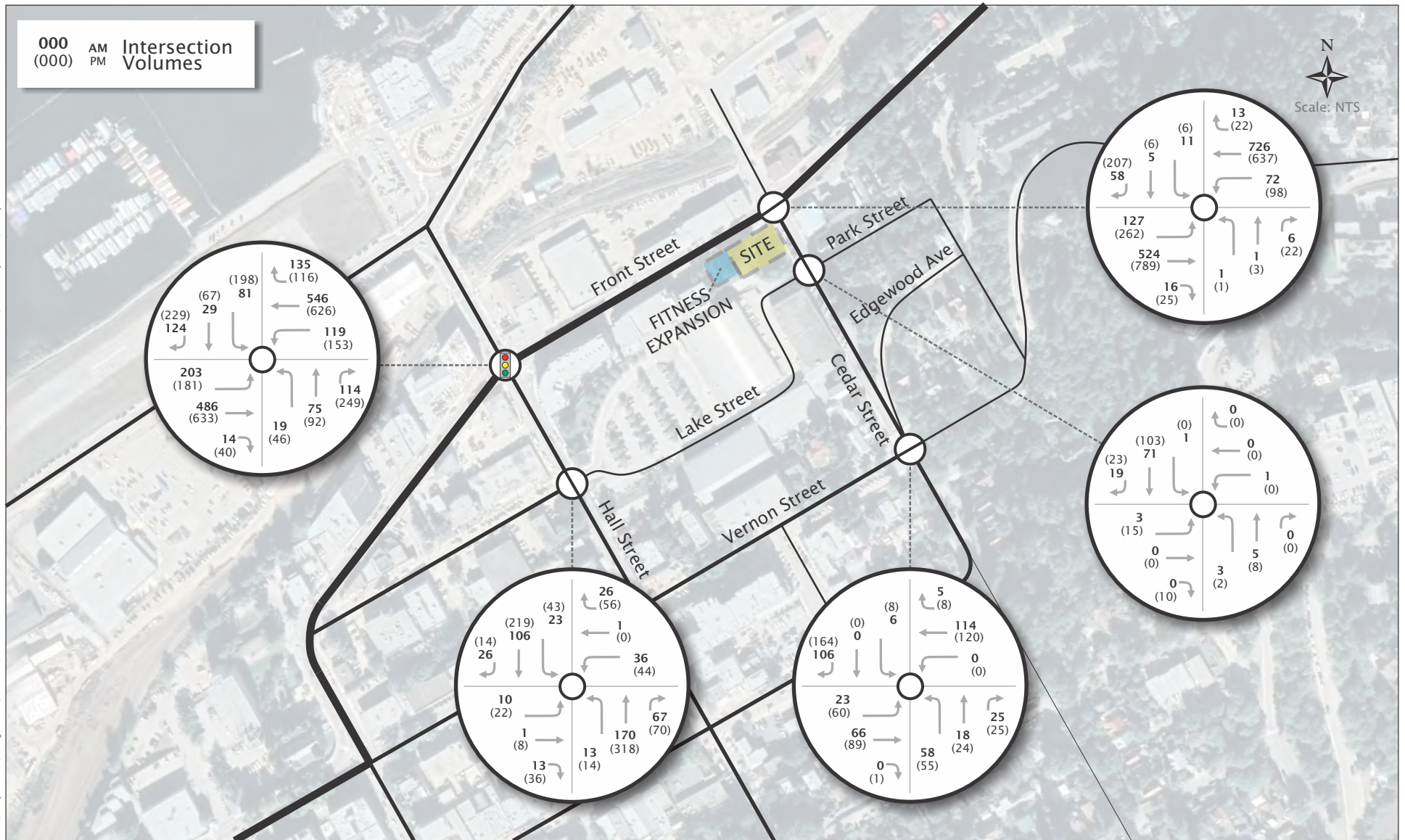


## Exhibit 3.2 Opening Day Background Traffic Forecasts - Right Turn

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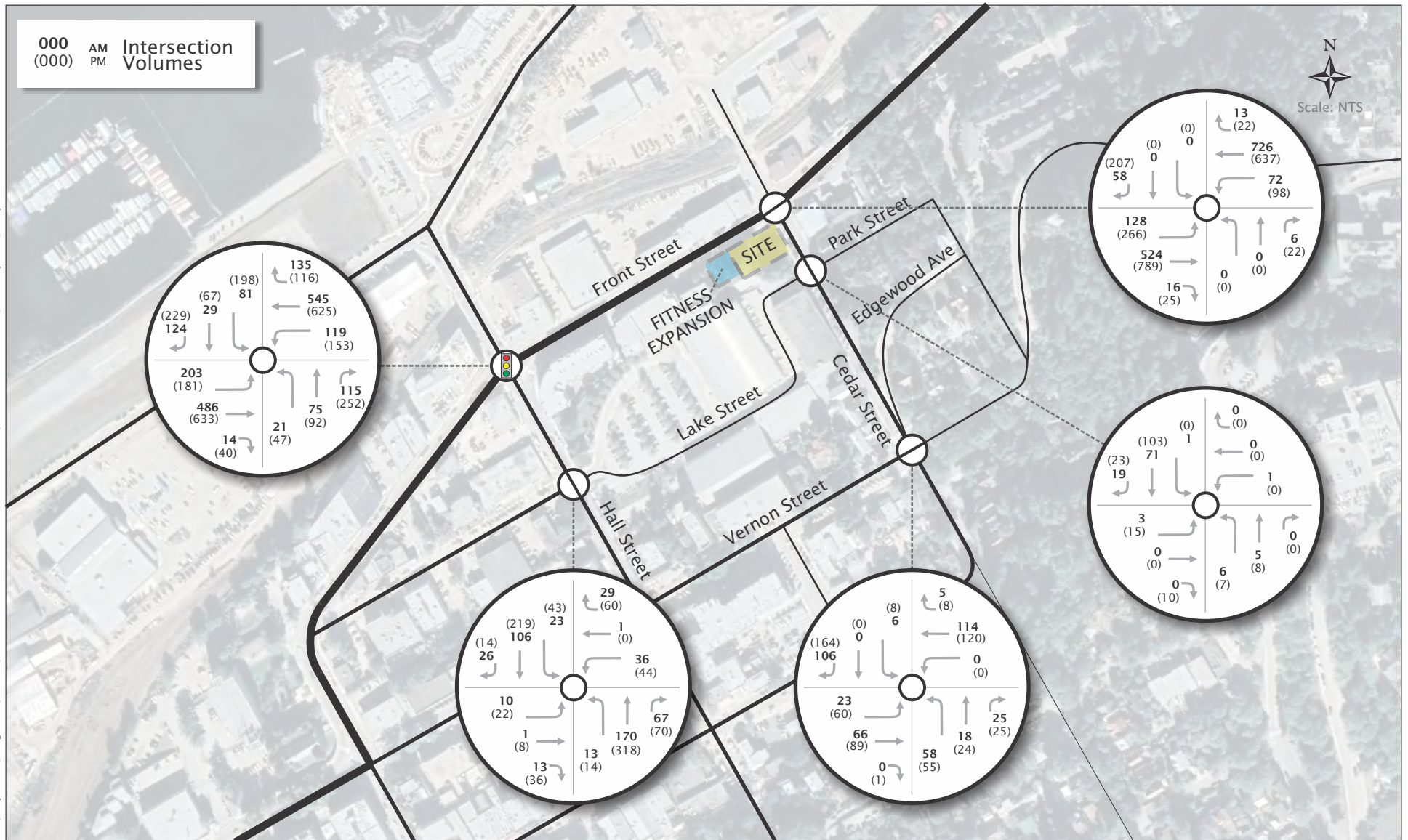


## Exhibit 3.3 Opening Day + 10 Background Traffic Forecasts - Signalized

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## Exhibit 3.4 Opening Day + 10 Background Traffic Forecasts - Right Turn

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## 3.2 Site Traffic

### 3.2.1 Trip Generation

Site traffic volumes were estimated using trip rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11<sup>th</sup> Edition. The applicable trip rates and the directional distributions are presented in **Table 3.1**. As indicated by the Regional District of Central Kootenay (RDCK), the Nelson & District Community Complex (NDCC) expansion is intended to be programmed with an expansion of existing services in the NDCC. As such it is assumed that the expansion would not generate significant additional vehicle trips.

**Table 3.1: Peak Hour Vehicle Trip Rates**

LAND USE	UNITS	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
221 - Multifamily Housing (Mid-Rise)	50 dwelling units	23%	77%	0.37	61%	39%	0.39

**Table 3.2** summarizes the anticipated future site generated vehicle trips for the proposed development based on the above rates.

**Table 3.2: Estimated Peak Hour Site Vehicle**

LAND USE	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
221 - Multifamily Housing (Mid-Rise)	4	14	18	12	8	20

The proposed development is anticipated to add 20 vehicles or less during the weekday peak hours. This translates to an average of 1 vehicle every 3 minutes added to the area network during peak periods, which is considered minimal.

### 3.2.2 Trip Distribution & Assignment

Site traffic volumes were distributed and assigned based on existing traffic volumes and a general understanding of the surrounding area as summarized in **Table 3.3** below.



**Table 3.3: Estimated Trip Distribution**

ORIGIN/DESTINATION	AM PEAK HOUR		PM PEAK HOUR	
	IN (%)	OUT (%)	IN (%)	OUT (%)
Hall Street (North)	10	20	15	10
Hall Street (South)	10	5	15	10
Cedar Street (North)	3	5	5	10
Cedar Street (South)	3	0	3	0
Front Street (East)	35	25	25	25
Front Street (West)	30	30	25	30
Vernon Street (East)	5	4	5	4
Vernon Street (West)	3	10	5	10
Lake Street	1	1	2	1
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

The resulting site traffic volumes are shown in **Exhibits 3.5** and **3.6** for the Front Street & Cedar Street signalized and right turn scenarios, respectively. **Tables 3.4** and **3.5** summarize the net change in future intersection volumes with the new site trips for each scenario. Cedar Street & Vernon Street experience no difference between the two scenarios.

**Table 3.4: Net Change in Future Intersection Vehicle Volumes with New Site Trips – Signalized**

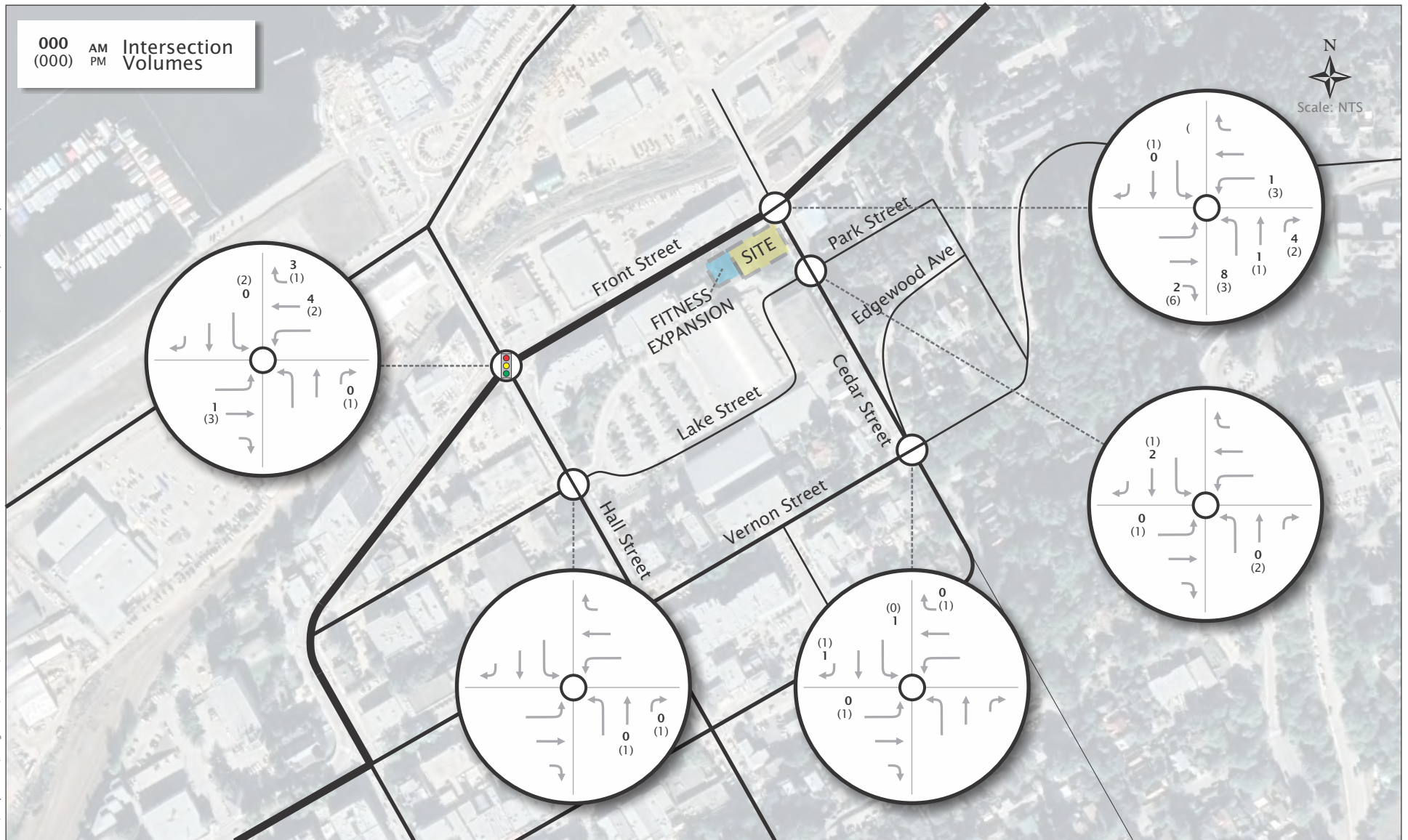
INTERSECTION		AM PEAK HOUR VOLUMES			PM PEAK HOUR VOLUMES		
		BACK-GROUND	WITH NEW SITE	% CHANGE	BACK-GROUND	WITH NEW SITE	% CHANGE
Hall Street & Front Street	2028	1,773	1,783	0.6	2,399	2,409	0.4
	2038	1,944	1,953	0.5	2,630	2,639	0.3
Hall Street & Lake Street	2028	449	451	0.4	770	772	0.3
	2038	492	494	0.4	844	846	0.2
Cedar Street & Front Street	2028	1,423	1,438	1.1	1,896	1,911	0.8
	2038	1,560	1,575	1.0	2,078	2,094	0.8
Cedar Street & Park Street	2028	95	98	3.2	147	151	2.7
	2038	104	107	2.9	161	165	2.5
Cedar Street & Vernon Street	2028	384	386	0.5	505	508	0.6
	2038	421	423	0.5	554	557	0.5

**Table 3.5: Net Change in Future Intersection Vehicle Volumes with New Site Trips – Right Turn**

INTERSECTION		AM PEAK HOUR VOLUMES			PM PEAK HOUR VOLUMES		
		BACK-GROUND	WITH NEW SITE	% CHANGE	BACK-GROUND	WITH NEW SITE	% CHANGE
Hall Street & Front Street	2028	1,774	1,784	0.6	2,402	2,412	0.4
	2038	1,945	1,955	0.5	2,633	2,643	0.4
Hall Street & Lake Street	2028	451	462	2.4	774	786	1.6
	2038	495	506	2.2	848	860	1.4
Cedar Street & Front Street	2028	1,407	1,413	0.4	1,884	1,891	0.4
	2038	1,542	1,548	0.4	2,066	2,072	0.3
Cedar Street & Park Street	2028	97	110	13.4	151	165	9.3
	2038	106	119	12.3	165	180	9.1
Cedar Street & Vernon Street	2028	384	386	0.5	505	508	0.6
	2038	421	423	0.5	554	557	0.5

### 3.3 Total Traffic

The total traffic forecasts for the analysis horizon years were determined from the sum of the estimated background volumes and site traffic. The Opening Day (2028) Total traffic volumes for each scenario are shown in **Exhibits 3.7** and **3.8**, and the Opening Day + 10 Years (2038) Total traffic volumes for each scenario are illustrated in **Exhibits 3.9** and **3.10**.

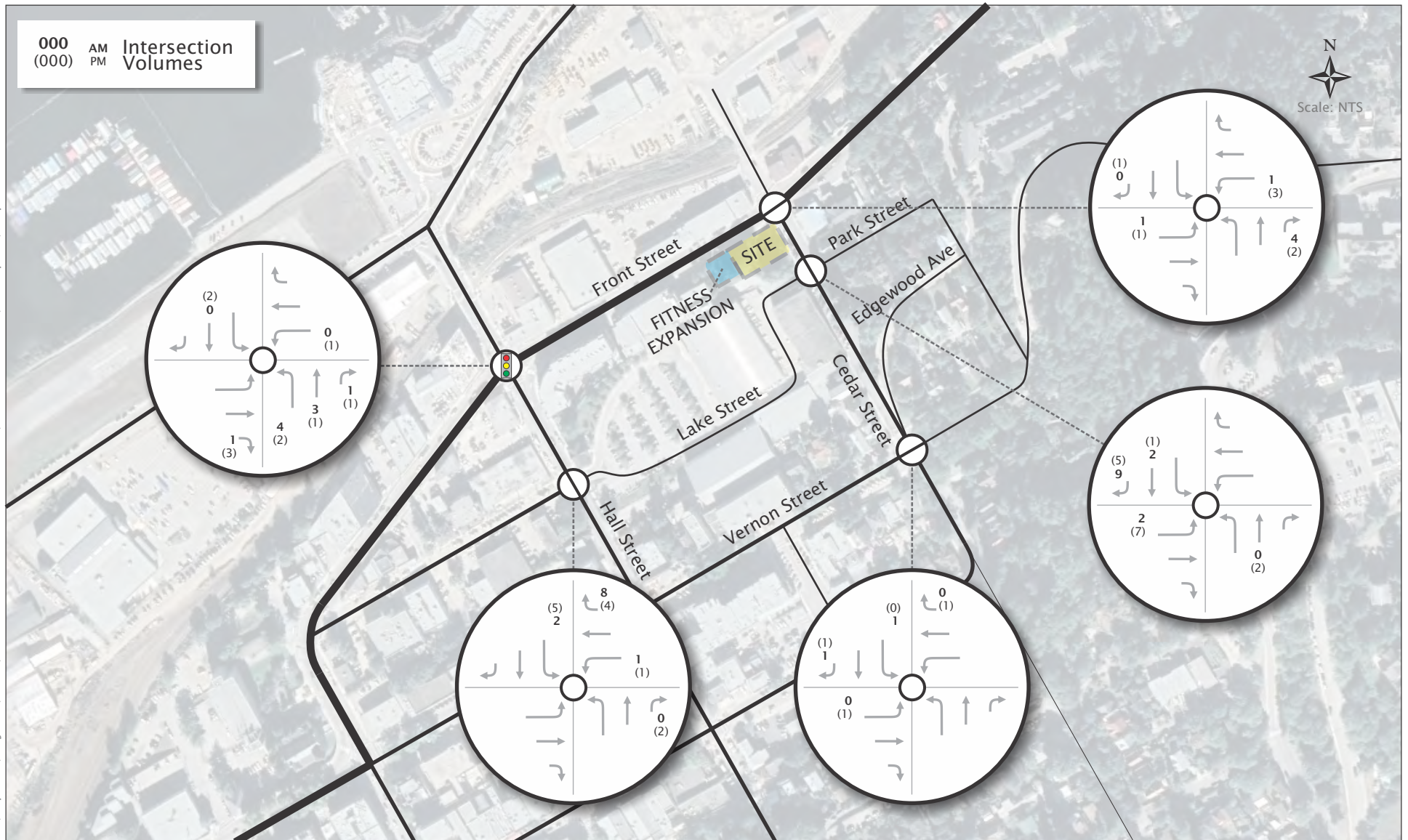


## Exhibit 3.5 Site Traffic Forecasts - Signalized

07-24-0062

M'akola Nelson CARES  
March 2025



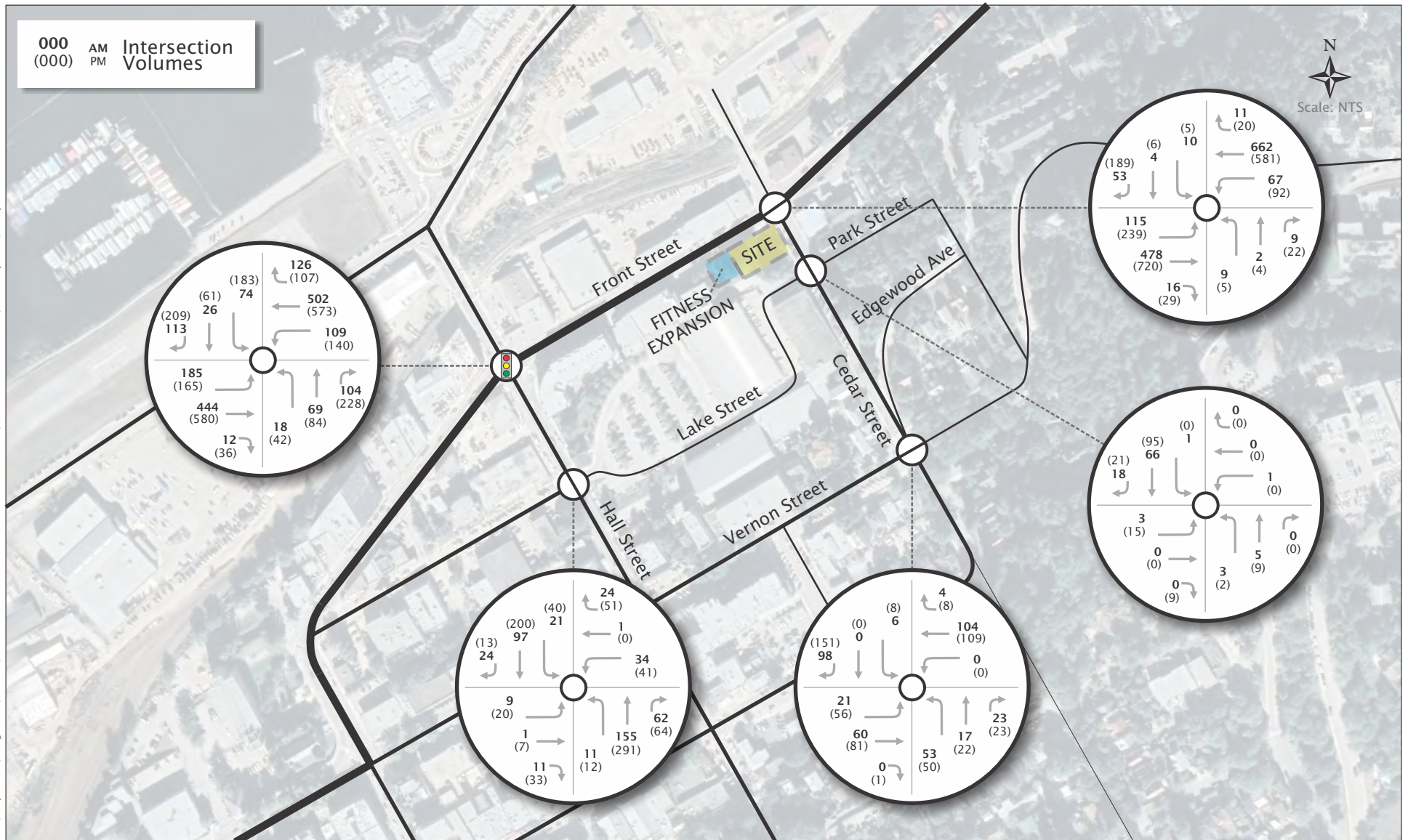


## Exhibit 3.6 Site Traffic Forecasts - Right Turn

07-24-0062

M'akola Nelson CARES  
March 2025



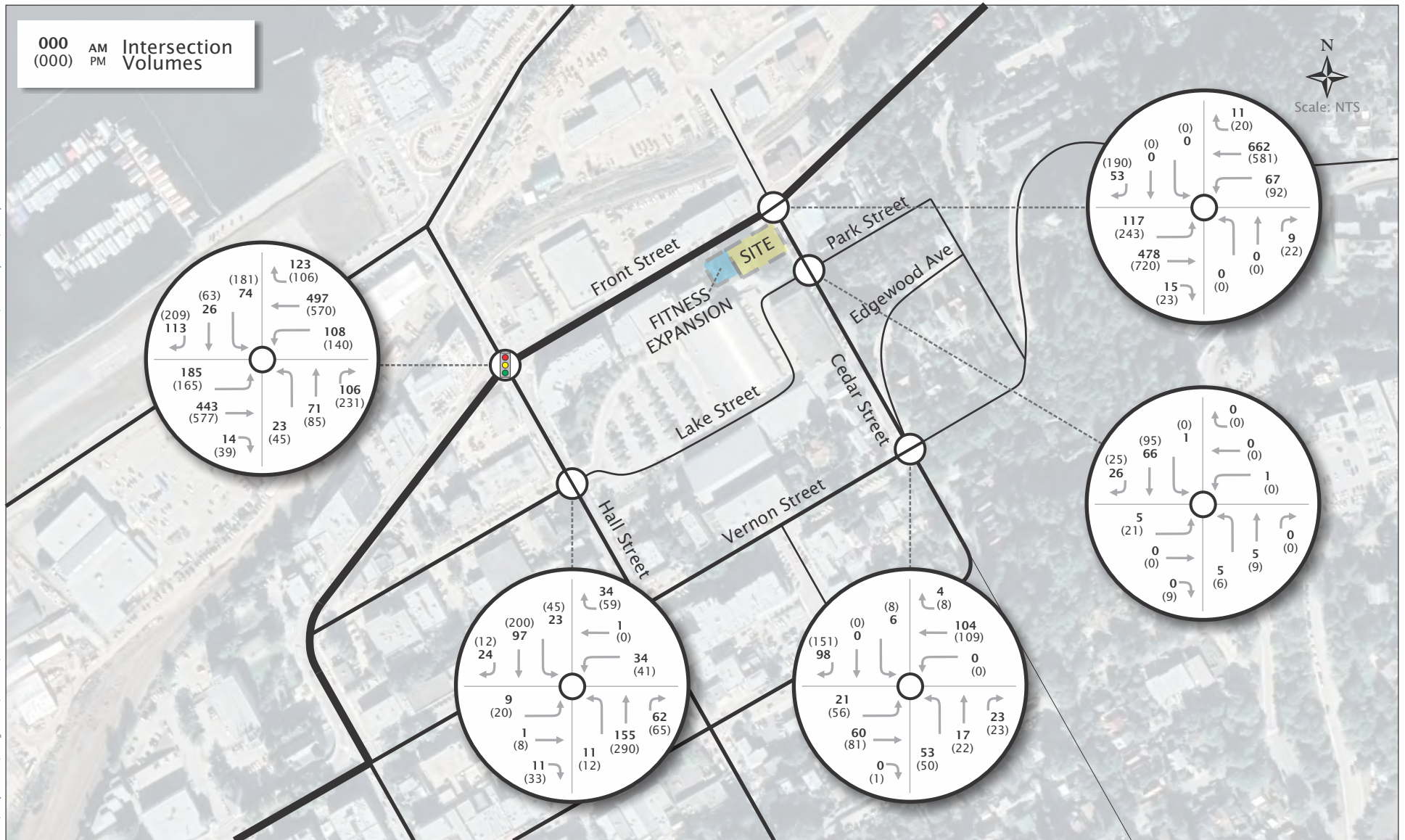


## Exhibit 3.7 Opening Day Total Traffic Forecasts - Signalized

07-24-0062

M'akola Nelson CARES  
March 2025



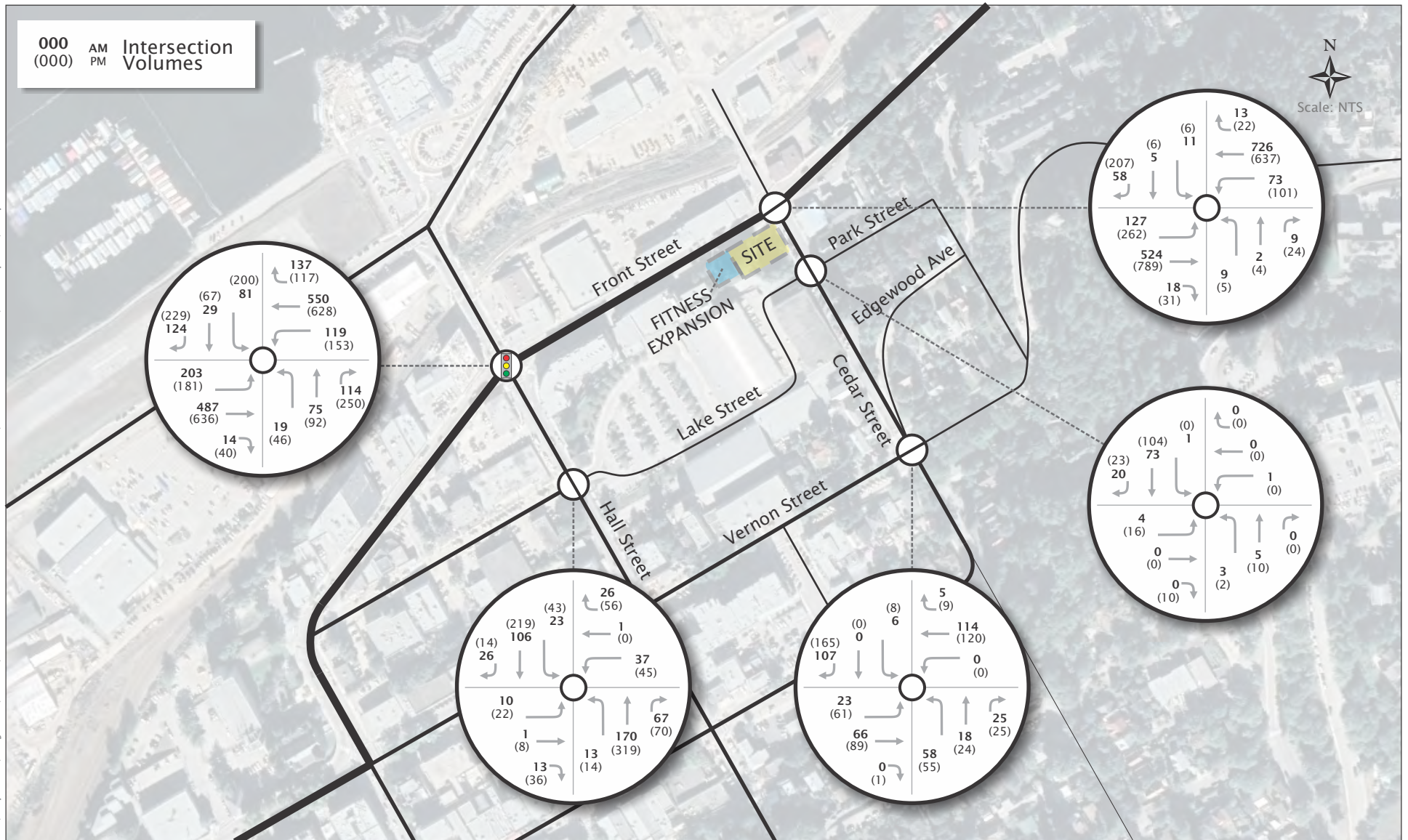


## Exhibit 3.8 Opening Day Total Traffic Forecasts - Right Turn

07-24-0062

M'akola Nelson CARES  
March 2025



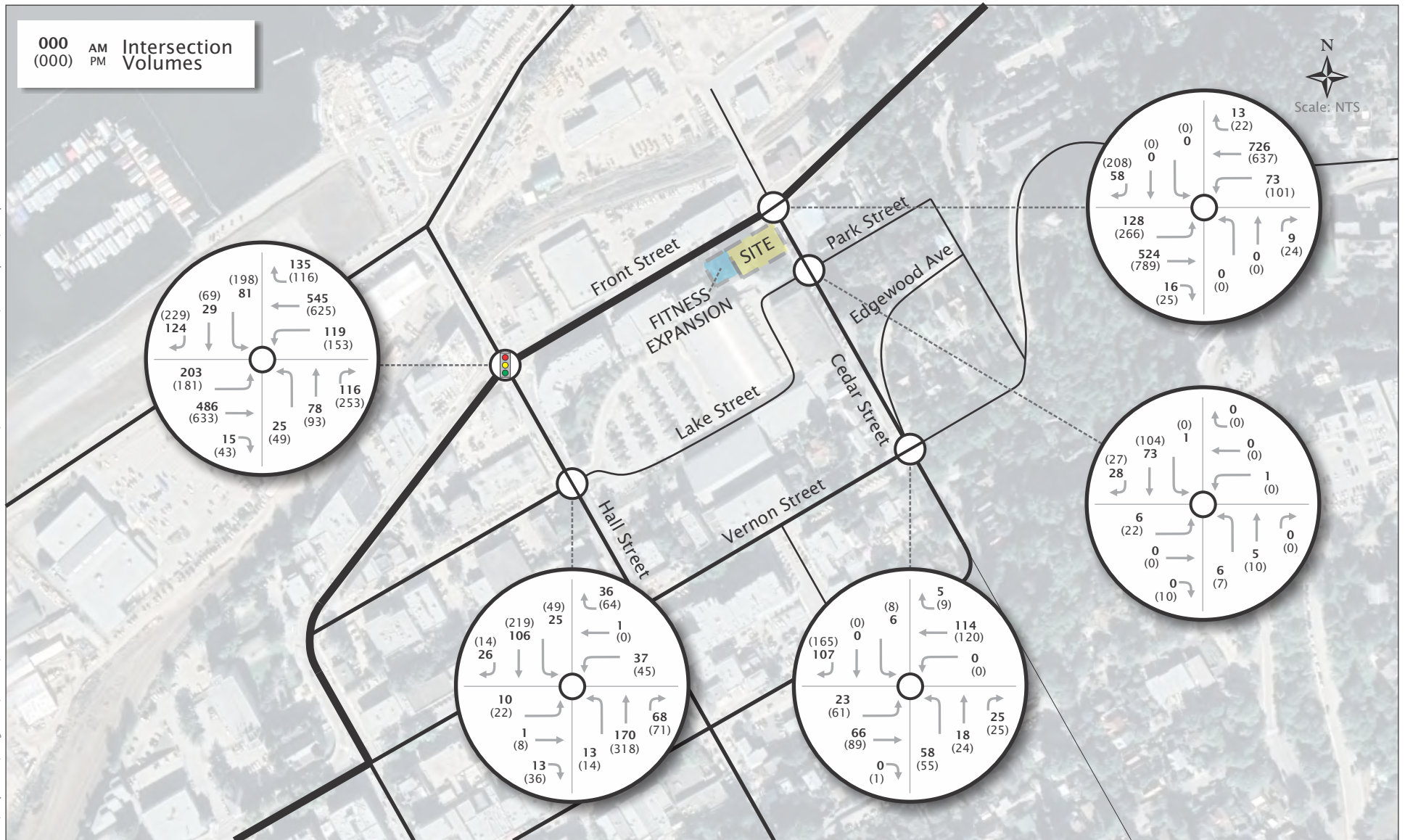


## Exhibit 3.9 Opening Day + 10 Total Traffic Forecasts - Signalized

07-24-0062

M'akola Nelson CARES  
March 2025





## Exhibit 3.10 Opening Day + 10 Total Traffic Forecasts - Right Turn

07-24-0062

M'akola Nelson CARES  
March 2025

## 4. FUTURE TRAFFIC OPERATIONS

### 4.1 Future Conditions Analysis Assumptions

Inputs to the existing conditions Synchro model were maintained in the future conditions, with the exception of the “heavy vehicle factor” (HVF), which was reported based on the existing data collection for the existing condition but reduced to a smaller value in future conditions. This is to account for existing low volume movements, such as the southbound movement in the AM peak hour at Front Street & Cedar Street where one of the four vehicles turning was counted as a heavy vehicle. It is not expected that 25% of all vehicles making this movement in the future will continue to be heavy vehicles as volumes increase. Thus, in the future scenarios HVF is adjusted to reflect more reasonable heavy vehicle factors.

Signal timing cycle lengths and splits were optimized for signalized intersections in each future scenario to account for increase in traffic volumes and changes to traffic patterns in the future.

### 4.2 Future Background Traffic Operations

#### 4.2.1 Opening Day (2028) Background Traffic Operations

Tables 4.1 and 4.2 summarize the Opening Day (2028) Background vehicle traffic operations for each scenario. The signalization at Cedar Street & Front Street can be seen to have improved the LOS of the north and southbound movements from LOS D in the AM peak and LOS F in the PM peak to an LOS B across both peak hours.

**Table 4.1: Opening Day Background Vehicle Operations – Signalized**

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.66	-	B	0.81	-
	NB LT	C	0.39	20	B	0.33	30
	NB R	B	0.08	10	B	0.16	15
	SB TL	C	0.54	20	C	0.74	60
	SB R	B	0.09	10	B	0.15	15
	EB L	A	0.47	20	B	0.58	25
	EB TR	A	0.43	50	A	0.60	85
	WB L	B	0.33	20	B	0.48	30
	WB T	B	0.71	100	C	0.84	130
	WB R	A	0.09	10	B	0.08	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.04	0	C	0.16	5

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
	WB LTR	B	0.13	5	C	0.24	10
	OVERALL	A	0.57	-	A	0.57	-
Cedar Street & Front Street (Signalized)	NB LTR	B	0.01	5	B	0.03	5
	SB LTR	B	0.09	10	B	0.17	15
	EB L	A	0.45	15	A	0.63	40
	EB TR	A	0.52	35	A	0.68	75
	WB L	A	0.17	5	A	0.33	10
	WB TR	A	0.72	60	A	0.58	55
	OVERALL	-	-	-	-	-	-
Cedar Street & Park Street (Unsignalized)	NB LTR	A	0.00	0	A	0.00	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.00	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
	OVERALL	-	-	-	-	-	-
Cedar Street & Vernon Street (Unsignalized)	NB LTR	B	0.20	5	C	0.29	10
	SB R	B	0.15	5	B	0.25	10
	EB LT	A	0.02	0	A	0.04	0
	WB TR	A	0.07	0	A	0.08	0
	OVERALL	-	-	-	-	-	-

Table 4.2: Opening Day Background Vehicle Operations – Right Turn

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
	OVERALL	B	0.66	-	B	0.81	-
Hall Street & Front Street (Signalized)	NB LT	C	0.40	20	B	0.33	30
	NB R	B	0.08	10	B	0.16	15
	SB TL	C	0.54	20	C	0.74	60
	SB R	B	0.09	10	B	0.15	15
	EB L	A	0.47	20	B	0.58	25
	EB TR	A	0.43	50	A	0.60	85
	WB L	B	0.33	20	B	0.48	30
	WB T	B	0.71	95	C	0.84	130
	WB R	A	0.09	10	B	0.08	10
	OVERALL	-	-	-	-	-	-
Hall Street & Lake Street (Unsignalized)	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.04	0	C	0.16	5



INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
	WB LTR	B	0.13	5	C	0.25	10
	OVERALL	-	-	-	-	-	-
Cedar Street & Front Street (Unsignalized)	NB R	B	0.01	0	B	0.06	0
	SB R	C	0.14	5	C	0.48	20
	EB L	B	0.15	5	B	0.29	10
	EB TR	A	0.32	0	A	0.48	0
	WB L	A	0.07	0	B	0.12	5
	WB TR	A	0.43	0	A	0.38	0
	OVERALL	-	-	-	-	-	-
Cedar Street & Park Street (Unsignalized)	NB LTR	A	0.00	0	A	0.01	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.00	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
	OVERALL	-	-	-	-	-	-
Cedar Street & Vernon Street (Unsignalized)	NB LTR	B	0.20	5	C	0.29	10
	SB R	B	0.15	5	B	0.25	10
	EB LT	A	0.02	0	A	0.04	0
	WB TR	A	0.07	0	A	0.08	0
	OVERALL	-	-	-	-	-	-

All intersections operate within the performance thresholds for both scenarios.

#### 4.2.1 Opening Day + 10 Years (2038) Background Traffic Operations

Tables 4.3 and 4.4 summarize the Opening Day (2028) Background vehicle traffic operations for each scenario.

**Table 4.3: Opening Day + 10 Background Vehicle Operations – Signalized**

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.71	-	C	0.86	-
	NB LT	C	0.42	20	C	0.10	35
	NB R	B	0.08	10	B	0.06	20
	SB TL	C	0.60	25	D	0.81	75
	SB R	B	0.09	10	B	0.16	15
	EB L	A	0.54	25	B	0.69	40
	EB TR	A	0.46	55	B	0.65	100
	WB L	B	0.37	25	B	0.55	35
	WB T	B	0.77	115	C	0.87	145
	WB R	A	0.10	10	B	0.08	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.05	0	C	0.20	5
	WB LTR	B	0.15	5	C	0.29	10
Cedar Street & Front Street (Signalized)	OVERALL	A	0.59	-	A	0.60	-
	NB LTR	B	0.01	5	B	0.03	5
	SB LTR	B	0.11	10	C	0.19	20
	EB L	A	0.47	5	A	0.68	65
	EB TR	A	0.51	15	A	0.68	95
	WB L	A	0.17	0	A	0.36	15
	WB TR	A	0.70	30	A	0.58	65
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.00	0
	SB LTR	A	0.00	0	-	0.00	0
	EB LTR	A	0.00	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.22	5	C	0.34	10
	SB R	B	0.16	5	B	0.27	10
	EB LT	A	0.02	0	A	0.05	0
	WB TR	A	0.08	0	A	0.09	0

**Table 4.4: Opening Day + 10 Background Vehicle Operations – Right Turn**

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.71	-	C	0.86	-
	NB LT	C	0.43	25	C	0.39	35
	NB R	B	0.08	10	B	0.22	20
	SB TL	C	0.60	25	D	0.82	75
	SB R	B	0.09	10	B	0.16	15
	EB L	A	0.54	25	B	0.68	40
	EB TR	A	0.46	55	B	0.65	100
	WB L	B	0.37	25	B	0.55	35
	WB T	B	0.77	115	C	0.87	145
	WB R	A	0.10	10	B	0.08	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.05	0	C	0.20	5
	WB LTR	B	0.15	5	C	0.29	10
Cedar Street & Front Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB R	B	0.01	0	C	0	0.07
	SB R	C	0.17	5	D	25	0.57
	EB L	B	0.18	5	B	10	0.33
	EB TR	A	0.35	0	A	0	0.51
	WB L	A	0.08	0	B	5	0.15
	WB TR	A	0.47	0	A	0	0.42
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.01	0
	SB LTR	A	0.00	0	-	0.00	0
	EB LTR	A	0.00	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.22	5	C	0.34	10
	SB R	B	0.16	5	B	0.27	10
	EB LT	A	0.02	0	A	0.05	0
	WB TR	A	0.08	0	A	0.09	0

With the exception of the overall intersection v/c at Hall Street & Front Street in the PM peak hour, all intersections and movements operation within the performance thresholds for both scenarios.

### 4.3 Future Total Traffic Operations

#### 4.3.1 Opening Day (2028) Total Traffic Operations

Tables 4.5 and 4.6 summarize the Opening Day (2028) Total vehicle traffic operations for each scenario.

**Table 4.5: Opening Day Total Vehicle Operations – Signalized**

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.66	-	B	0.82	-
	NB LT	C	0.39	10	B	0.33	30
	NB R	B	0.08	20	B	0.16	15
	SB TL	C	0.55	10	C	0.75	60
	SB R	B	0.08	20	B	0.15	15
	EB L	A	0.47	10	B	0.58	25
	EB TR	A	0.43	20	A	0.61	85
	WB L	B	0.33	50	B	0.49	30
	WB T	B	0.72	20	C	0.84	130
	WB R	A	0.09	100	B	0.08	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.04	0	C	0.16	5
	WB LTR	B	0.13	5	C	0.24	10
Cedar Street & Front Street (Signalized)	OVERALL	A	0.57	-	A	0.58	-
	NB LTR	B	0.05	5	B	0.05	5
	SB LTR	B	0.09	10	B	0.17	15
	EB L	A	0.45	15	A	0.63	40
	EB TR	A	0.52	35	A	0.68	75
	WB L	A	0.17	5	A	0.34	10
	WB TR	A	0.72	60	A	0.58	55
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.00	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.00	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.20	5	C	0.29	10
	SB R	B	0.15	5	B	0.25	10
	EB LT	A	0.02	0	A	0.05	0
	WB TR	A	0.07	0	A	0.08	0



Table 4.6: Opening Day Total Vehicle Operations – Right Turn

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.66	-	B	0.81	-
	NB LT	C	0.43	20	B	0.34	15
	NB R	B	0.08	10	B	0.16	60
	SB TL	C	0.55	20	C	0.75	15
	SB R	B	0.08	10	B	0.15	25
	EB L	A	0.47	20	B	0.58	90
	EB TR	A	0.43	50	A	0.61	30
	WB L	B	0.33	20	B	0.49	130
	WB T	B	0.72	95	C	0.84	10
	WB R	A	0.09	10	B	0.08	30
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.04	0	C	0.17	5
	WB LTR	B	0.14	5	C	0.26	10
Cedar Street & Front Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.02	0	B	0.06	0
	SB LTR	C	0.14	5	C	0.48	20
	EB L	B	0.15	5	B	0.29	10
	EB TR	A	0.32	0	A	0.47	0
	WB L	A	0.07	0	B	0.13	5
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.01	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.01	0	A	0.05	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.20	5	C	0.29	10
	SB R	B	0.15	5	B	0.25	10
	EB LT	A	0.02	0	A	0.05	0
	WB TR	A	0.07	0	A	0.08	0

### 4.3.1 Opening Day + 10 Years (2038) Total Traffic Operations

Tables 4.7 and 4.8 summarize the Opening Day + 10 Years (2038) Total vehicle traffic operations for each scenario.

**Table 4.7: Opening Day + 10 Total Vehicle Operations – Signalized**

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.71	-	C	0.86	-
	NB LT	C	0.42	20	C	0.38	35
	NB R	B	0.08	10	B	0.22	20
	SB TL	C	0.59	25	D	0.82	75
	SB R	B	0.09	10	B	0.16	15
	EB L	A	0.55	25	C	0.71	40
	EB TR	A	0.46	60	B	0.65	100
	WB L	B	0.37	25	B	0.56	36.8
	WB T	B	0.77	115	C	0.86	140
	WB R	A	0.10	10	B	0.08	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.04	0
	EB LTR	B	0.05	0	C	0.20	5
	WB LTR	B	0.15	5	C	0.29	10
Cedar Street & Front Street (Signalized)	OVERALL	A	0.59	-	C	0.73	-
	NB LTR	B	0.06	5	C	0.08	10
	SB LTR	B	0.11	10	C	0.21	20
	EB L	A	0.47	15	C	0.71	80
	EB TR	A	0.51	40	B	0.79	165
	WB L	A	0.17	5	C	0.58	45
	WB TR	A	0.70	70	C	0.84	170
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.00	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.01	0	A	0.04	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.22	5	C	0.34	10
	SB R	B	0.17	5	B	0.28	10
	EB LT	A	0.02	0	A	0.05	5
	WB TR	A	0.08	0	A	0.09	0

**Table 4.8: Opening Day + 10 Total Vehicle Operations – Right Turn**

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Hall Street & Front Street (Signalized)	OVERALL	B	0.71	-	C	0.86	-
	NB LT	C	0.46	25	C	0.40	35
	NB R	B	0.08	10	B	0.23	20
	SB TL	C	0.60	25	D	0.82	75
	SB R	B	0.09	10	B	0.16	15
	EB L	A	0.54	25	B	0.69	40
	EB TR	A	0.46	60	B	0.65	100
	WB L	B	0.37	25	B	0.55	35
	WB T	B	0.77	115	C	0.87	145
	WB R	A	0.10	10	B	0.08	10
Hall Street & Lake Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.01	0	A	0.01	0
	SB LTR	A	0.02	0	A	0.05	0
	EB LTR	B	0.05	0	C	0.20	5
	WB LTR	B	0.17	5	C	0.31	10
Cedar Street & Front Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.02	0	C	0.08	0
	SB LTR	C	0.17	5	D	0.57	30
	EB L	B	0.18	5	B	0.33	10
	EB TR	A	0.35	0	A	0.51	0
	WB L	A	0.08	0	B	0.15	5
	WB TR	A	0.47	0	A	0.42	0
Cedar Street & Park Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	A	0.00	0	A	0.01	0
	SB LTR	A	0.00	0	A	0.00	0
	EB LTR	A	0.01	0	A	0.05	0
	WB LTR	A	0.00	0	A	0.00	0
Cedar Street & Vernon Street (Unsignalized)	OVERALL	-	-	-	-	-	-
	NB LTR	B	0.22	5	C	0.34	10
	SB R	B	0.17	5	B	0.28	10
	EB LT	A	0.02	0	A	0.05	0
	WB TR	A	0.08	0	A	0.08	0

#### 4.4 Summary of Traffic Impacts

In the Opening Day + 10 Years (2038) Background scenarios, the overall intersection v/c at Hall Street & Front Street exceeds the performance threshold of 0.85 with a value of 0.86.

The addition of site traffic on the network results in minimal impact to the study intersections with both Front Street & Cedar Street signalized and right turn restricted. The overall intersection v/c at Hall Street & Front Street remains the same in the Opening Day + 10 Years (2038) Total scenarios.

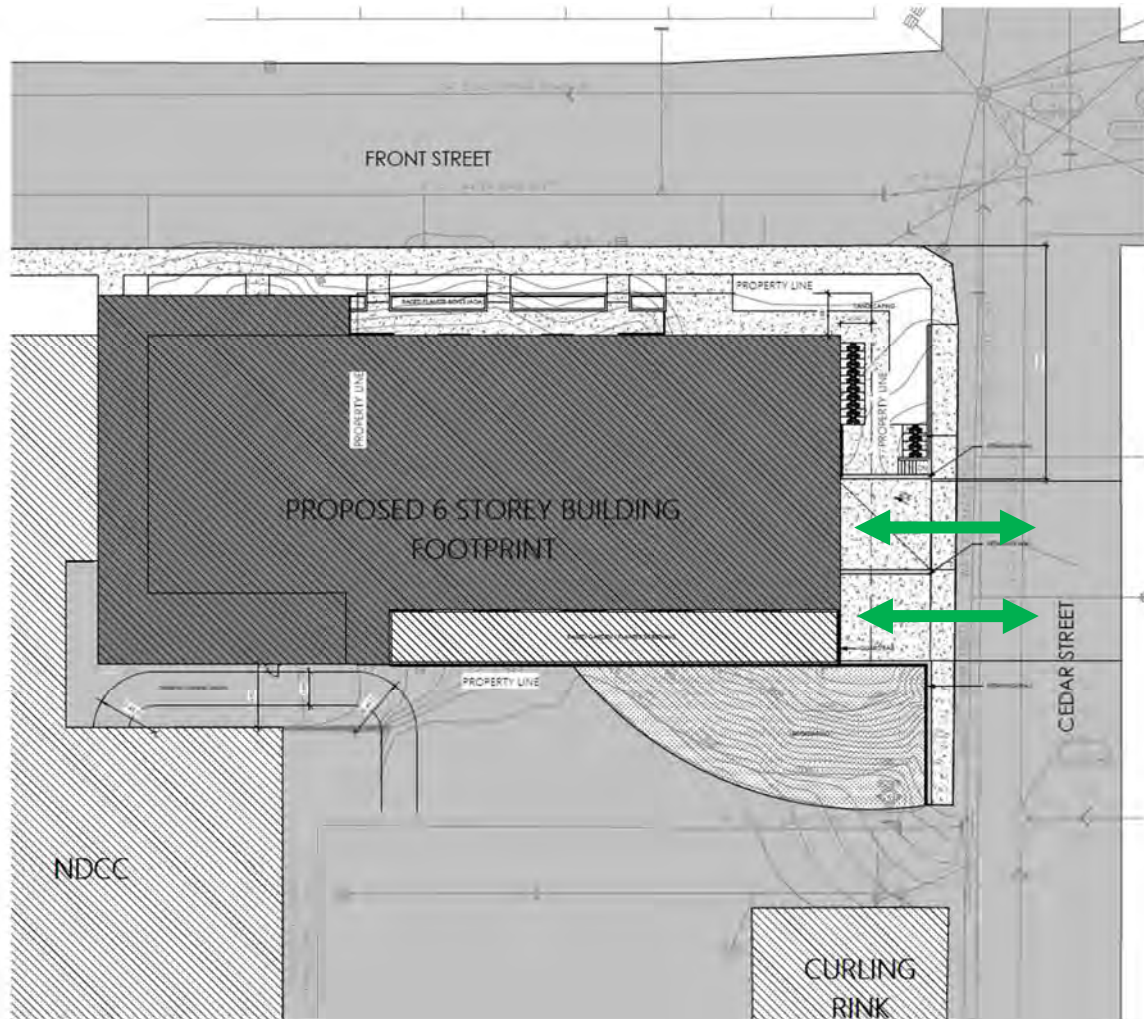
Beyond the existing conditions mitigations, no mitigations are recommended for the future conditions.

## 5. SITE PLAN DESIGN REVIEW

### 5.1 Site Access Design

Vehicle access to the development is provided via Cedar Street, as shown in **Figure 5.1**. Two (2) side-by-side driveways are proposed, making it a double wide driveway crossing. The northernmost of the two driveways ramps down and the southernmost ramps up. Both ramps lead to separate levels of vehicle parking. It is our present understanding that the developer will seek to revise the current site plan to meet the City's Bylaw requirements for maximum driveway width.

**Figure 5.1: Development Vehicle Access**





## 5.2 Parking Supply

### 5.2.1 Vehicle Parking

**Table 5.1** summarizes the vehicle parking requirements as per the City of Nelson's Off-Street Parking and Landscape Bylaw No. 3274, 2013, Part 7. As indicated by the Regional District of Central Kootenay (RDCK), the Nelson & District Community Complex (NDCC) expansion is intended to be programmed with an expansion of existing services in the NDCC. As such, it is anticipated that the expansion would be accommodated within the NDCC's existing parking lot.

**Table 5.1: Vehicle Parking Supply Requirement & Provision**

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	COUNTED STALLS	DIFFERENCE
Multifamily Housing (Mid-Rise)	50 Dwelling Units	1 space per dwelling unit	50	41	45**	-10
		0.1 visitor spaces per dwelling unit	5			
	50 Parking Spaces Required	2 accessible parking spaces for 40-74 required parking spaces	2*	2		

\* A portion of the required residential parking.

\*\* As per City bylaws accessible parking spaces will count as two parking spaces for the purpose of satisfying the minimum required number of parking spaces.

The development is proposing a reduction of 10 vehicle parking spaces, or a reduced parking rate of 0.80 spaces per dwelling unit (in addition to the visitor space requirement).

The City of Nelson allows for reduced parking via:

- Payment-in-lieu; and,
- Car share stall provisions.

Section 7.3(5) of City of Nelson's Off-Street Parking and Landscape Bylaw No. 3274, 2013, states that the total parking requirement for residential lots may be reduced by four stalls for every one carshare stall provided, up to two carshare stalls. The development intends to provide two carshare stalls for an eight-space reduction.

Section 6.1(3) of City of Nelson's Off-Street Parking and Landscape Bylaw No. 3274, 2013, states that a financial contribution of \$3,000 per vehicle parking space may be made to the City's Active Transportation Reserve Fund in lieu of providing off-street vehicle parking spaces. The development intends to provide payment-in-lieu for the remaining two vehicle parking space reduction.

M'akola Development Services provided parking data from 6 other non-profit housing developments in Nelson. The data is summarized in **Table 5.2** along with the average parking rate.

**Table 5.2: Nelson Non-Profit Housing Developments Parking Data**

BUILDING	DWELLING UNITS (DU)	PARKING STALLS PROVIDED	PARKING STALLS IN USE	PARKING DEMAND RATE (SPACES/DU)
Hall Street Place	43	44	44	1.02
Lakeside Place	47	19	19	0.40
Copper Mountain Court	37	39	31	0.84
Cedar Grove Estates	39	15	8	0.21
813/HAR	8	8	2	0.25
North Shore Inn	28	28	2	0.07
<b>WEIGHTED AVERAGE PARKING DEMAND RATE (SPACES/DU)</b>				<b>0.52</b>

The weighted average parking demand rate of the 6 non-profit housing developments in Nelson is 0.52 spaces per dwelling unit, which supports the proposed reduced parking rate of 0.80 spaces per dwelling unit.

Additionally, the development has a required rent mix that includes:

- 30% of units rented at near market rates;
- 50% of units rented as Rent Geared to Income units, in which the households must earn less than BC Housing's Household Income Limits to qualify; and,
- 20% of units rented as Deep Subsidy units, in which the households must earn less than BC Housing's Deep Subsidy Income Limits to qualify.

Tenants qualifying for Rent Geared to Income or Deep Subsidy units are typically less likely to own a vehicle, as shown in Table 5.2.

Nelson also hosts Kootenay Rideshare and Kootenay Carshare Cooperative, which provide access to vehicles for residents who do not own a vehicle.

The development intends to provide Transportation Demand Management measures to support the parking reduction, further discussed in **Section 6**.

### 5.2.2 Bicycle Parking

Well managed, secure, accessible and covered bicycle parking will be provided as part of the development plan. The development will supply at least 50 Long Term spaces and 30 Short Term spaces. The Long-Term parking spaces will be located in a dedicated bicycle storage room to the northwest of the building's second floor. The Short-Term parking is provided outside at the northeast and northwest side of the main level. **Table 5.3** summarizes the bicycle parking supply requirements as per the City of Nelson's Off-Street Parking and Landscape Bylaw No. 3274, 2013, Part 9.

**Table 5.3: Bicycle Parking Supply Requirement & Provision**

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	DIFFERENCE
Multifamily Housing (Mid-Rise)	50 Dwelling Units	1 Long Term space per dwelling unit	50	50	0
		6 Short Term spaces for any development with 10 or more DU, plus 6 additional spaces for each additional 10 dwelling units	30	30	0

### 5.2.3 Loading Supply

The City of Nelson's Off-Street Parking and Landscape Bylaw No. 3274, 2013, Part 8 indicates that no loading is required for residential developments.

## 6. CONCLUSIONS & RECOMMENDATIONS

Bunt's conclusions and recommendations are as follows:

### Existing Conditions

1. The proposed development is within 160m of the nearest bus stop, with access to all bus stops servicing Nelson within 800m.
2. Sidewalks are available along most adjacent roads.
3. Cycling infrastructure is minimal, but the "Cycle Great Tour" route runs adjacent to the proposed development. Additional cyclist infrastructure within close proximity to the site is planned.
4. The existing site is undeveloped.
5. The existing study intersections are mostly operating well within the acceptable performance thresholds, though the northbound and southbound movements at the unsignalized Cedar Street & Front Street are observed to experience long delays particularly during the weekday afternoon peak hour. Two mitigation strategies are proposed for Cedar Street & Front Street:
  - a. Signalize the intersection.
  - b. Restrict the northbound and southbound vehicles to right turns only.

### Future Traffic Volumes Forecasts

6. A linear growth rate of 1% was utilized to forecast future background traffic volumes.
7. Background traffic volumes for the right turn restricted scenario were adjusted to account for the movement restrictions at Cedar Street & Front Street.
8. It is estimated that the proposed development would generate about 18 two-way vehicle trips during the AM peak hour and 20 two-way vehicle trips during the PM peak hour.

### Future Traffic Operations

9. In the 2038 Background traffic scenario (without traffic from the proposed development) the intersection of Hall Street & Front Street slightly exceeds performance thresholds with overall intersection v/c ratio of 0.86.
10. The addition of the traffic from the proposed development does not change the overall performance of this intersection, therefore no mitigations are recommended.
11. All other intersections operate within the performance thresholds during the Background and Total scenarios.

### Site Plan Design Review

12. A total of 55 vehicle parking spaces are required by the City Bylaw, though given the housing demographic and transit accessibility, the site is proposing to provide 45 parking spaces, i.e., a parking reduction of 10 spaces.
13. As permitted in the Bylaw, the development intends to provide two car share spaces and payment in-lieu to support the proposed 10 vehicle parking space reduction from bylaw.

14. A total of 50 long term and 30 short term bicycle parking spaces are provided, which meet the minimum bylaw requirements.
15. No loading spaces are required or provided for the development.



# APPENDIX A

## Terms of Reference

## MEMO

DATE: October 18<sup>th</sup>, 2024  
PROJECT NO: 07-24-0062  
PROJECT: **M'akola Nelson CARES**  
SUBJECT: **Terms of Reference for Transportation Assessment and Management Study**

TO: Madelyn McPhee, BA  
M'akola Development Services

PREPARED BY: Ian Hancock, EIT  
REVIEWED BY: Hana Stoer, EIT  
Jason Potter, M.Sc., PTP  
APPROVED BY: Yulia Liem, P.Eng, PTOE

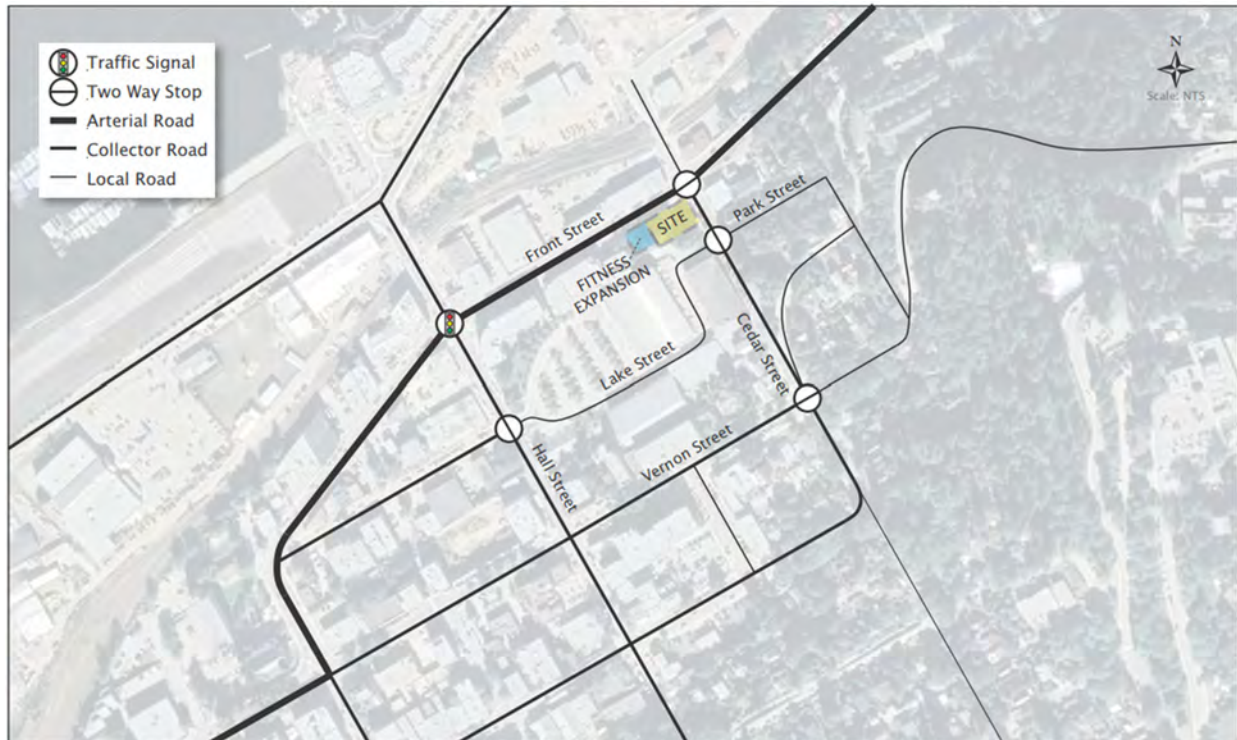
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### 1. INTRODUCTION

Bunt & Associates Engineering Ltd. (Bunt) has been retained by M'akola Development Services to prepare a Transportation Assessment and Management Study (TAMS) to support the development of an affordable housing development at 818-824 Front Street in Nelson, BC. To confirm the scope of the TAMS, Bunt has prepared this proposed Terms of Reference (ToR) which outlines the proposed development and the TAMS methodology that Bunt will utilize. Bunt seeks comments on these terms of reference from approving agencies to ensure our work program meets all requirements.

### 2. PROPOSED DEVELOPMENT

The proposed development would primarily be residential housing units with smaller portions of the development being designated as an extension to the existing Nelson & District Community Centre (NDCC) fitness centre and for commercial use. Though exact values are subject to change, 30-50 units are anticipated, with 40 units being the current design. Approximately 50% of these are intended to have rent "geared to income", with an additional 20% of these units intended for those transitioning out of homelessness, or clients of Community Living British Columbia (CLBC). The proposed design is for a six-storey building, with the first of these levels being primarily dedicated to vehicle parking. Parking access would be provided from a laneway off Cedar Street, just north of the intersection with Park Street. This location is shown in **Figure 2.1**. A parking reduction is being requested, which is elaborated upon in a subsequent section of this ToR.

**Figure 2.1: Site Location**

### 3. PROPOSED SCOPE OF WORK

Bunt's proposed scope of work for the TAMS is summarized as follows:

#### 3.1 Data Collection

Bunt will conduct traffic counts during 7-9 AM and 3-6 PM time periods at the 5 proposed study intersections listed and previously highlighted in **Figure 2.1**. Once the peak hour is established some intersection counts may be extrapolated from other data, future counts truncated to the relevant peak hour, or otherwise subject to change at the discretion of the engineering judgement of Bunt's engineers.

1. Front Street & Hall Street (Signalized)
2. Front Street & Cedar Street (Unsignalized)
3. Lake Street + Park Street & Cedar Street (Unsignalized)
4. Lake Street & Hall Street (Unsignalized)
5. Vernon Street & Cedar Street + Edgewood Avenue (Unsignalized)

This count program will include vehicle, pedestrian, cyclist, and heavy vehicle volumes. Dependant on the acceptance date of this ToR, Bunt aims to collect this data by the end of November 2024. The following traffic analysis periods are proposed to be examined:

1. Weekday AM Peak Hour
2. Weekday PM Peak Hour

### 3.2 Study Horizons

Three study years will be analysed:

- Existing 2024, and
- Future 2028
  - Background 2028, excluding the proposed development but including the city's background traffic growth;
  - Total 2028, adding in development trips to the Background 2028 network.
- Future 2038
  - Background 2038, excluding the proposed development but including the city's background traffic growth;
  - Total 2038, adding in development trips to the Background 2038 network.

#### 3.2.1 Background Growth Assumptions

##### *Blanket Growth*

In order to estimate the traffic conditions in the Future 2028 and 2038 horizon years, a linear background growth rate of +1% per year is proposed to be applied throughout the study area to non-site related vehicle volumes.

The 1% annual growth rate was determined to be appropriate for the analysis as a conservative industry standard for a city experiencing continued growth. Bunt's analysis can discuss the impact of the applied growth rate as it relates to analysis findings.

Site trips will be allocated as per existing travel patterns from the collected data.

### 3.3 Vehicle Trip Generation

##### *Vehicle Trips Rates*

ITE *Trip Generation Manual* (11<sup>th</sup> Edition) rates were, and will, be applied to determine the estimated vehicle trips the site is anticipated to generate. Using the preliminary site plan of 40 units, 7,110 ft<sup>2</sup> of NDCC fitness centre expansion, and 961 ft<sup>2</sup> of undetermined commercial space, **Table 3.1** shows the proposed land uses selected and corresponding anticipated trip generation:

**Table 3.1: Peak Hour Site Generated Vehicle Trip Rates**

LAND USE	ITE CODE	UNIT	AM PEAK HOUR			PM PEAK HOUR		
			IN	OUT	RATE	IN	OUT	RATE
Multifamily Housing (Mid-Rise)	ITE 221	Dwelling Units	3	11	0.37	10	6	0.39
Health/Fitness Club	ITE 492	1000 ft <sup>2</sup> GFA	5	5	1.31	14	11	3.45
Shopping Center	ITE 820	1000 ft <sup>2</sup> GFA	1	0	0.84	2	2	3.40
<b>TOTAL</b>			<b>9</b>	<b>16</b>	<b>-</b>	<b>26</b>	<b>19</b>	<b>-</b>

This is to be updated as the final number of dwelling units, exact GFA of the fitness club and commercial units, and retail use of the commercial areas is determined. It is to be noted that these values are conservative as affordable housing often attracts less vehicle trips than typical residential housing, and the fitness centre expansion is anticipated to achieve some internal capture of the new residential units that would not generate vehicle trips.

#### *Access Assumptions*

Pending final site plan confirmation, it is to be assumed that the trips in will terminate and trips out will originate from a stop-controlled intersection with Cedar Street just north of Park/Lake Street.

### 3.4 Analysis & Deliverables

#### *Site Design Assistance*

To guide and validate the site design iterations, Bunt will:

- Apply relevant bylaws to ensure parking supply compliance to bylaw;
- Use AutoTURN software to ensure parking areas and internal site circulation is functional;
- Use AutoTURN software to ensure required loading and/or waste vehicles can conduct their respective operations.

#### *Parking Reduction Memorandum*

Prior to the submission of the finalized TAMS report, Bunt will produce and circulate a memorandum to the City of Nelson justifying and quantifying the requested parking reduction at the site. Preliminarily, the reasons for this request include proximity to bus stops, downtown core location, and affordable housing component generating less anticipated trips. Mitigation strategies, such as Transportation Demand Management (TDM) plans or planned overflow parking agreements with neighbouring properties, will also be discussed.

#### *Traffic Analysis and Reporting*

The following analysis will be conducted, utilizing collected traffic data, updated site statistics, acceptance or rejection of parking reduction measures, and other factors:

- Finalize trip generation estimates.



- Analyze Existing and Future Conditions AM and PM peak hour traffic operations using the Synchro/SimTraffic software with HCM 2000 methodology.

The finalized TAMS report will also achieve and present the following:

- Review and summarize graphically the existing road network characteristics, intersection traffic control, and geometric parameters.
- Review and summarize graphically the transportation networks for all travel modes including transit, pedestrian, and cycling facilities (as applicable).
- Review relevant municipal plans and policies applicable to the development study area.
- Present existing and anticipated traffic volumes and intersection laning configurations graphically.
- Assess performance results and recommend mitigation strategies as appropriate to improve travel for all modes of transportation.
- Provide a conclusion and summary of findings and recommendations.



*The attached information is provided to support the agency's review process  
and shall not be distributed to other parties without written consent from  
Bunt & Associates Engineering Ltd.*

## APPENDIX B

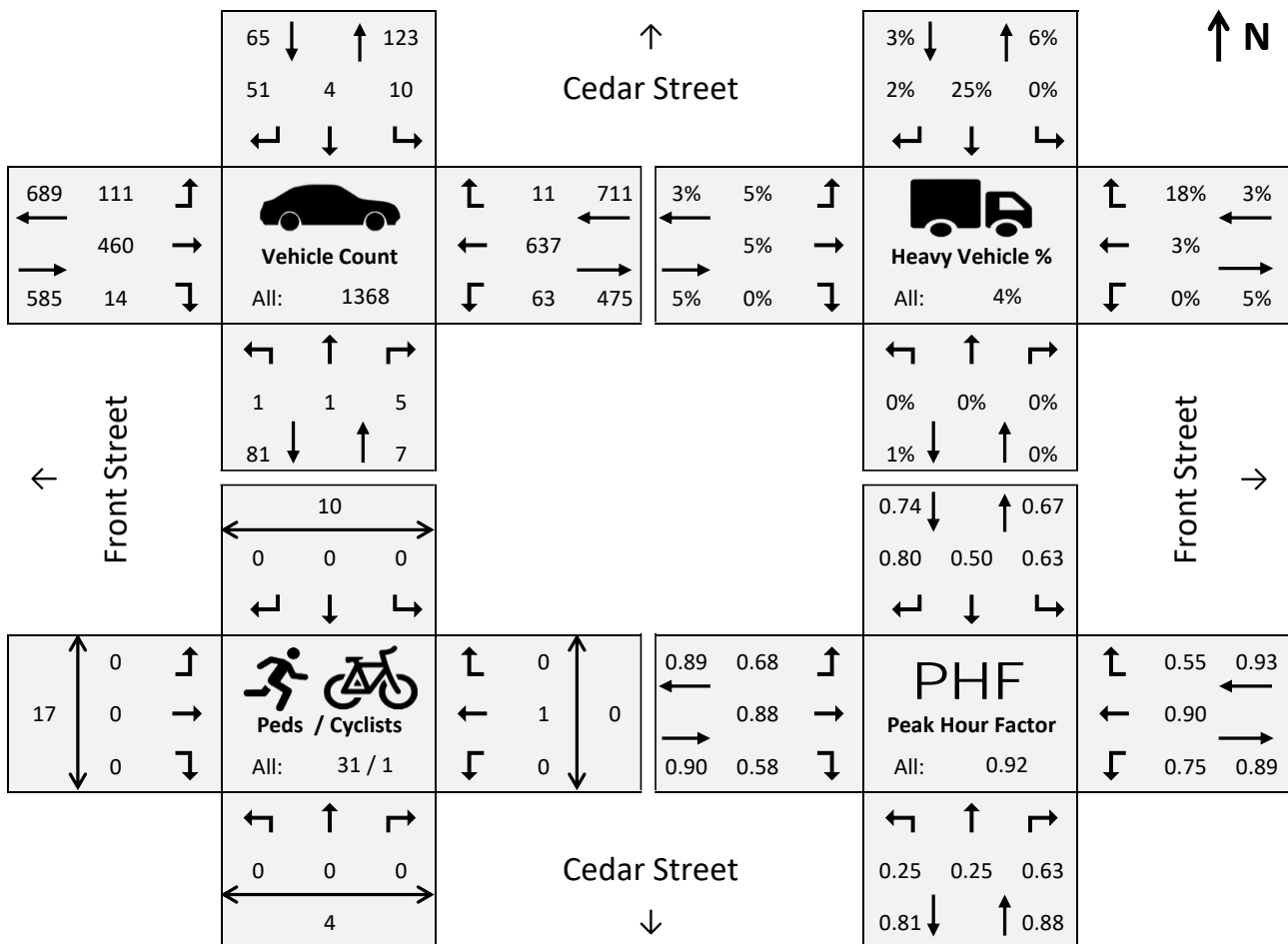
Traffic Data

# Front Street @ Cedar Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 8:00 - 9:00  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 8:00 - 9:00  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
7:00 - 7:15	0	0	2	3	3	8	22	55	0	8	68	2	3	0	0	3
7:15 - 7:30	0	1	1	1	0	6	10	64	2	7	79	0	1	0	0	0
7:30 - 7:45	1	0	0	1	0	10	16	82	0	10	109	7	2	1	0	1
7:45 - 8:00	0	0	3	1	0	9	35	89	2	15	159	2	4	0	0	2
8:00 - 8:15	0	0	2	0	1	11	17	101	1	17	152	1	2	1	0	3
8:15 - 8:30	0	1	1	2	0	11	27	130	6	13	163	1	4	0	0	2
8:30 - 8:45	1	0	1	4	2	16	26	127	4	12	176	4	2	0	0	6
8:45 - 9:00	0	0	1	4	1	13	41	102	3	21	146	5	2	3	0	6
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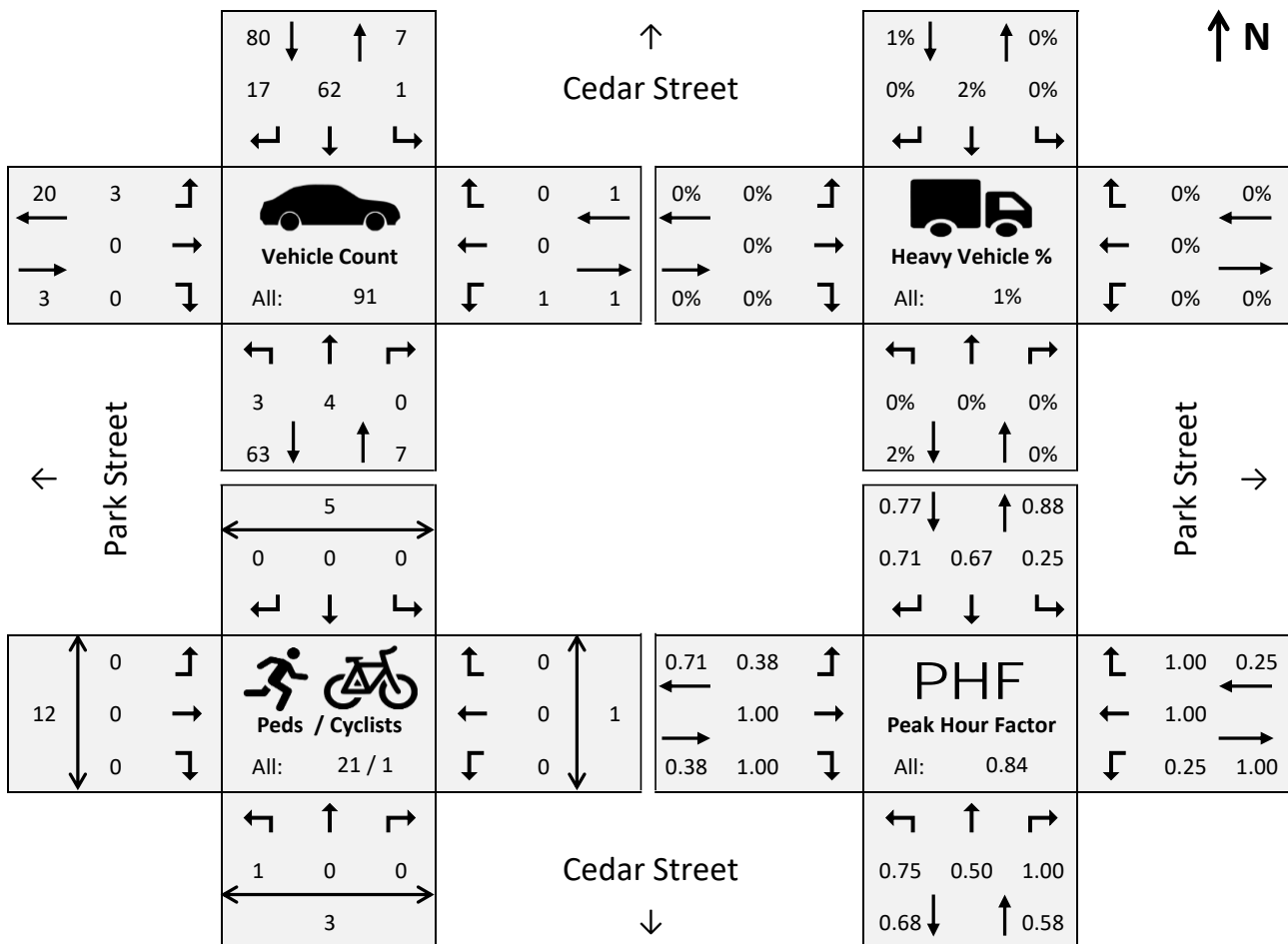


# Cedar Street @ Park Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 8:00 - 9:00  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 8:00 - 9:00  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
7:00 - 7:15	0	1	0	0	7	4	1	0	1	0	0	0	0	1	0	1
7:15 - 7:30	0	1	0	0	8	1	1	0	0	0	0	0	0	1	0	1
7:30 - 7:45	1	1	0	0	6	4	0	0	0	1	0	0	0	0	0	0
7:45 - 8:00	1	0	0	0	14	4	2	0	0	0	0	1	0	0	0	1
8:00 - 8:15	1	2	0	0	15	4	0	0	0	1	0	0	0	0	0	2
8:15 - 8:30	1	1	0	0	14	4	1	0	0	0	0	0	2	0	0	2
8:30 - 8:45	1	0	0	1	10	6	2	0	0	0	0	0	2	1	1	5
8:45 - 9:00	0	1	0	0	23	3	0	0	0	0	0	0	1	2	0	3
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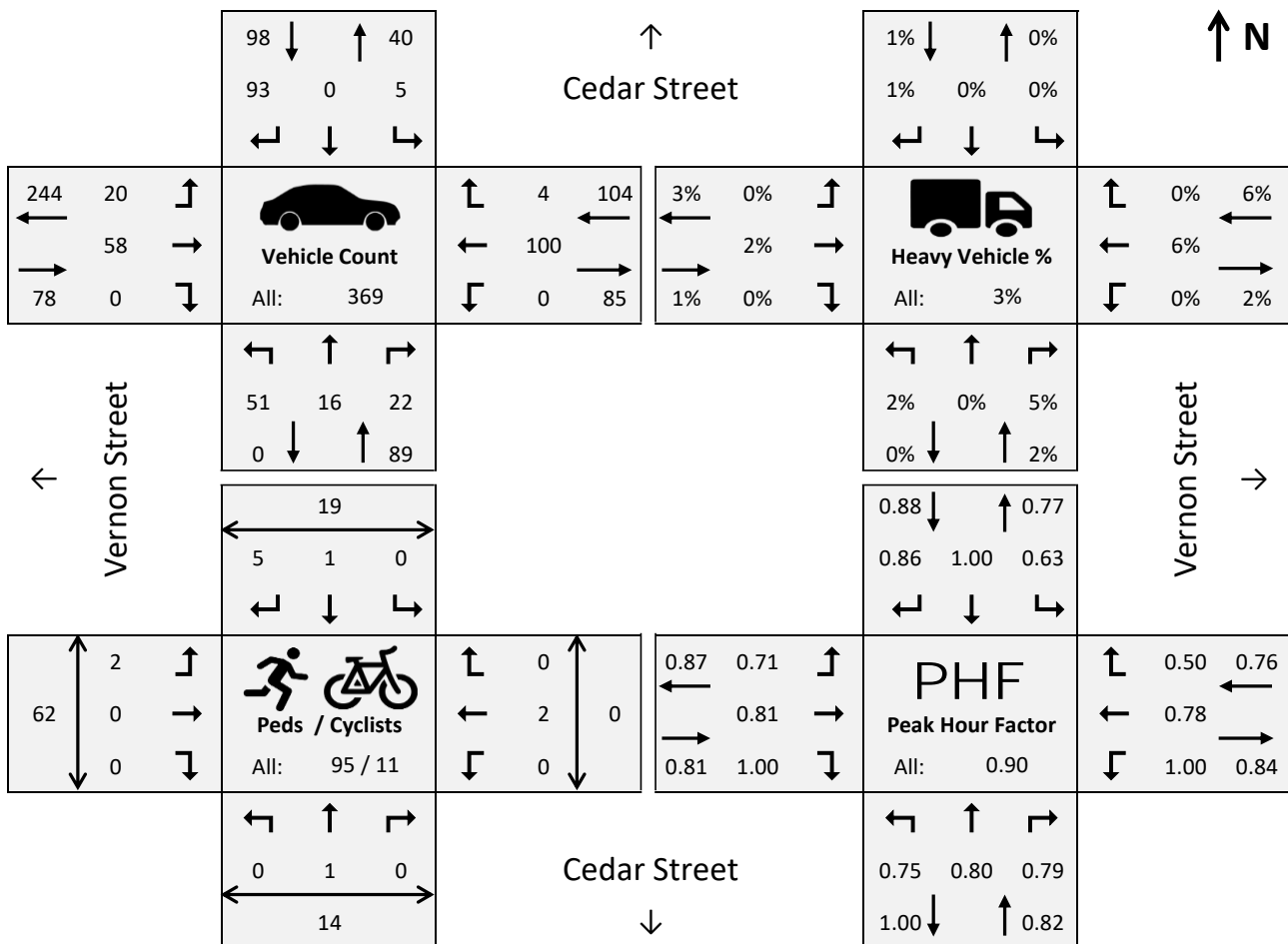


# Vernon Street @ Cedar Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 8:00 - 9:00  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 8:00 - 9:00  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
7:00 - 7:15	6	1	0	0	0	11	0	9	0	0	6	0	1	0	0	3
7:15 - 7:30	4	3	2	1	0	10	3	7	0	0	4	0	1	1	0	8
7:30 - 7:45	5	1	1	1	0	11	1	7	0	0	7	0	4	0	3	8
7:45 - 8:00	3	2	2	0	0	16	1	8	0	0	14	0	3	3	0	14
8:00 - 8:15	10	4	7	0	0	24	1	11	0	0	24	0	1	7	0	11
8:15 - 8:30	17	3	5	2	0	24	5	18	0	0	16	1	8	2	0	22
8:30 - 8:45	9	4	3	2	0	18	7	17	0	0	32	2	1	1	0	10
8:45 - 9:00	15	5	7	1	0	27	7	12	0	0	28	1	9	4	0	19
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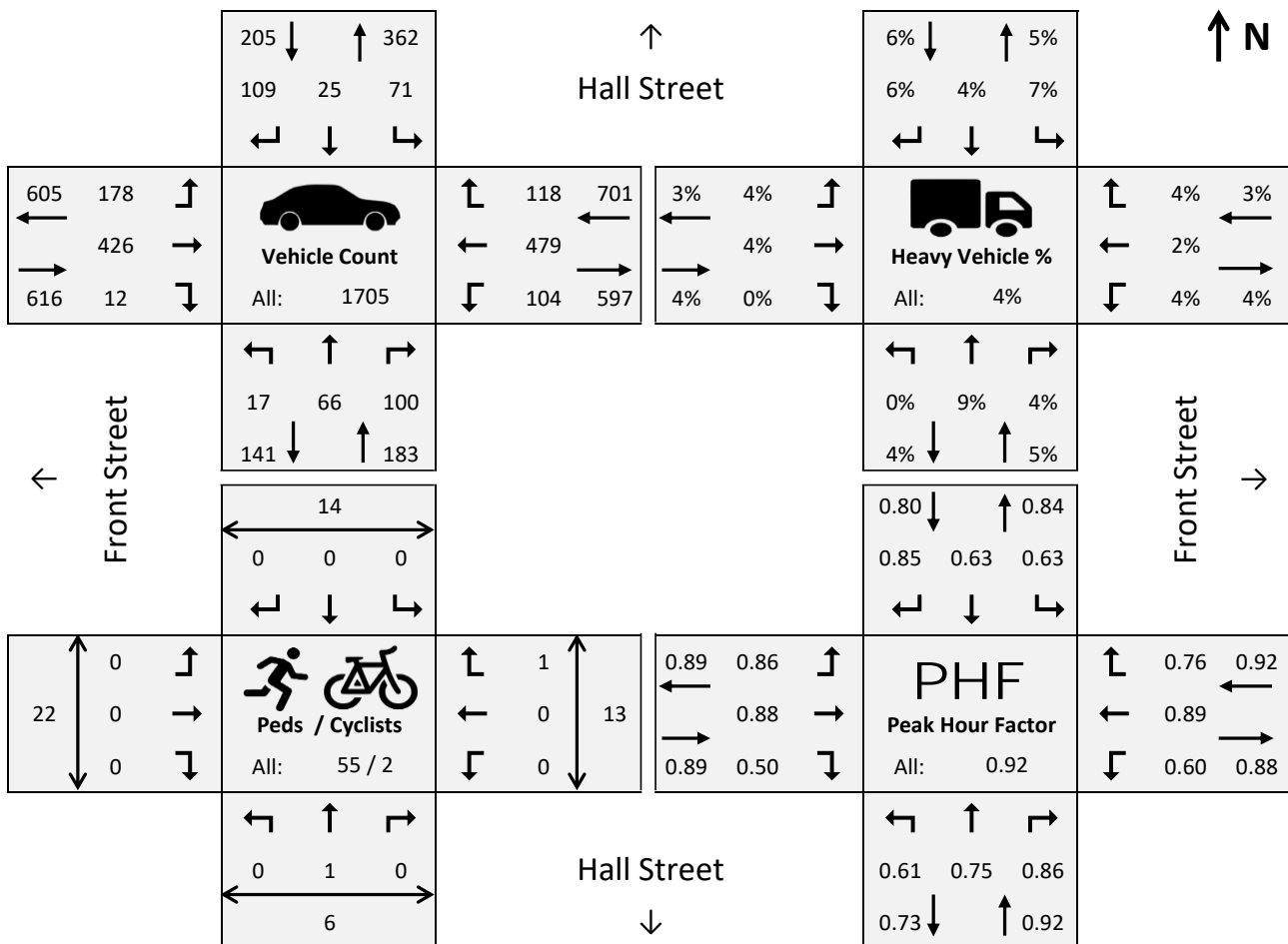


# Front Street @ Hall Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 8:00 - 9:00  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 8:00 - 9:00  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
7:00 - 7:15	2	3	16	9	3	13	12	53	2	7	66	12	3	0	0	1
7:15 - 7:30	5	9	11	14	4	19	29	53	1	11	64	9	2	1	2	3
7:30 - 7:45	6	7	20	11	4	11	17	71	4	13	92	16	3	3	0	6
7:45 - 8:00	4	6	19	15	2	21	36	99	0	14	124	26	2	0	3	4
8:00 - 8:15	2	15	20	9	5	25	49	90	1	14	119	24	5	1	2	4
8:15 - 8:30	7	12	28	18	6	28	34	121	4	17	134	32	2	0	2	8
8:30 - 8:45	4	17	29	16	10	24	52	115	6	30	122	39	2	4	4	5
8:45 - 9:00	4	22	23	28	4	32	43	100	1	43	104	23	5	1	5	5
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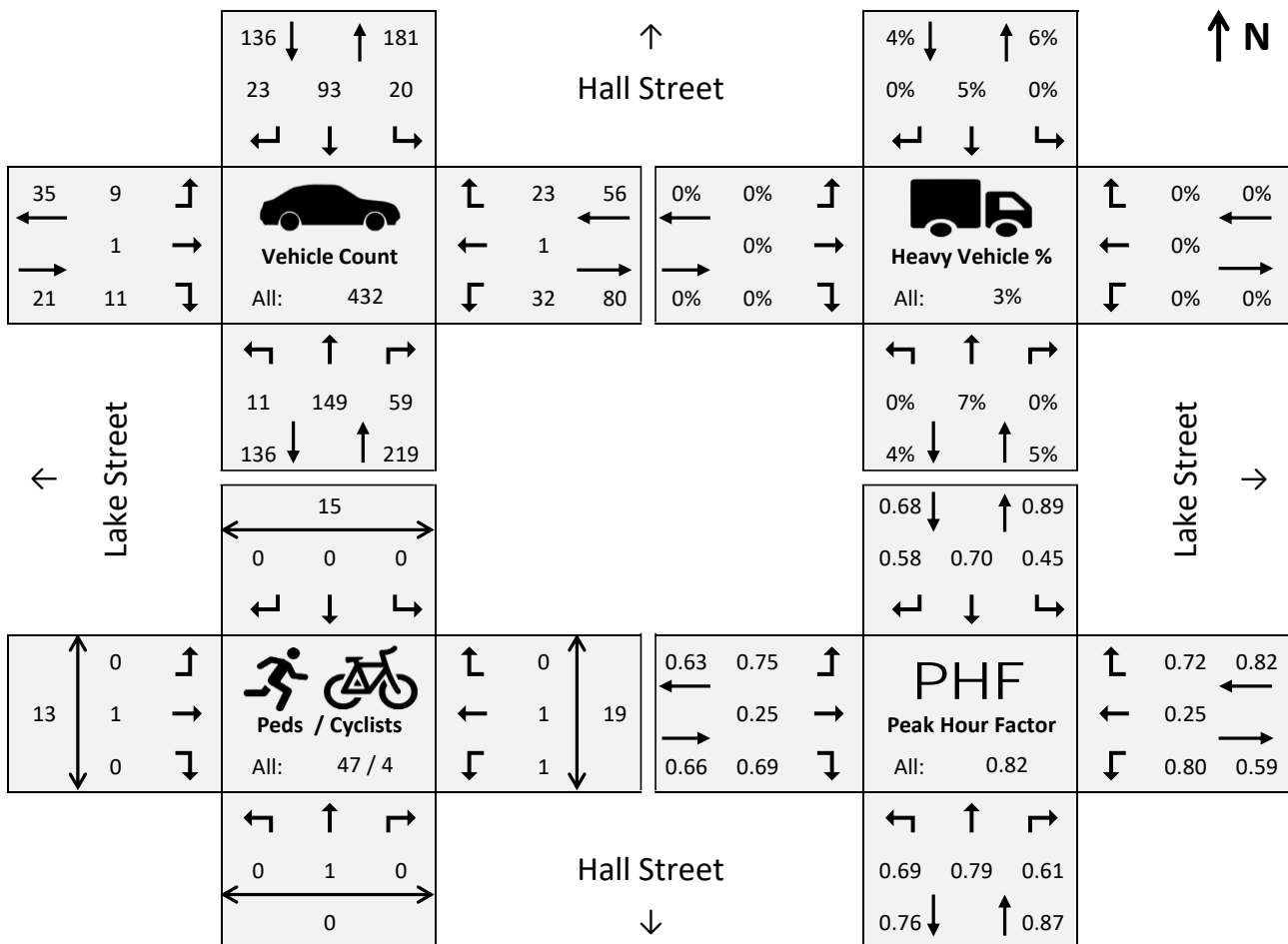


# Hall Street @ Lake Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 8:00 - 9:00  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 8:00 - 9:00  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
7:00 - 7:15	0	16	7	3	8	1	0	0	1	7	0	3	1	0	1	0
7:15 - 7:30	1	17	6	4	9	3	0	0	1	4	0	9	1	0	6	0
7:30 - 7:45	1	18	3	6	15	0	0	1	1	5	0	16	2	0	2	2
7:45 - 8:00	0	18	9	4	13	3	7	0	2	8	0	9	4	0	3	5
8:00 - 8:15	4	27	10	4	10	5	3	0	1	4	0	5	0	0	0	0
8:15 - 8:30	0	47	10	2	19	2	1	0	4	10	0	3	4	0	6	6
8:30 - 8:45	3	36	24	3	31	10	3	1	4	8	1	8	4	0	8	1
8:45 - 9:00	4	39	15	11	33	6	2	0	2	10	0	7	7	0	5	6
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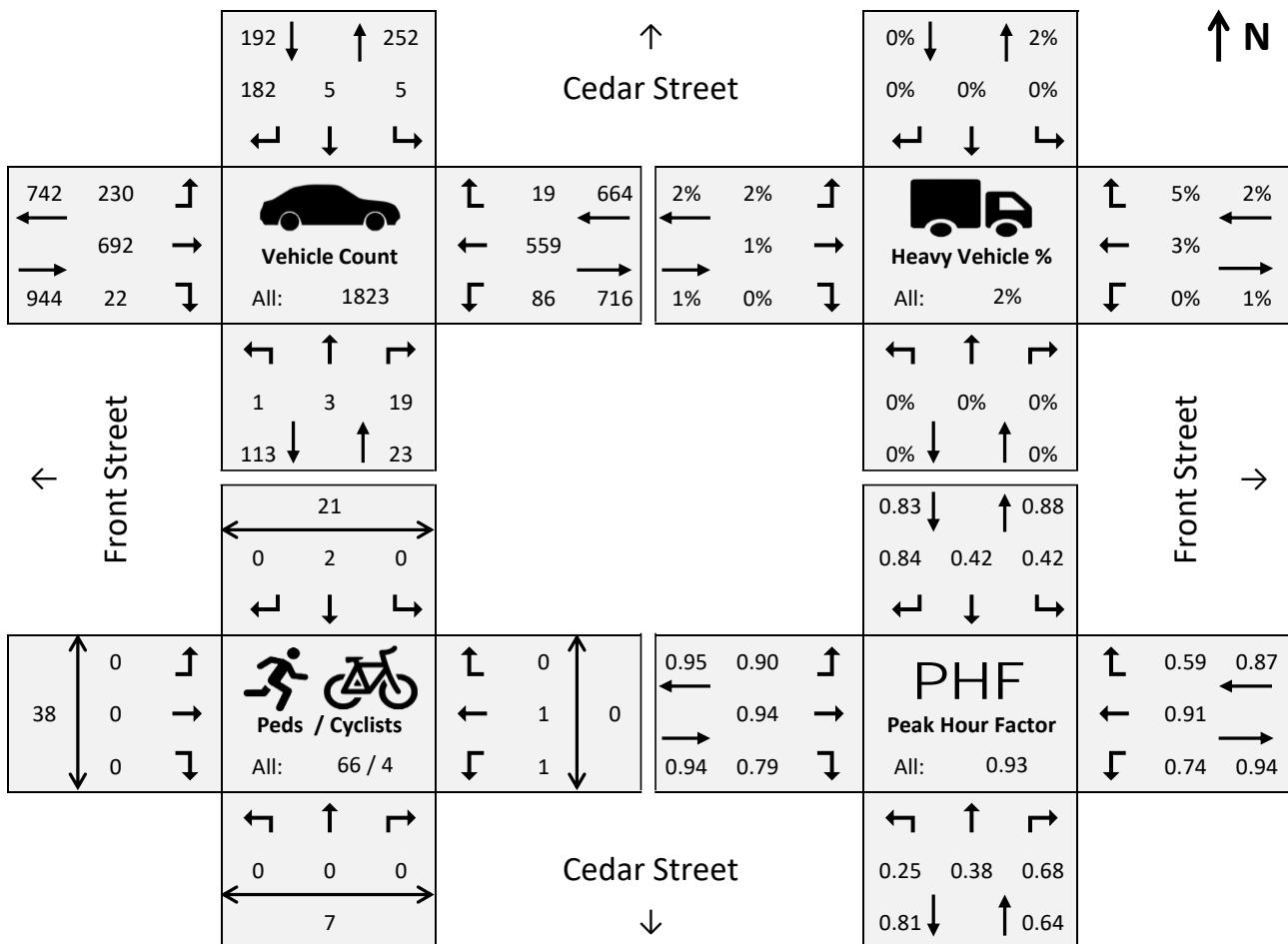


# Front Street @ Cedar Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 15:15 - 16:15  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 16:15 - 17:15  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
15:00 - 15:15	0	0	3	1	2	28	66	163	2	12	125	3	2	7	0	7
15:15 - 15:30	0	0	4	1	0	42	64	182	6	29	153	8	6	1	0	5
15:30 - 15:45	0	0	5	0	1	47	56	184	5	27	149	4	7	4	0	17
15:45 - 16:00	1	1	7	3	1	54	58	154	7	16	121	6	5	1	0	7
16:00 - 16:15	0	2	3	1	3	39	52	172	4	14	136	1	3	1	0	9
16:15 - 16:30	0	1	4	0	1	47	52	181	6	16	141	4	3	0	0	5
16:30 - 16:45	0	0	6	1	1	37	49	176	4	18	139	5	4	0	0	11
16:45 - 17:00	1	0	4	0	3	46	53	180	3	32	141	7	4	3	0	9
17:00 - 17:15	0	0	17	1	1	46	52	192	3	17	149	2	2	0	0	8
17:15 - 17:30	0	0	2	3	3	38	48	137	2	12	124	2	4	1	0	5
17:30 - 17:45	0	0	6	0	4	45	30	147	3	19	137	1	0	1	0	9
17:45 - 18:00	0	2	4	1	5	43	26	103	6	23	154	3	1	0	0	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



# Cedar Street @ Park Street – Nelson, BC

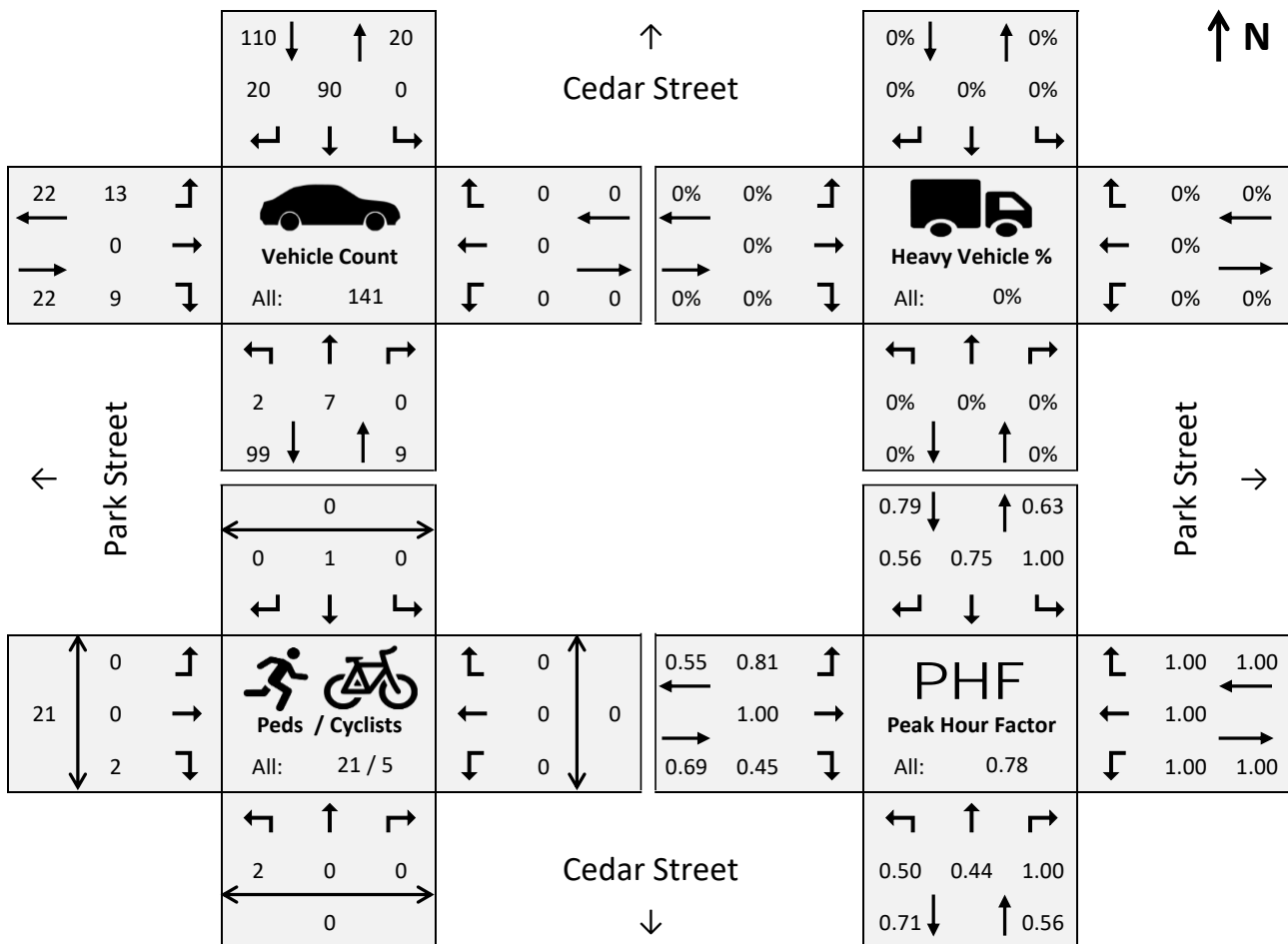
**Project#:** 07-24-0062  
**Date:** Nov 6th, 2024  
**Notes:**

**Weather:** Clear  
**Road Cond:** Dry

**Analysis Period:** 15:15 - 16:15  
**Intersection Peak:** 16:15 - 17:15



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
15:00 - 15:15	2	2	0	0	14	2	1	0	1	0	0	0	0	0	0	3
15:15 - 15:30	1	0	0	0	25	9	4	0	3	0	0	0	0	0	0	3
15:30 - 15:45	0	2	0	0	30	5	3	0	5	0	0	0	0	0	0	16
15:45 - 16:00	0	4	0	0	18	5	4	0	1	0	0	0	0	0	0	1
16:00 - 16:15	1	1	0	0	17	1	2	0	0	0	0	0	0	0	0	1
16:15 - 16:30	0	2	0	1	18	4	3	0	0	0	0	1	0	0	0	2
16:30 - 16:45	0	3	0	0	19	3	2	0	3	0	0	1	0	0	0	6
16:45 - 17:00	2	3	0	0	30	10	3	0	3	0	0	0	0	0	0	5
17:00 - 17:15	0	6	0	0	17	5	6	0	6	0	0	1	0	0	0	5
17:15 - 17:30	1	1	0	0	16	1	0	0	1	1	0	1	0	0	0	1
17:30 - 17:45	0	3	0	0	18	8	3	0	3	0	0	0	0	0	0	5
17:45 - 18:00	0	3	0	0	26	8	1	0	1	0	0	2	0	0	0	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



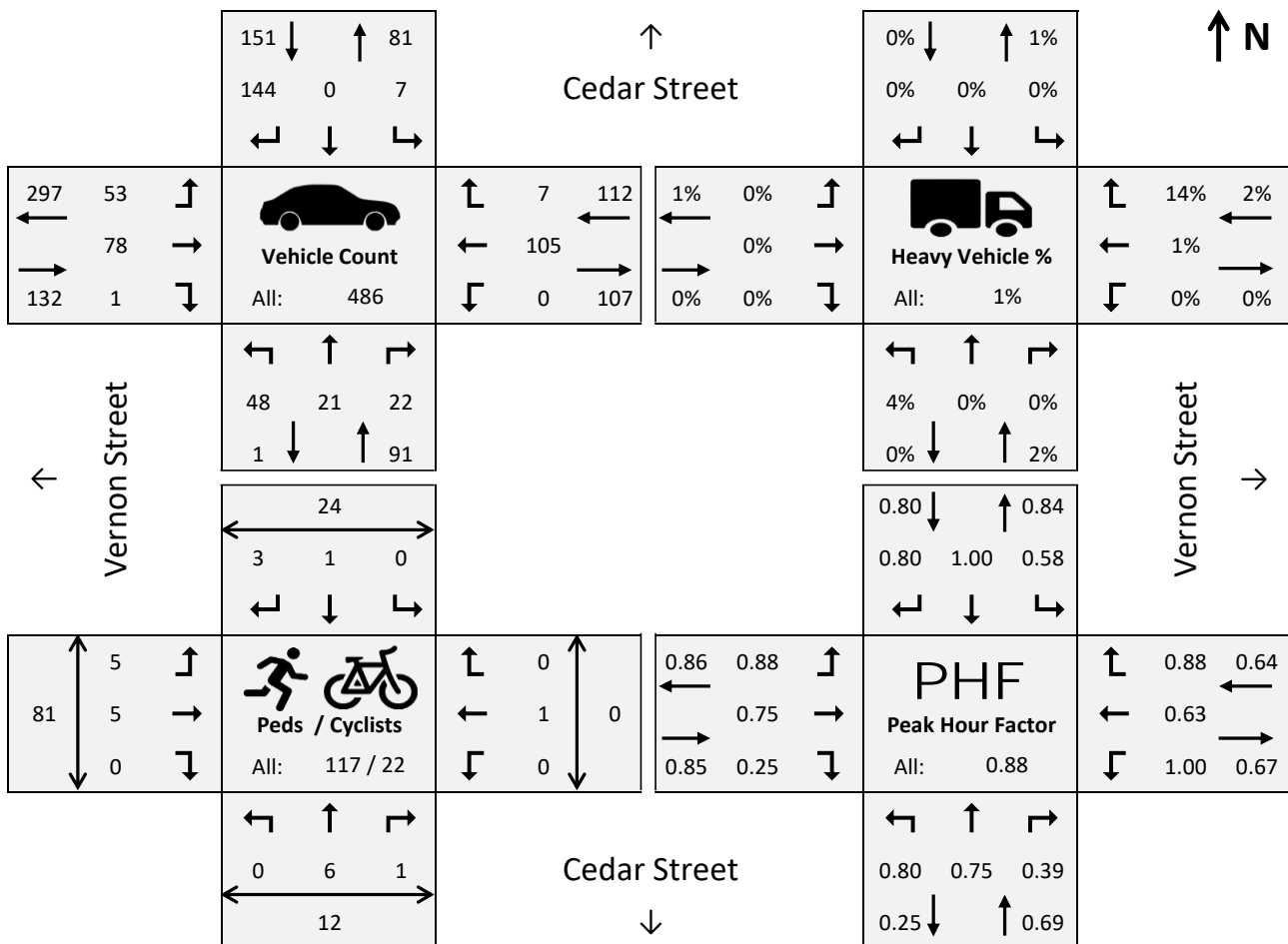


# Vernon Street @ Cedar Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 15:15 - 16:15  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 15:15 - 16:15  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
15:00 - 15:15	11	12	7	0	0	24	10	20	0	0	20	0	2	0	0	19
15:15 - 15:30	7	5	5	1	0	37	15	24	0	0	42	2	3	2	0	13
15:30 - 15:45	13	7	2	2	0	45	15	13	0	0	26	2	10	5	0	32
15:45 - 16:00	13	5	1	3	0	33	11	15	0	0	17	2	7	1	0	19
16:00 - 16:15	15	4	14	1	0	29	12	26	1	0	20	1	4	4	0	17
16:15 - 16:30	12	6	5	0	0	20	11	22	0	0	14	1	2	4	2	16
16:30 - 16:45	8	15	10	0	0	27	17	17	0	0	18	0	5	2	0	9
16:45 - 17:00	6	13	3	1	0	29	14	34	0	0	10	1	6	6	0	18
17:00 - 17:15	10	7	9	5	0	43	12	20	0	0	17	0	4	3	1	18
17:15 - 17:30	5	8	6	4	0	20	15	15	0	0	11	0	6	0	1	12
17:30 - 17:45	3	6	3	1	0	26	10	17	1	0	22	0	6	0	1	16
17:45 - 18:00	8	4	5	3	0	23	8	11	0	0	19	0	2	3	0	18
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

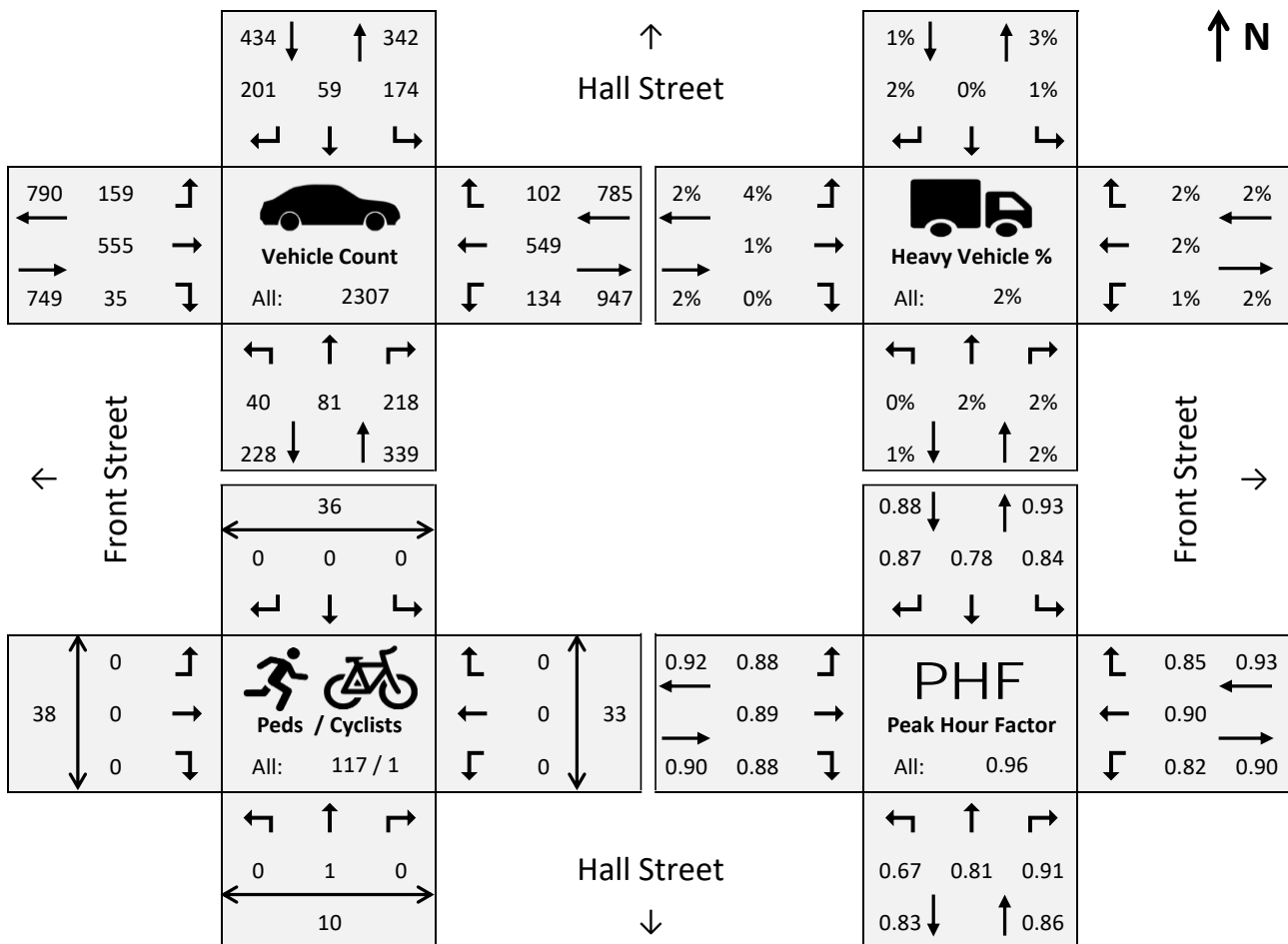


# Front Street @ Hall Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 15:15 - 16:15  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 15:15 - 16:15  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
15:00 - 15:15	5	22	50	32	14	31	30	142	13	28	122	19	8	1	10	11
15:15 - 15:30	9	20	58	45	11	45	43	156	9	37	130	24	12	1	8	14
15:30 - 15:45	4	25	52	52	14	58	45	139	7	29	152	22	7	3	6	10
15:45 - 16:00	12	12	48	36	19	45	34	130	9	41	141	30	9	5	7	6
16:00 - 16:15	15	24	60	41	15	53	37	130	10	27	126	26	8	1	12	8
16:15 - 16:30	10	21	50	42	15	46	44	150	5	33	133	17	9	0	11	6
16:30 - 16:45	4	9	53	31	19	53	41	154	14	28	143	23	5	1	10	2
16:45 - 17:00	12	14	45	46	17	49	33	138	9	34	145	20	3	1	11	8
17:00 - 17:15	8	17	56	44	14	44	27	152	7	39	151	18	5	1	11	1
17:15 - 17:30	7	8	48	23	9	18	18	115	5	34	124	11	7	0	8	1
17:30 - 17:45	7	10	40	28	8	22	26	109	8	27	140	18	3	0	3	3
17:45 - 18:00	3	36	30	19	5	17	47	87	6	33	125	42	3	2	14	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

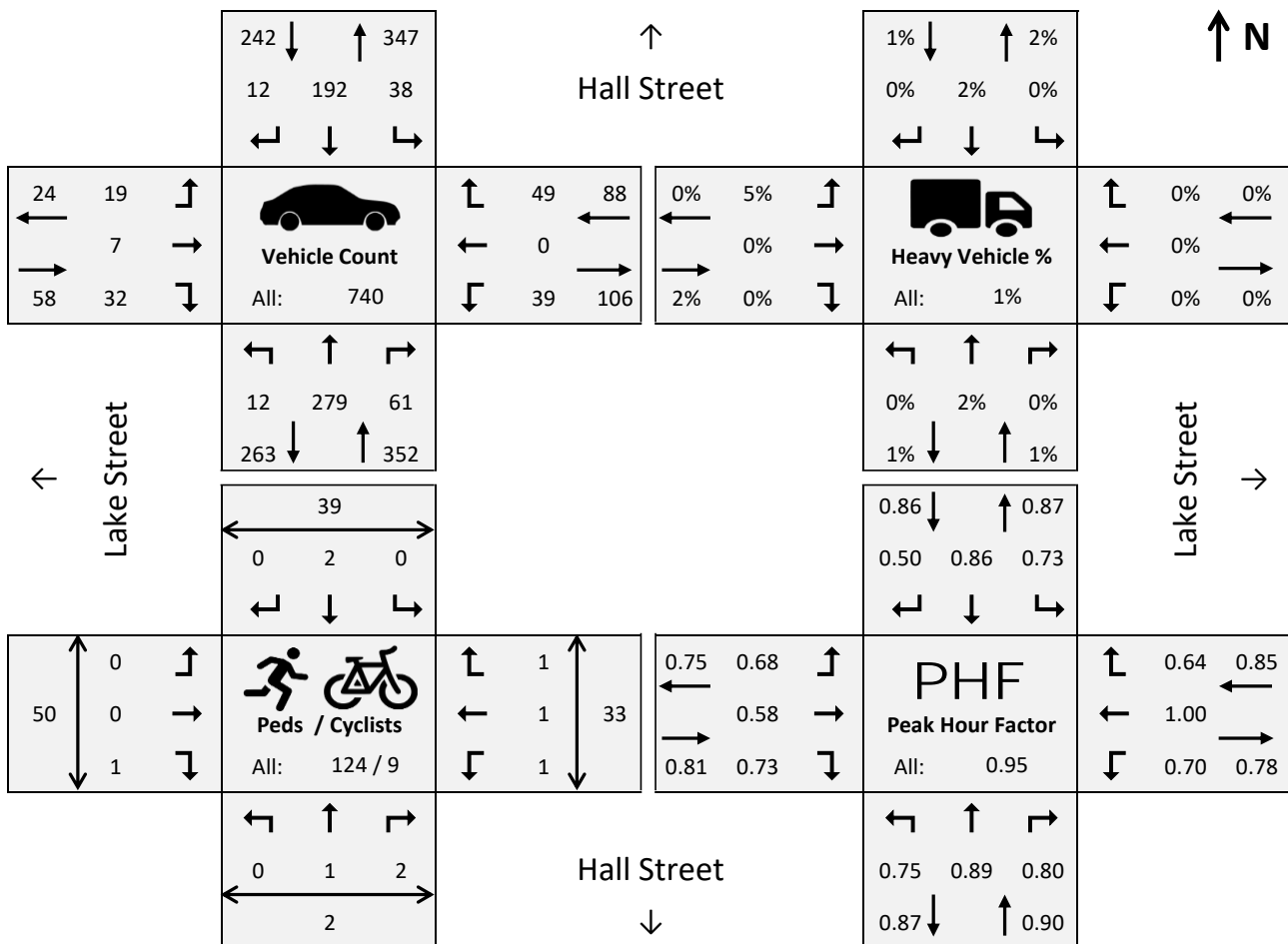


# Hall Street @ Lake Street – Nelson, BC

**Project#:** 07-24-0062      **Weather:** Clear      **Analysis Period:** 15:15 - 16:15  
**Date:** Nov 6th, 2024      **Road Cond:** Dry      **Intersection Peak:** 15:15 - 16:15  
**Notes:**



TIME INTERVAL	AUTOMOBILE COUNT												PEDESTRIANS			
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	N	S	E	W
15:00 - 15:15	1	58	14	6	43	9	4	1	10	10	0	13	9	1	10	9
15:15 - 15:30	4	73	19	13	44	1	7	1	7	14	0	12	23	2	9	24
15:30 - 15:45	4	65	11	9	48	3	3	2	6	10	0	8	5	0	6	13
15:45 - 16:00	2	63	13	8	56	6	6	1	11	9	0	10	4	0	7	5
16:00 - 16:15	2	78	18	8	44	2	3	3	8	6	0	19	7	0	11	8
16:15 - 16:30	6	51	14	9	46	3	7	2	12	13	0	13	5	0	2	5
16:30 - 16:45	3	51	9	13	46	4	6	1	14	11	0	9	2	0	10	4
16:45 - 17:00	5	47	18	12	48	3	5	3	18	11	3	19	10	0	15	8
17:00 - 17:15	1	61	19	10	43	2	7	4	21	8	0	14	8	1	16	4
17:15 - 17:30	2	41	16	8	49	1	7	0	8	13	1	12	5	0	8	5
17:30 - 17:45	0	47	18	7	39	1	3	1	5	11	0	8	5	1	3	2
17:45 - 18:00	5	56	16	9	30	2	1	1	7	12	0	10	7	0	12	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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*The attached information is provided to support the agency's review process  
and shall not be distributed to other parties without written consent from  
Bunt & Associates Engineering Ltd.*










## APPENDIX C

Synchro Reports



Queues  
1: Hall Street & Front Street












Existing AM Traffic  
M'akola Nelson CARES

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	193	476	113	521	128	90	109	104	118
v/c Ratio	0.34	0.37	0.25	0.56	0.16	0.28	0.28	0.39	0.30
Control Delay	6.3	6.0	16.4	18.8	3.7	25.7	7.8	28.6	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	6.0	16.4	18.8	3.7	25.7	7.8	28.6	7.9
Queue Length 50th (m)	7.2	20.8	9.1	51.0	0.0	9.2	0.0	10.9	0.0
Queue Length 95th (m)	17.8	45.8	23.4	95.3	9.4	23.3	12.0	27.2	12.6
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	650	1493	527	1102	925	719	741	588	719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.32	0.21	0.47	0.14	0.13	0.15	0.18	0.16
Intersection Summary									

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















Existing AM Traffic  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	178	426	12	104	479	118	17	66	100	71	25	109
Future Volume (vph)	178	426	12	104	479	118	17	66	100	71	25	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1733	1820		1727	1863	1488		1720	1493		1713	1449
Flt Permitted	0.27	1.00		0.49	1.00	1.00		0.91	1.00		0.72	1.00
Satd. Flow (perm)	485	1820		892	1863	1488		1573	1493		1287	1449
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	193	463	13	113	521	128	18	72	109	77	27	118
RTOR Reduction (vph)	0	1	0	0	0	72	0	0	94	0	0	101
Lane Group Flow (vph)	193	475	0	113	521	56	0	90	15	0	104	17
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	38.2	38.2		24.8	24.8	24.8		8.0	8.0		8.0	8.0
Effective Green, g (s)	38.2	38.2		24.8	24.8	24.8		8.0	8.0		8.0	8.0
Actuated g/C Ratio	0.67	0.67		0.44	0.44	0.44		0.14	0.14		0.14	0.14
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	500	1226		390	814	650		221	210		181	204
v/s Ratio Prot	0.05	c0.26			c0.28							
v/s Ratio Perm	0.21			0.13		0.04		0.06	0.01		c0.08	0.01
v/c Ratio	0.39	0.39		0.29	0.64	0.09		0.41	0.07		0.57	0.08
Uniform Delay, d1	5.4	4.1		10.3	12.5	9.3		22.2	21.1		22.8	21.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.2		0.4	1.7	0.1		1.2	0.1		4.4	0.2
Delay (s)	5.9	4.3		10.7	14.2	9.4		23.4	21.3		27.1	21.3
Level of Service	A	A		B	B	A		C	C		C	C
Approach Delay (s)		4.7			12.9			22.2			24.0	
Approach LOS		A			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			56.7				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			63.2%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street




















Existing AM Traffic  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	11	32	1	23	11	149	59	20	93	23
Future Volume (Veh/h)	9	1	11	32	1	23	11	149	59	20	93	23
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	1	13	39	1	28	13	182	72	24	113	28
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00		1.00					
vC, conflicting volume	476	487	141	452	465	252	154				273	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	471	483	135	448	461	252	148				273	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	92	100	96	99				98	
cM capacity (veh/h)	455	459	904	484	471	769	1424				1281	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	68	267	165								
Volume Left	11	39	13	24								
Volume Right	13	28	72	28								
cSH	614	571	1424	1281								
Volume to Capacity	0.04	0.12	0.01	0.02								
Queue Length 95th (m)	1.0	3.2	0.2	0.5								
Control Delay (s)	11.1	12.2	0.4	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.1	12.2	0.4	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.7								
Intersection Capacity Utilization				29.2%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















Existing AM Traffic  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	111	460	14	63	637	11	1	1	5	10	4	51		
Future Volume (Veh/h)	111	460	14	63	637	11	1	1	5	10	4	51		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			6%			6%			-3%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	121	500	15	68	692	12	1	1	5	11	4	55		
Pedestrians	17						4			10				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	1						0			1				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)	228													
pX, platoon unblocked				1.00			1.00			1.00	1.00	1.00	1.00	
vC, conflicting volume	714				519				1656	1604	512	1592	1605	725
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	714				516				1656	1604	508	1592	1605	725
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.7	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.2	3.3
p0 queue free %	86				94				98	99	99	85	95	87
cM capacity (veh/h)	865				1053				54	84	565	72	74	416
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1								
Volume Total	121	515	68	704	7	70								
Volume Left	121	0	68	0	1	11								
Volume Right	0	15	0	12	5	55								
cSH	865	1700	1053	1700	178	206								
Volume to Capacity	0.14	0.30	0.06	0.41	0.04	0.34								
Queue Length 95th (m)	3.9	0.0	1.7	0.0	1.0	11.4								
Control Delay (s)	9.8	0.0	8.7	0.0	26.0	31.2								
Lane LOS	A			A	D		D							
Approach Delay (s)	1.9			0.8	26.0		31.2							
Approach LOS					D	D								
Intersection Summary														
Average Delay				2.8										
Intersection Capacity Utilization				59.9%	ICU Level of Service				B					
Analysis Period (min)				15										

# HCM Unsignalized Intersection Capacity Analysis

## 4: Cedar Street & Lake Street/Park Street

















Existing AM Traffic  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	1	0	0	3	4	0	1	62	17
Future Volume (Veh/h)	3	0	0	1	0	0	3	4	0	1	62	17
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	0	0	1	0	0	4	5	0	1	74	20
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	116	112	99	103	122	11	106				6	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	116	112	99	103	122	11	106				6	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	844	771	950	869	761	1070	1483				1627	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	1	9	95								
Volume Left	4	1	4	1								
Volume Right	0	0	0	20								
cSH	844	869	1483	1627								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.0	0.1	0.0								
Control Delay (s)	9.3	9.1	3.3	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.3	9.1	3.3	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.8								
Intersection Capacity Utilization				19.0%	ICU Level of Service				A			
Analysis Period (min)				15								












# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

Existing AM Traffic  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	20	58	0	0	100	4	51	16	22	5	0	93												
Future Volume (Veh/h)	20	58	0	0	100	4	51	16	22	5	0	93												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90												
Hourly flow rate (vph)	22	64	0	0	111	4	57	18	24	6	0	103												
Pedestrians	62						14			19														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	5						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	134				78				400	256	78	273	254	194										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	134				78				400	256	78	273	254	194										
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	98				100				87	97	98	99	100	87										
cM capacity (veh/h)	1440				1515				442	623	963	622	626	794										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	86	115	99	109																				
Volume Left	22	0	57	6																				
Volume Right	0	4	24	103																				
cSH	1440	1700	542	782																				
Volume to Capacity	0.02	0.07	0.18	0.14																				
Queue Length 95th (m)	0.4	0.0	5.3	3.9																				
Control Delay (s)	2.0	0.0	13.1	10.3																				
Lane LOS	A		B	B																				
Approach Delay (s)	2.0	0.0	13.1	10.3																				
Approach LOS			B	B																				
Intersection Summary																								
Average Delay				6.4																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				

Queues  
1: Hall Street & Front Street

Existing PM Traffic  
M'akola Nelson CARES

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	166	614	140	572	106	126	227	242	209
v/c Ratio	0.44	0.56	0.48	0.85	0.18	0.34	0.42	0.76	0.41
Control Delay	10.6	11.0	24.7	34.5	4.6	25.7	6.3	42.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	11.0	24.7	34.5	4.6	25.7	6.3	42.4	6.5
Queue Length 50th (m)	9.8	48.0	15.3	74.4	0.0	15.2	0.0	32.9	0.0
Queue Length 95th (m)	19.1	78.7	33.5	#133.5	9.4	30.8	16.2	#67.6	15.7
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	428	1340	365	846	707	479	626	409	600
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.46	0.38	0.68	0.15	0.26	0.36	0.59	0.35






















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















Existing PM Traffic  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	555	35	134	549	102	40	81	218	174	59	201
Future Volume (vph)	159	555	35	134	549	102	40	81	218	174	59	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.91		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1862		1773	1863	1446		1792	1490		1781	1456
Flt Permitted	0.15	1.00		0.43	1.00	1.00		0.83	1.00		0.70	1.00
Satd. Flow (perm)	275	1862		806	1863	1446		1511	1490		1294	1456
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	166	578	36	140	572	106	42	84	227	181	61	209
RTOR Reduction (vph)	0	3	0	0	0	67	0	0	170	0	0	157
Lane Group Flow (vph)	166	611	0	140	572	39	0	126	57	0	242	52
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	40.6	40.6		25.0	25.0	25.0		17.0	17.0		17.0	17.0
Effective Green, g (s)	40.6	40.6		25.0	25.0	25.0		17.0	17.0		17.0	17.0
Actuated g/C Ratio	0.60	0.60		0.37	0.37	0.37		0.25	0.25		0.25	0.25
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	380	1110		295	683	530		377	371		323	363
v/s Ratio Prot	0.06	c0.33			c0.31							
v/s Ratio Perm	0.20			0.17		0.03		0.08	0.04		c0.19	0.04
v/c Ratio	0.44	0.55		0.47	0.84	0.07		0.33	0.15		0.75	0.14
Uniform Delay, d1	9.9	8.3		16.5	19.7	14.0		20.9	19.9		23.6	19.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.6		1.2	8.8	0.1		0.5	0.2		9.2	0.2
Delay (s)	10.7	8.9		17.7	28.5	14.1		21.4	20.1		32.8	20.1
Level of Service	B	A		B	C	B		C	C		C	C
Approach Delay (s)		9.3			24.8			20.6			26.9	
Approach LOS		A			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			19.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			68.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			77.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street




















Existing PM Traffic  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	7	32	39	0	49	12	279	61	38	192	12
Future Volume (Veh/h)	19	7	32	39	0	49	12	279	61	38	192	12
Sign Control	Stop				Stop				Free			
Grade	-3%				3%				12%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	20	7	34	41	0	52	13	294	64	40	202	13
Pedestrians	50				33				2			
Lane Width (m)	3.6				3.6				3.6			
Walking Speed (m/s)	1.2				1.2				1.2			
Percent Blockage	4				3				0			
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	782	756	260	713	730	398	265	391				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	753	726	212	682	700	398	216	391				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	92	98	96	86	100	92	99	97				
cM capacity (veh/h)	241	303	767	294	313	617	1259	1146				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	61	93	371	255								
Volume Left	20	41	13	40								
Volume Right	34	52	64	13								
cSH	406	416	1259	1146								
Volume to Capacity	0.15	0.22	0.01	0.03								
Queue Length 95th (m)	4.2	6.8	0.3	0.9								
Control Delay (s)	15.4	16.1	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	15.4	16.1	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay				3.8								
Intersection Capacity Utilization				47.4%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

Existing PM Traffic  
M'akola Nelson CARES

















													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	230	692	22	86	559	19	1	3	19	5	5	182	
Future Volume (Veh/h)	230	692	22	86	559	19	1	3	19	5	5	182	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			6%			6%			-3%			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Hourly flow rate (vph)	247	744	24	92	601	20	1	3	20	5	5	196	
Pedestrians	38						7			21			
Lane Width (m)	3.6						3.6			3.6			
Walking Speed (m/s)	1.2						1.2			1.2			
Percent Blockage	3						1			2			
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)	228												
pX, platoon unblocked				0.88			0.88			0.88	0.88	0.88	0.88
vC, conflicting volume	642				775		2278		2083	763	2076	2085	670
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	642				678		2383		2161	664	2153	2163	670
tC, single (s)	4.1				4.1		7.1		6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2				2.2		3.5		4.0	3.3	3.5	4.0	3.3
p0 queue free %	73				89		86		89	95	74	81	55
cM capacity (veh/h)	926				810		7		27	406	19	27	438
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	247	768	92	621	24	206							
Volume Left	247	0	92	0	1	5							
Volume Right	0	24	0	20	20	196							
cSH	926	1700	810	1700	79	230							
Volume to Capacity	0.27	0.45	0.11	0.37	0.31	0.89							
Queue Length 95th (m)	8.6	0.0	3.1	0.0	9.1	59.2							
Control Delay (s)	10.3	0.0	10.0	0.0	69.8	79.6							
Lane LOS	B			B	F		F						
Approach Delay (s)	2.5			1.3	69.8		79.6						
Approach LOS					F		F						
Intersection Summary													
Average Delay			11.0										
Intersection Capacity Utilization			70.0%		ICU Level of Service				C				
Analysis Period (min)			15										



# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

Existing PM Traffic  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	9	0	0	0	2	7	0	0	90	20
Future Volume (Veh/h)	13	0	9	0	0	0	2	7	0	0	90	20
Sign Control		Stop			Yield			Free			Free	
Grade		-6%			12%			15%			-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	17	0	12	0	0	0	3	9	0	0	115	26
Pedestrians		21										
Lane Width (m)		3.6										
Walking Speed (m/s)		1.2										
Percent Blockage		2										
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	164	164	149	155	177	9	162			9		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	164	164	149	155	177	9	162			9		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	100	100	100	100			100		
cM capacity (veh/h)	780	718	887	792	705	1079	1404			1624		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	0	12	141								
Volume Left	17	0	3	0								
Volume Right	12	0	0	26								
cSH	821	1700	1404	1624								
Volume to Capacity	0.04	0.00	0.00	0.00								
Queue Length 95th (m)	0.9	0.0	0.1	0.0								
Control Delay (s)	9.5	0.0	1.9	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.5	0.0	1.9	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				19.8%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

Existing PM Traffic  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	53	78	1	0	105	7	48	21	22	7	0	144												
Future Volume (Veh/h)	53	78	1	0	105	7	48	21	22	7	0	144												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	60	89	1	0	119	8	55	24	25	8	0	164												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	151				102				590	372	102	394	369	228										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	151				102				590	372	102	394	369	228										
tC, single (s)	4.1				4.1				7.2	6.5	6.2	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	96				100				81	95	97	98	100	78										
cM capacity (veh/h)	1414				1488				283	520	949	497	524	746										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	150	127	104	172																				
Volume Left	60	0	55	8																				
Volume Right	1	8	25	164																				
cSH	1414	1700	390	729																				
Volume to Capacity	0.04	0.07	0.27	0.24																				
Queue Length 95th (m)	1.1	0.0	8.5	7.3																				
Control Delay (s)	3.3	0.0	17.6	11.5																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.3	0.0	17.6	11.5																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				7.7																				
Intersection Capacity Utilization				Err%	ICU Level of Service				H															
Analysis Period (min)				15																				

Queues  
1: Hall Street & Front Street

AM Background 2028 - Signalized  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	201	495	117	541	134	95	113	108	123
v/c Ratio	0.46	0.40	0.33	0.71	0.19	0.30	0.28	0.42	0.31
Control Delay	8.6	6.8	15.2	20.6	3.6	21.4	5.5	24.6	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	6.8	15.2	20.6	3.6	21.4	5.5	24.6	6.4
Queue Length 50th (m)	7.2	21.2	7.7	43.5	0.0	8.5	0.0	10.0	0.0
Queue Length 95th (m)	18.2	47.2	21.0	#97.5	8.9	19.3	8.6	22.3	10.0
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	438	1277	403	858	755	687	729	562	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.39	0.29	0.63	0.18	0.14	0.16	0.19	0.17






















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

















## 1: Hall Street & Front Street

AM Background 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	443	12	108	498	123	18	69	104	74	26	113
Future Volume (vph)	185	443	12	108	498	123	18	69	104	74	26	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1820		1728	1863	1492		1721	1495		1714	1453
Flt Permitted	0.23	1.00		0.48	1.00	1.00		0.90	1.00		0.72	1.00
Satd. Flow (perm)	421	1820		878	1863	1492		1564	1495		1282	1453
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	482	13	117	541	134	20	75	113	80	28	123
RTOR Reduction (vph)	0	1	0	0	0	79	0	0	95	0	0	104
Lane Group Flow (vph)	201	494	0	117	541	55	0	95	18	0	108	19
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	32.4	32.4		20.7	20.7	20.7		7.9	7.9		7.9	7.9
Effective Green, g (s)	32.4	32.4		20.7	20.7	20.7		7.9	7.9		7.9	7.9
Actuated g/C Ratio	0.64	0.64		0.41	0.41	0.41		0.16	0.16		0.16	0.16
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	428	1160		357	759	607		243	232		199	225
v/s Ratio Prot	0.06	c0.27			c0.29							
v/s Ratio Perm	0.24			0.13		0.04		0.06	0.01		c0.08	0.01
v/c Ratio	0.47	0.43		0.33	0.71	0.09		0.39	0.08		0.54	0.09
Uniform Delay, d1	6.0	4.6		10.3	12.6	9.3		19.3	18.3		19.8	18.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.3		0.5	3.2	0.1		1.0	0.1		3.0	0.2
Delay (s)	6.8	4.8		10.8	15.7	9.3		20.3	18.5		22.8	18.5
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		5.4			13.9			19.3			20.5	
Approach LOS		A			B			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			50.8				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			64.7%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis 2: Hall Street & Lake Street







AM Background 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	11	33	1	24	11	155	61	21	97	24
Future Volume (Veh/h)	9	1	11	33	1	24	11	155	61	21	97	24
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	1	13	40	1	29	13	189	74	26	118	29
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												96
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00	1.00						
vC, conflicting volume	494	506	146	470	483	260	160				282	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	491	503	142	467	480	260	156				282	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	91	100	96	99				98	
cM capacity (veh/h)	440	447	897	470	459	761	1417				1272	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	70	276	173								
Volume Left	11	40	13	26								
Volume Right	13	29	74	29								
cSH	599	559	1417	1272								
Volume to Capacity	0.04	0.13	0.01	0.02								
Queue Length 95th (m)	1.0	3.4	0.2	0.5								
Control Delay (s)	11.3	12.4	0.4	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.3	12.4	0.4	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				30.1%	ICU Level of Service				A			
Analysis Period (min)				15								



Queues  
3: Cedar Street & Front Street




















AM Background 2028 - Signalized  
M'akola Nelson CARES

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	125	536	72	732	7	73
v/c Ratio	0.46	0.53	0.17	0.73	0.02	0.22
Control Delay	10.7	6.8	4.6	10.7	12.5	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	6.8	4.6	10.7	12.5	9.4
Queue Length 50th (m)	3.3	14.9	1.6	24.3	0.1	0.8
Queue Length 95th (m)	13.6	34.5	5.7	58.0	2.8	9.7
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	420	1556	662	1541	895	912
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.34	0.11	0.48	0.01	0.08
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















AM Background 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	478	15	66	662	11	1	1	5	10	4	53
Future Volume (vph)	115	478	15	66	662	11	1	1	5	10	4	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.90			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1714	1803		1748	1784			1651			1650	
Flt Permitted	0.27	1.00		0.42	1.00			0.95			0.95	
Satd. Flow (perm)	488	1803		767	1784			1583			1582	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	520	16	72	720	12	1	1	5	11	4	58
RTOR Reduction (vph)	0	2	0	0	1	0	0	4	0	0	47	0
Lane Group Flow (vph)	125	534	0	72	731	0	0	3	0	0	26	0
Confl. Peds. (#/hr)	10		4	4		10	17					17
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	5%	0%	0%	3%	3%	0%	0%	0%	0%	3%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.3	20.3		20.3	20.3			6.5			6.5	
Effective Green, g (s)	20.3	20.3		20.3	20.3			6.5			6.5	
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.18			0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	276	1022		434	1011			287			287	
v/s Ratio Prot		0.30			c0.41							
v/s Ratio Perm	0.26			0.09				0.00			c0.02	
v/c Ratio	0.45	0.52		0.17	0.72			0.01			0.09	
Uniform Delay, d1	4.5	4.8		3.7	5.7			12.0			12.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.2	0.5		0.2	2.6			0.0			0.1	
Delay (s)	5.7	5.3		3.9	8.3			12.0			12.3	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		5.3			7.9			12.0			12.3	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			7.0			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			35.8			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			63.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

AM Background 2028 - Signalized  
M'akola Nelson CARES

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	3	0	0	1	0	0	3	4	0	1	64	18	
Future Volume (Veh/h)	3	0	0	1	0	0	3	4	0	1	64	18	
Sign Control	Stop			Yield			Free			Free			
Grade	-6%			12%			15%			-9%			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	
Hourly flow rate (vph)	4	0	0	1	0	0	4	5	0	1	76	21	
Pedestrians	12			1			3			5			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	1			0			0			0			
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (m)												60	
pX, platoon unblocked													
vC, conflicting volume	118	114	102	106	125	11	109						6
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	118	114	102	106	125	11	109						6
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	100	100	100	100						100
cM capacity (veh/h)	841	769	947	866	758	1070	1479						1627
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	4	1	9	98									
Volume Left	4	1	4	1									
Volume Right	0	0	0	21									
cSH	841	866	1479	1627									
Volume to Capacity	0.00	0.00	0.00	0.00									
Queue Length 95th (m)	0.1	0.0	0.1	0.0									
Control Delay (s)	9.3	9.2	3.3	0.1									
Lane LOS	A	A	A	A									
Approach Delay (s)	9.3	9.2	3.3	0.1									
Approach LOS	A	A											
Intersection Summary													
Average Delay				0.7									
Intersection Capacity Utilization				19.1%	ICU Level of Service				A				
Analysis Period (min)				15									

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Background 2028 - Signalized  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	21	60	0	0	104	4	53	17	23	5	0	97												
Future Volume (Veh/h)	21	60	0	0	104	4	53	17	23	5	0	97												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90												
Hourly flow rate (vph)	23	67	0	0	116	4	59	19	26	6	0	108												
Pedestrians	62						14			19														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	5						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	139				81				415	266	81	286												
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	139				81				415	266	81	286												
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1												
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5												
p0 queue free %	98				100				86	97	97	99												
cM capacity (veh/h)	1434				1512				428	615	959	608												
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	90	120	104	114																				
Volume Left	23	0	59	6																				
Volume Right	0	4	26	108																				
cSH	1434	1700	531	776																				
Volume to Capacity	0.02	0.07	0.20	0.15																				
Queue Length 95th (m)	0.4	0.0	5.8	4.1																				
Control Delay (s)	2.0	0.0	13.4	10.4																				
Lane LOS	A		B	B																				
Approach Delay (s)	2.0	0.0	13.4	10.4																				
Approach LOS			B	B																				
Intersection Summary																								
Average Delay				6.5																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				

Queues  
1: Hall Street & Front Street

PM Background 2028 - Signalized  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	172	639	145	595	110	132	236	253	218
v/c Ratio	0.58	0.61	0.49	0.85	0.18	0.33	0.42	0.75	0.40
Control Delay	16.7	12.7	22.6	32.3	3.6	21.8	5.6	36.5	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	12.7	22.6	32.3	3.6	21.8	5.6	36.5	5.6
Queue Length 50th (m)	9.8	48.6	13.6	66.7	0.0	13.8	0.0	30.1	0.0
Queue Length 95th (m)	#23.1	86.5	31.6	#127.9	8.0	27.5	14.7	#57.0	14.3
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	297	1176	348	823	705	517	666	442	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.54	0.42	0.72	0.16	0.26	0.35	0.57	0.34

Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















PM Background 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	577	36	139	571	106	42	84	227	181	61	209
Future Volume (vph)	165	577	36	139	571	106	42	84	227	181	61	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.92		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1861		1774	1863	1455		1794	1495		1785	1464
Flt Permitted	0.15	1.00		0.42	1.00	1.00		0.83	1.00		0.70	1.00
Satd. Flow (perm)	274	1861		789	1863	1455		1507	1495		1290	1464
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	172	601	38	145	595	110	44	88	236	189	64	218
RTOR Reduction (vph)	0	3	0	0	0	68	0	0	173	0	0	160
Lane Group Flow (vph)	172	636	0	145	595	42	0	132	63	0	253	58
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.3	35.3		23.7	23.7	23.7		16.5	16.5		16.5	16.5
Effective Green, g (s)	35.3	35.3		23.7	23.7	23.7		16.5	16.5		16.5	16.5
Actuated g/C Ratio	0.57	0.57		0.38	0.38	0.38		0.26	0.26		0.26	0.26
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	298	1054		300	708	553		399	395		341	387
v/s Ratio Prot	0.06	c0.34			c0.32							
v/s Ratio Perm	0.27			0.18		0.03		0.09	0.04		c0.20	0.04
v/c Ratio	0.58	0.60		0.48	0.84	0.08		0.33	0.16		0.74	0.15
Uniform Delay, d1	10.3	8.9		14.7	17.6	12.3		18.5	17.6		21.0	17.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.7	1.0		1.2	8.9	0.1		0.5	0.2		8.4	0.2
Delay (s)	13.0	9.9		15.9	26.4	12.4		18.9	17.8		29.4	17.7
Level of Service	B	A		B	C	B		B	B		C	B
Approach Delay (s)		10.5			22.8			18.2			24.0	
Approach LOS		B			C			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			18.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			62.3				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			79.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street

PM Background 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	7	33	41	0	51	12	290	63	40	200	12
Future Volume (Veh/h)	20	7	33	41	0	51	12	290	63	40	200	12
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	7	35	43	0	54	13	305	66	42	211	13
Pedestrians	50			33			2			39		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	4			3			0			3		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	808	782	270	739	755	410	274	404				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	783	755	224	711	727	410	228	404				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	91	98	95	85	100	91	99	96				
cM capacity (veh/h)	229	292	757	281	302	608	1249	1134				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	63	97	384	266								
Volume Left	21	43	13	42								
Volume Right	35	54	66	13								
cSH	390	401	1249	1134								
Volume to Capacity	0.16	0.24	0.01	0.04								
Queue Length 95th (m)	4.6	7.5	0.3	0.9								
Control Delay (s)	16.0	16.8	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.0	16.8	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay	4.0											
Intersection Capacity Utilization	49.1%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues  
3: Cedar Street & Front Street

PM Background 2028 - Signalized  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	257	799	96	647	26	213
v/c Ratio	0.64	0.69	0.33	0.59	0.09	0.50
Control Delay	14.2	9.0	7.6	7.3	11.6	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.2	9.0	7.6	7.3	11.6	9.0
Queue Length 50th (m)	8.4	27.1	2.4	19.8	0.3	0.8
Queue Length 95th (m)	#38.6	76.2	11.4	55.4	5.7	15.9
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	537	1559	387	1481	728	815
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.51	0.25	0.44	0.04	0.26




















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

















## 3: Cedar Street & Front Street

PM Background 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	720	23	89	581	20	1	3	20	5	5	189
Future Volume (vph)	239	720	23	89	581	20	1	3	20	5	5	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.96	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.89			0.87	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1754	1871		1747	1776			1628			1611	
Flt Permitted	0.35	1.00		0.25	1.00			0.99			0.99	
Satd. Flow (perm)	645	1871		465	1776			1614			1602	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	257	774	25	96	625	22	1	3	22	5	5	203
RTOR Reduction (vph)	0	1	0	0	2	0	0	18	0	0	170	0
Lane Group Flow (vph)	257	798	0	96	645	0	0	8	0	0	43	0
Confl. Peds. (#/hr)	21		7	7		21	38					38
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	2%	1%	0%	0%	3%	5%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7			7.2			7.2	
Effective Green, g (s)	27.7	27.7		27.7	27.7			7.2			7.2	
Actuated g/C Ratio	0.63	0.63		0.63	0.63			0.16			0.16	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	406	1180		293	1120			264			262	
v/s Ratio Prot		c0.43			0.36							
v/s Ratio Perm	0.40			0.21				0.00			c0.03	
v/c Ratio	0.63	0.68		0.33	0.58			0.03			0.17	
Uniform Delay, d1	5.0	5.2		3.8	4.7			15.4			15.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.2	1.5		0.7	0.7			0.0			0.3	
Delay (s)	8.2	6.8		4.4	5.4			15.5			16.1	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		7.1			5.3			15.5			16.1	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			7.5			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			43.9			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			73.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis 4: Cedar Street & Lake Street/Park Street

PM Background 2028 - Signalized  
M'akola Nelson CARES

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	9	0	0	0	2	7	0	0	94	21
Future Volume (Veh/h)	14	0	9	0	0	0	2	7	0	0	94	21
Sign Control	Stop				Yield				Free		Free	
Grade	-6%				12%				15%		-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	18	0	12	0	0	0	3	9	0	0	121	27
Pedestrians	21											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	2											
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												60
pX, platoon unblocked												
vC, conflicting volume	170	170	156	162	184	9	169				9	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	170	170	156	162	184	9	169				9	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	100	100	100	100				100	
cM capacity (veh/h)	772	712	880	784	699	1079	1396				1624	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	0	12	148								
Volume Left	18	0	3	0								
Volume Right	12	0	0	27								
cSH	812	1700	1396	1624								
Volume to Capacity	0.04	0.00	0.00	0.00								
Queue Length 95th (m)	0.9	0.0	0.1	0.0								
Control Delay (s)	9.6	0.0	1.9	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.6	0.0	1.9	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			20.0%	ICU Level of Service				A				
Analysis Period (min)			15									



# HCM Unsignalized Intersection Capacity Analysis

## 5: Cedar Street & Vernon Street

PM Background 2028 - Signalized  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	55	81	1	0	109	7	50	22	23	7	0	150												
Future Volume (Veh/h)	55	81	1	0	109	7	50	22	23	7	0	150												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	62	92	1	0	124	8	57	25	26	8	0	170												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	156				105				608	384	104	407	381	233										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	156				105				608	384	104	407	381	233										
tC, single (s)	4.1				4.1				7.2	6.5	6.2	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	96				100				79	95	97	98	100	77										
cM capacity (veh/h)	1408				1484				272	512	946	485	516	742										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	155	132	108	178																				
Volume Left	62	0	57	8																				
Volume Right	1	8	26	170																				
cSH	1408	1700	378	724																				
Volume to Capacity	0.04	0.08	0.29	0.25																				
Queue Length 95th (m)	1.1	0.0	9.3	7.7																				
Control Delay (s)	3.3	0.0	18.3	11.6																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.3	0.0	18.3	11.6																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				7.9																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				

## Queues

## 1: Hall Street &amp; Front Street

AM Background 2028 - Right Turn

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	201	495	117	540	134	96	114	108	123
v/c Ratio	0.46	0.40	0.33	0.70	0.19	0.31	0.28	0.42	0.31
Control Delay	8.6	6.8	15.2	20.6	3.6	21.5	5.5	24.6	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	6.8	15.2	20.6	3.6	21.5	5.5	24.6	6.4
Queue Length 50th (m)	7.2	21.2	7.7	43.3	0.0	8.6	0.0	10.0	0.0
Queue Length 95th (m)	18.2	47.2	21.0	#97.3	8.9	19.5	8.7	22.3	10.0
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	439	1278	404	860	756	685	730	564	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.39	0.29	0.63	0.18	0.14	0.16	0.19	0.17

## Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street
















AM Background 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	443	12	108	497	123	19	69	105	74	26	113
Future Volume (vph)	185	443	12	108	497	123	19	69	105	74	26	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1820		1728	1863	1492		1721	1495		1714	1453
Flt Permitted	0.23	1.00		0.48	1.00	1.00		0.90	1.00		0.72	1.00
Satd. Flow (perm)	422	1820		878	1863	1492		1557	1495		1281	1453
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	482	13	117	540	134	21	75	114	80	28	123
RTOR Reduction (vph)	0	1	0	0	0	79	0	0	96	0	0	104
Lane Group Flow (vph)	201	494	0	117	540	55	0	96	18	0	108	19
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	32.4	32.4		20.7	20.7	20.7		7.9	7.9		7.9	7.9
Effective Green, g (s)	32.4	32.4		20.7	20.7	20.7		7.9	7.9		7.9	7.9
Actuated g/C Ratio	0.64	0.64		0.41	0.41	0.41		0.16	0.16		0.16	0.16
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	429	1160		357	759	607		242	232		199	225
v/s Ratio Prot	0.06	c0.27			c0.29							
v/s Ratio Perm	0.24			0.13		0.04		0.06	0.01		c0.08	0.01
v/c Ratio	0.47	0.43		0.33	0.71	0.09		0.40	0.08		0.54	0.09
Uniform Delay, d1	6.0	4.6		10.3	12.6	9.3		19.3	18.3		19.8	18.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.3		0.5	3.2	0.1		1.1	0.1		3.0	0.2
Delay (s)	6.8	4.8		10.8	15.7	9.3		20.4	18.5		22.8	18.5
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		5.4			13.9			19.3			20.5	
Approach LOS		A			B			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			50.8				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			64.7%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street



















AM Background 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	11	33	1	26	11	155	61	21	97	24
Future Volume (Veh/h)	9	1	11	33	1	26	11	155	61	21	97	24
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	1	13	40	1	32	13	189	74	26	118	29
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00		1.00					
vC, conflicting volume	497	506	146	470	483	260	160				282	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	494	503	142	467	480	260	156				282	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	91	100	96	99				98	
cM capacity (veh/h)	437	447	897	470	459	761	1417				1272	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	73	276	173								
Volume Left	11	40	13	26								
Volume Right	13	32	74	29								
cSH	596	565	1417	1272								
Volume to Capacity	0.04	0.13	0.01	0.02								
Queue Length 95th (m)	1.0	3.5	0.2	0.5								
Control Delay (s)	11.3	12.3	0.4	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.3	12.3	0.4	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				30.2%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

AM Background 2028 - Right Turn  
M'akola Nelson CARES

















													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	116	478	15	66	662	11	0	0	5	0	0	53	
Future Volume (Veh/h)	116	478	15	66	662	11	0	0	5	0	0	53	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			6%			6%			-3%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	126	520	16	72	720	12	0	0	5	0	0	58	
Pedestrians	17						4			10			
Lane Width (m)	3.6						3.6			3.6			
Walking Speed (m/s)	1.2						1.2			1.2			
Percent Blockage	1						0			1			
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)	228												
pX, platoon unblocked				0.99			0.99			0.99	0.99	0.99	0.99
vC, conflicting volume	742				540				1723	1670	532	1657	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	742				526				1726	1672	518	1659	
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	
tC, 2 stage (s)													
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	
p0 queue free %	85				93				100	100	99	100	
cM capacity (veh/h)	844				1033				48	74	551	64	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	126	536	72	732	5	58							
Volume Left	126	0	72	0	0	0							
Volume Right	0	16	0	12	5	58							
cSH	844	1700	1033	1700	551	401							
Volume to Capacity	0.15	0.32	0.07	0.43	0.01	0.14							
Queue Length 95th (m)	4.2	0.0	1.8	0.0	0.2	4.0							
Control Delay (s)	10.0	0.0	8.7	0.0	11.6	15.5							
Lane LOS	B			A			B	C					
Approach Delay (s)	1.9			0.8			11.6	15.5					
Approach LOS							B	C					
Intersection Summary													
Average Delay				1.9									
Intersection Capacity Utilization				50.8%			ICU Level of Service			A			
Analysis Period (min)				15									



# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

AM Background 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	1	0	0	5	4	0	1	64	18
Future Volume (Veh/h)	3	0	0	1	0	0	5	4	0	1	64	18
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	0	0	1	0	0	6	5	0	1	76	21
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	122	118	102	110	129	11	109				6	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122	118	102	110	129	11	109				6	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	835	764	947	860	753	1070	1479				1627	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	1	11	98								
Volume Left	4	1	6	1								
Volume Right	0	0	0	21								
cSH	835	860	1479	1627								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.0	0.1	0.0								
Control Delay (s)	9.3	9.2	4.1	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.3	9.2	4.1	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.9								
Intersection Capacity Utilization				19.1%	ICU Level of Service			A				
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Background 2028 - Right Turn  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	21	60	0	0	104	4	53	17	23	5	0	97												
Future Volume (Veh/h)	21	60	0	0	104	4	53	17	23	5	0	97												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90												
Hourly flow rate (vph)	23	67	0	0	116	4	59	19	26	6	0	108												
Pedestrians	62						14			19														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	5						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	139				81				415	266	81	286	264	199										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	139				81				415	266	81	286	264	199										
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	98				100				86	97	97	99	100	86										
cM capacity (veh/h)	1434				1512				428	615	959	608	618	789										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	90	120	104	114																				
Volume Left	23	0	59	6																				
Volume Right	0	4	26	108																				
cSH	1434	1700	531	776																				
Volume to Capacity	0.02	0.07	0.20	0.15																				
Queue Length 95th (m)	0.4	0.0	5.8	4.1																				
Control Delay (s)	2.0	0.0	13.4	10.4																				
Lane LOS	A		B	B																				
Approach Delay (s)	2.0	0.0	13.4	10.4																				
Approach LOS			B	B																				
Intersection Summary																								
Average Delay				6.5																				
Intersection Capacity Utilization				Err%	ICU Level of Service				H															
Analysis Period (min)				15																				

## Queues

## 1: Hall Street &amp; Front Street

PM Background 2028 - Right Turn

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	172	639	145	594	110	133	240	253	218
v/c Ratio	0.58	0.61	0.49	0.85	0.18	0.34	0.42	0.75	0.40
Control Delay	16.7	12.7	22.6	32.2	3.7	21.8	5.5	36.6	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	12.7	22.6	32.2	3.7	21.8	5.5	36.6	5.6
Queue Length 50th (m)	9.8	48.6	13.6	66.5	0.0	13.9	0.0	30.2	0.0
Queue Length 95th (m)	#23.1	86.5	31.6	#127.6	8.0	27.6	14.9	#57.2	14.3
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	297	1176	348	824	705	515	669	442	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.54	0.42	0.72	0.16	0.26	0.36	0.57	0.34

## Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















PM Background 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	577	36	139	570	106	43	84	230	181	61	209
Future Volume (vph)	165	577	36	139	570	106	43	84	230	181	61	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.92		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1861		1774	1863	1455		1793	1495		1785	1464
Flt Permitted	0.15	1.00		0.42	1.00	1.00		0.82	1.00		0.70	1.00
Satd. Flow (perm)	273	1861		789	1863	1455		1501	1495		1289	1464
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	172	601	38	145	594	110	45	88	240	189	64	218
RTOR Reduction (vph)	0	3	0	0	0	68	0	0	176	0	0	160
Lane Group Flow (vph)	172	636	0	145	594	42	0	133	64	0	253	58
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.2	35.2		23.6	23.6	23.6		16.5	16.5		16.5	16.5
Effective Green, g (s)	35.2	35.2		23.6	23.6	23.6		16.5	16.5		16.5	16.5
Actuated g/C Ratio	0.57	0.57		0.38	0.38	0.38		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	297	1053		299	706	552		398	396		341	388
v/s Ratio Prot	0.06	c0.34			c0.32							
v/s Ratio Perm	0.27			0.18		0.03		0.09	0.04		c0.20	0.04
v/c Ratio	0.58	0.60		0.48	0.84	0.08		0.33	0.16		0.74	0.15
Uniform Delay, d1	10.3	8.9		14.7	17.6	12.3		18.4	17.5		20.9	17.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.7	1.0		1.2	8.9	0.1		0.5	0.2		8.4	0.2
Delay (s)	13.0	9.9		15.9	26.5	12.4		18.9	17.7		29.3	17.7
Level of Service	B	A		B	C	B		B	B		C	B
Approach Delay (s)		10.5			22.9			18.2			23.9	
Approach LOS		B			C			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			18.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			62.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			79.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street

PM Background 2028 - Right Turn  
M'akola Nelson CARES



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	7	33	41	0	55	12	290	63	40	200	12
Future Volume (Veh/h)	20	7	33	41	0	55	12	290	63	40	200	12
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			3%			12%			-6%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	7	35	43	0	58	13	305	66	42	211	13
Pedestrians		50			33			2			39	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		4			3			0			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											96	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	812	782	270	739	755	410	274			404		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	787	755	224	711	727	410	228			404		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	98	95	85	100	90	99			96		
cM capacity (veh/h)	226	292	757	281	302	608	1249			1134		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	63	101	384	266								
Volume Left	21	43	13	42								
Volume Right	35	58	66	13								
cSH	387	406	1249	1134								
Volume to Capacity	0.16	0.25	0.01	0.04								
Queue Length 95th (m)	4.6	7.7	0.3	0.9								
Control Delay (s)	16.1	16.8	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.1	16.8	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay			4.0									
Intersection Capacity Utilization			49.2%		ICU Level of Service				A			
Analysis Period (min)			15									



# HCM Unsignalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















PM Background 2028 - Right Turn  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	242	720	23	89	581	20	0	0	20	0	0	189		
Future Volume (Veh/h)	242	720	23	89	581	20	0	0	20	0	0	189		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			6%			6%			-3%				
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Hourly flow rate (vph)	260	774	25	96	625	22	0	0	22	0	0	203		
Pedestrians	38						7			21				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	3						1			2				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)	228													
pX, platoon unblocked				0.86			0.86			0.86	0.86	0.86		
vC, conflicting volume	668				806		2372		2174	794	2165	2175	695	
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	668				694		2512		2282	679	2272	2284	695	
tC, single (s)	4.1				4.1		7.1		6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)														
tF (s)	2.2				2.2		3.5		4.0	3.3	3.5	4.0	3.3	
p0 queue free %	71				88		100		100	94	100	100	52	
cM capacity (veh/h)	906				780		6		21	389	16	21	424	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1								
Volume Total	260	799	96	647	22	203								
Volume Left	260	0	96	0	0	0								
Volume Right	0	25	0	22	22	203								
cSH	906	1700	780	1700	389	424								
Volume to Capacity	0.29	0.47	0.12	0.38	0.06	0.48								
Queue Length 95th (m)	9.5	0.0	3.4	0.0	1.4	20.2								
Control Delay (s)	10.6	0.0	10.3	0.0	14.8	21.0								
Lane LOS	B			B			B	C						
Approach Delay (s)	2.6			1.3			14.8	21.0						
Approach LOS							B		C					
Intersection Summary														
Average Delay				4.1										
Intersection Capacity Utilization				53.5%		ICU Level of Service				A				
Analysis Period (min)				15										

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

PM Background 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	9	0	0	0	6	7	0	0	94	21
Future Volume (Veh/h)	14	0	9	0	0	0	6	7	0	0	94	21
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	18	0	12	0	0	0	8	9	0	0	121	27
Pedestrians	21											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	2											
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	180	180	156	172	194	9	169				9	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180	180	156	172	194	9	169				9	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	100	100	100	99				100	
cM capacity (veh/h)	759	701	880	771	688	1079	1396				1624	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	30	0	17	148								
Volume Left	18	0	8	0								
Volume Right	12	0	0	27								
cSH	803	1700	1396	1624								
Volume to Capacity	0.04	0.00	0.01	0.00								
Queue Length 95th (m)	0.9	0.0	0.1	0.0								
Control Delay (s)	9.7	0.0	3.6	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.7	0.0	3.6	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				1.8								
Intersection Capacity Utilization				20.0%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

PM Background 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	81	1	0	109	7	50	22	23	7	0	150
Future Volume (Veh/h)	55	81	1	0	109	7	50	22	23	7	0	150
Sign Control	Free			Free			Stop			Stop		
Grade	-6%			12%			6%			-9%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	62	92	1	0	124	8	57	25	26	8	0	170
Pedestrians	81						12			24		
Lane Width (m)	3.6						3.6			3.6		
Walking Speed (m/s)	1.2						1.2			1.2		
Percent Blockage	7						1			2		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	156			105			608	384	104	407	381	233
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	156			105			608	384	104	407	381	233
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			79	95	97	98	100	77
cM capacity (veh/h)	1408			1484			272	512	946	485	516	742
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	155	132	108	178								
Volume Left	62	0	57	8								
Volume Right	1	8	26	170								
cSH	1408	1700	378	724								
Volume to Capacity	0.04	0.08	0.29	0.25								
Queue Length 95th (m)	1.1	0.0	9.3	7.7								
Control Delay (s)	3.3	0.0	18.3	11.6								
Lane LOS	A		C	B								
Approach Delay (s)	3.3	0.0	18.3	11.6								
Approach LOS			C	B								
Intersection Summary												
Average Delay			7.9									
Intersection Capacity Utilization			Err%	ICU Level of Service					H			
Analysis Period (min)			15									

Queues  
1: Hall Street & Front Street

AM Background 2038 - Signalized  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	221	543	129	593	147	103	124	120	135
v/c Ratio	0.53	0.43	0.37	0.77	0.21	0.31	0.30	0.45	0.33
Control Delay	11.1	7.2	16.4	23.2	3.5	23.3	7.0	27.2	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	7.2	16.4	23.2	3.5	23.3	7.0	27.2	7.1
Queue Length 50th (m)	8.7	26.0	9.2	52.7	0.0	10.1	0.0	12.2	0.0
Queue Length 95th (m)	#23.6	57.2	24.5	#114.6	9.4	22.4	11.4	26.7	11.8
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	414	1320	455	1012	871	673	712	548	696
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.41	0.28	0.59	0.17	0.15	0.17	0.22	0.19






















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















AM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	486	14	119	546	135	19	75	114	81	29	124
Future Volume (vph)	203	486	14	119	546	135	19	75	114	81	29	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1820		1728	1863	1490		1720	1494		1715	1451
Flt Permitted	0.19	1.00		0.46	1.00	1.00		0.90	1.00		0.72	1.00
Satd. Flow (perm)	351	1820		840	1863	1490		1568	1494		1277	1451
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	528	15	129	593	147	21	82	124	88	32	135
RTOR Reduction (vph)	0	1	0	0	0	86	0	0	104	0	0	114
Lane Group Flow (vph)	221	542	0	129	593	61	0	103	20	0	120	21
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.0	35.0		22.4	22.4	22.4		8.5	8.5		8.5	8.5
Effective Green, g (s)	35.0	35.0		22.4	22.4	22.4		8.5	8.5		8.5	8.5
Actuated g/C Ratio	0.65	0.65		0.41	0.41	0.41		0.16	0.16		0.16	0.16
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	409	1179		348	772	618		246	235		201	228
v/s Ratio Prot	0.07	c0.30			c0.32							
v/s Ratio Perm	0.28			0.15		0.04		0.07	0.01		c0.09	0.01
v/c Ratio	0.54	0.46		0.37	0.77	0.10		0.42	0.08		0.60	0.09
Uniform Delay, d1	7.0	4.8		10.9	13.6	9.6		20.5	19.4		21.2	19.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.3		0.7	4.6	0.1		1.2	0.2		4.7	0.2
Delay (s)	8.4	5.0		11.6	18.2	9.7		21.7	19.6		25.9	19.6
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		6.0			15.8			20.5			22.6	
Approach LOS		A			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			13.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			54.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			68.5%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												









# HCM Unsignalized Intersection Capacity Analysis 2: Hall Street & Lake Street

AM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1	13	36	1	26	13	170	67	23	106	26
Future Volume (Veh/h)	10	1	13	36	1	26	13	170	67	23	106	26
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	1	16	44	1	32	16	207	82	28	129	32
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												96
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	542	554	159	518	529	282	174				308	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	528	540	140	503	515	282	155				308	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	98	90	100	96	99				98	
cM capacity (veh/h)	408	419	890	437	432	740	1402				1244	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	77	305	189								
Volume Left	12	44	16	28								
Volume Right	16	32	82	32								
cSH	583	526	1402	1244								
Volume to Capacity	0.05	0.15	0.01	0.02								
Queue Length 95th (m)	1.3	4.1	0.3	0.6								
Control Delay (s)	11.5	13.0	0.5	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.5	13.0	0.5	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.9								
Intersection Capacity Utilization				31.4%	ICU Level of Service				A			
Analysis Period (min)				15								

Queues  
3: Cedar Street & Front Street




















AM Background 2038 - Signalized  
M'akola Nelson CARES

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	138	587	78	803	9	80
v/c Ratio	0.47	0.51	0.17	0.71	0.04	0.28
Control Delay	10.5	6.0	4.2	9.4	12.9	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	6.0	4.2	9.4	12.9	10.8
Queue Length 50th (m)	3.9	17.2	1.7	28.9	0.2	1.4
Queue Length 95th (m)	17.1	40.1	6.3	71.0	3.2	10.5
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	353	1373	551	1357	697	724
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.43	0.14	0.59	0.01	0.11
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















AM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	524	16	72	726	13	1	1	6	11	5	58
Future Volume (vph)	127	524	16	72	726	13	1	1	6	11	5	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.90			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1714	1803		1747	1784			1638			1649	
Flt Permitted	0.26	1.00		0.39	1.00			0.96			0.95	
Satd. Flow (perm)	463	1803		725	1784			1584			1579	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	570	17	78	789	14	1	1	7	12	5	63
RTOR Reduction (vph)	0	1	0	0	1	0	0	6	0	0	53	0
Lane Group Flow (vph)	138	586	0	78	802	0	0	3	0	0	27	0
Confl. Peds. (#/hr)	10		4	4		10	17					17
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	5%	0%	0%	3%	3%	0%	0%	0%	0%	3%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7			6.6			6.6	
Effective Green, g (s)	27.7	27.7		27.7	27.7			6.6			6.6	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.15			0.15	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	1153		463	1141			241			240	
v/s Ratio Prot		0.32			c0.45							
v/s Ratio Perm	0.30			0.11				0.00			c0.02	
v/c Ratio	0.47	0.51		0.17	0.70			0.01			0.11	
Uniform Delay, d1	4.0	4.2		3.1	5.1			15.6			15.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.2	0.4		0.2	2.0			0.0			0.2	
Delay (s)	5.2	4.5		3.3	7.1			15.6			16.0	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		4.6			6.8			15.6			16.0	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		6.3			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		43.3			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		68.1%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

AM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	1	0	0	3	5	0	1	71	19
Future Volume (Veh/h)	3	0	0	1	0	0	3	5	0	1	71	19
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	0	0	1	0	0	4	6	0	1	85	23
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												60
pX, platoon unblocked												
vC, conflicting volume	130	126	112	116	137	12	120				7	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130	126	112	116	137	12	120				7	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	827	758	935	852	746	1069	1466				1625	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	1	10	109								
Volume Left	4	1	4	1								
Volume Right	0	0	0	23								
cSH	827	852	1466	1625								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.0	0.1	0.0								
Control Delay (s)	9.4	9.2	3.0	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.4	9.2	3.0	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.7								
Intersection Capacity Utilization				19.4%	ICU Level of Service			A				
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Background 2038 - Signalized  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	23	66	0	0	114	5	58	18	25	6	0	106		
Future Volume (Veh/h)	23	66	0	0	114	5	58	18	25	6	0	106		
Sign Control	Free			Free			Stop			Stop				
Grade	-6%			12%			6%			-9%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	26	73	0	0	127	6	64	20	28	7	0	118		
Pedestrians	62						14			19				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	5						1			2				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	152				87				449	291	87	312	288	211
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	152				87				449	291	87	312	288	211
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				100				84	97	97	99	100	85
cM capacity (veh/h)	1418				1504				399	594	952	580	598	777
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	99	133	112	125										
Volume Left	26	0	64	7										
Volume Right	0	6	28	118										
cSH	1418	1700	501	762										
Volume to Capacity	0.02	0.08	0.22	0.16										
Queue Length 95th (m)	0.4	0.0	6.8	4.7										
Control Delay (s)	2.1	0.0	14.2	10.6										
Lane LOS	A		B	B										
Approach Delay (s)	2.1	0.0	14.2	10.6										
Approach LOS			B	B										
Intersection Summary														
Average Delay				6.7										
Intersection Capacity Utilization				Err%	ICU Level of Service			H						
Analysis Period (min)				15										



Queues  
1: Hall Street & Front Street

PM Background 2038 - Signalized  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	189	701	159	652	121	144	259	276	239
v/c Ratio	0.69	0.65	0.55	0.87	0.19	0.39	0.46	0.82	0.43
Control Delay	25.0	13.5	25.1	34.1	3.8	25.1	7.2	46.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	13.5	25.1	34.1	3.8	25.1	7.2	46.0	6.0
Queue Length 50th (m)	12.1	63.0	17.0	83.7	0.0	17.1	2.4	37.6	0.0
Queue Length 95th (m)	#39.1	98.6	36.7	#144.6	9.0	32.9	19.3	#76.0	15.9
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	275	1205	336	872	735	439	626	397	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.58	0.47	0.75	0.16	0.33	0.41	0.70	0.39






















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















PM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	633	40	153	626	116	46	92	249	198	67	229
Future Volume (vph)	181	633	40	153	626	116	46	92	249	198	67	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.91		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1861		1775	1863	1446		1793	1490		1782	1456
Flt Permitted	0.12	1.00		0.39	1.00	1.00		0.77	1.00		0.69	1.00
Satd. Flow (perm)	224	1861		720	1863	1446		1410	1490		1275	1456
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	189	659	42	159	652	121	48	96	259	206	70	239
RTOR Reduction (vph)	0	3	0	0	0	72	0	0	174	0	0	175
Lane Group Flow (vph)	189	698	0	159	652	49	0	144	85	0	276	64
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	39.7	39.7		27.6	27.6	27.6		18.2	18.2		18.2	18.2
Effective Green, g (s)	39.7	39.7		27.6	27.6	27.6		18.2	18.2		18.2	18.2
Actuated g/C Ratio	0.58	0.58		0.40	0.40	0.40		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	275	1080		290	751	583		375	396		339	387
v/s Ratio Prot	0.07	c0.38			c0.35							
v/s Ratio Perm	0.33			0.22		0.03		0.10	0.06		c0.22	0.04
v/c Ratio	0.69	0.65		0.55	0.87	0.08		0.38	0.21		0.81	0.16
Uniform Delay, d1	12.1	9.6		15.6	18.7	12.6		20.5	19.5		23.5	19.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.0	1.3		2.1	10.4	0.1		0.7	0.3		13.9	0.2
Delay (s)	19.0	11.0		17.7	29.1	12.7		21.2	19.8		37.4	19.5
Level of Service	B	B		B	C	B		C	B		D	B
Approach Delay (s)		12.7			25.1			20.3			29.1	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			68.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			83.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street

PM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	8	36	44	0	56	14	318	70	43	219	14
Future Volume (Veh/h)	22	8	36	44	0	56	14	318	70	43	219	14
Sign Control	Stop				Stop				Free			
Grade	-3%				3%				12%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	8	38	46	0	59	15	335	74	45	231	15
Pedestrians	50				33				2			
Lane Width (m)	3.6				3.6				3.6			
Walking Speed (m/s)	1.2				1.2				1.2			
Percent Blockage	4				3				0			
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	878	850	290	808	821	444	296	442				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	850	821	235	776	790	444	241	442				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	89	97	95	81	100	90	99	96				
cM capacity (veh/h)	201	263	740	248	274	581	1226	1098				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	105	424	291								
Volume Left	23	46	15	45								
Volume Right	38	59	74	15								
cSH	352	366	1226	1098								
Volume to Capacity	0.20	0.29	0.01	0.04								
Queue Length 95th (m)	5.7	9.3	0.3	1.0								
Control Delay (s)	17.7	18.7	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	17.7	18.7	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay	4.3											
Intersection Capacity Utilization	51.2%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues  
3: Cedar Street & Front Street

PM Background 2038 - Signalized  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	282	875	105	709	28	235
v/c Ratio	0.69	0.69	0.36	0.59	0.11	0.57
Control Delay	16.7	8.6	7.8	6.9	13.5	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	8.6	7.8	6.9	13.5	11.0
Queue Length 50th (m)	10.6	32.8	2.8	23.6	0.4	1.2
Queue Length 95th (m)	#65.6	93.6	13.5	66.7	6.8	18.9
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	515	1598	368	1517	607	723
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.55	0.29	0.47	0.05	0.33




















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















PM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	262	789	25	98	637	22	1	3	22	6	6	207
Future Volume (vph)	262	789	25	98	637	22	1	3	22	6	6	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.95	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.88			0.87	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1753	1871		1747	1776			1626			1603	
Flt Permitted	0.33	1.00		0.23	1.00			0.98			0.99	
Satd. Flow (perm)	603	1871		430	1776			1600			1592	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	282	848	27	105	685	24	1	3	24	6	6	223
RTOR Reduction (vph)	0	1	0	0	2	0	0	21	0	0	191	0
Lane Group Flow (vph)	282	874	0	105	707	0	0	7	0	0	44	0
Confl. Peds. (#/hr)	21		7	7		21	38					38
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	2%	1%	0%	0%	3%	5%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	36.2	36.2		36.2	36.2			7.6			7.6	
Effective Green, g (s)	36.2	36.2		36.2	36.2			7.6			7.6	
Actuated g/C Ratio	0.69	0.69		0.69	0.69			0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	413	1282		294	1217			230			229	
v/s Ratio Prot		0.47			0.40							
v/s Ratio Perm	c0.47			0.24				0.00			c0.03	
v/c Ratio	0.68	0.68		0.36	0.58			0.03			0.19	
Uniform Delay, d1	4.9	4.9		3.5	4.3			19.4			19.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	4.6	1.5		0.7	0.7			0.1			0.4	
Delay (s)	9.5	6.4		4.2	5.1			19.5			20.3	
Level of Service	A	A		A	A			B			C	
Approach Delay (s)		7.2			4.9			19.5			20.3	
Approach LOS		A			A			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		7.9						HCM 2000 Level of Service		A		
HCM 2000 Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		52.8						Sum of lost time (s)		9.0		
Intersection Capacity Utilization		79.5%						ICU Level of Service		D		
Analysis Period (min)		15										
c Critical Lane Group												



















# HCM Unsignalized Intersection Capacity Analysis 4: Cedar Street & Lake Street/Park Street

PM Background 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	10	0	0	0	2	8	0	0	103	23
Future Volume (Veh/h)	15	0	10	0	0	0	2	8	0	0	103	23
Sign Control		Stop			Yield			Free			Free	
Grade		-6%			12%			15%			-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	19	0	13	0	0	0	3	10	0	0	132	29
Pedestrians		21										
Lane Width (m)		3.6										
Walking Speed (m/s)		1.2										
Percent Blockage		2										
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											60	
pX, platoon unblocked												
vC, conflicting volume	184	184	168	176	198	10	182			10		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184	184	168	176	198	10	182			10		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	99	100	100	100	100			100		
cM capacity (veh/h)	757	701	867	767	687	1077	1381			1623		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	32	0	13	161								
Volume Left	19	0	3	0								
Volume Right	13	0	0	29								
cSH	798	1700	1381	1623								
Volume to Capacity	0.04	0.00	0.00	0.00								
Queue Length 95th (m)	1.0	0.0	0.1	0.0								
Control Delay (s)	9.7	0.0	1.8	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.7	0.0	1.8	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				20.3%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

PM Background 2038 - Signalized  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	60	89	1	0	120	8	55	24	25	8	0	164												
Future Volume (Veh/h)	60	89	1	0	120	8	55	24	25	8	0	164												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	68	101	1	0	136	9	62	27	28	9	0	186												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	169				114				657	418	114	444	414	246										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	169				114				657	418	114	444	414	246										
tC, single (s)	4.1				4.1				7.2	6.5	6.2	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	95				100				74	94	97	98	100	75										
cM capacity (veh/h)	1392				1473				242	487	935	454	491	730										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	170	145	117	195																				
Volume Left	68	0	62	9																				
Volume Right	1	9	28	186																				
cSH	1392	1700	343	710																				
Volume to Capacity	0.05	0.09	0.34	0.27																				
Queue Length 95th (m)	1.2	0.0	11.8	8.9																				
Control Delay (s)	3.3	0.0	20.8	12.0																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.3	0.0	20.8	12.0																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				8.5																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				

Queues  
1: Hall Street & Front Street

AM Background 2038 - Right Turn  
M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	221	543	129	592	147	105	125	120	135
v/c Ratio	0.53	0.43	0.37	0.77	0.21	0.32	0.30	0.45	0.33
Control Delay	11.0	7.2	16.4	23.2	3.5	23.5	7.0	27.2	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	7.2	16.4	23.2	3.5	23.5	7.0	27.2	7.1
Queue Length 50th (m)	8.7	26.0	9.2	52.4	0.0	10.3	0.0	12.2	0.0
Queue Length 95th (m)	#23.5	57.2	24.5	#114.3	9.4	22.9	11.5	26.7	11.8
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	415	1321	456	1014	872	670	714	548	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.41	0.28	0.58	0.17	0.16	0.18	0.22	0.19






















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















AM Background 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	486	14	119	545	135	21	75	115	81	29	124
Future Volume (vph)	203	486	14	119	545	135	21	75	115	81	29	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1820		1728	1863	1490		1721	1494		1715	1451
Flt Permitted	0.19	1.00		0.46	1.00	1.00		0.89	1.00		0.72	1.00
Satd. Flow (perm)	352	1820		840	1863	1490		1555	1494		1275	1451
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	528	15	129	592	147	23	82	125	88	32	135
RTOR Reduction (vph)	0	1	0	0	0	86	0	0	105	0	0	114
Lane Group Flow (vph)	221	542	0	129	592	61	0	105	20	0	120	21
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.0	35.0		22.4	22.4	22.4		8.5	8.5		8.5	8.5
Effective Green, g (s)	35.0	35.0		22.4	22.4	22.4		8.5	8.5		8.5	8.5
Actuated g/C Ratio	0.65	0.65		0.41	0.41	0.41		0.16	0.16		0.16	0.16
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	409	1179		348	772	618		244	235		200	228
v/s Ratio Prot	0.07	c0.30			c0.32							
v/s Ratio Perm	0.28			0.15		0.04		0.07	0.01		c0.09	0.01
v/c Ratio	0.54	0.46		0.37	0.77	0.10		0.43	0.08		0.60	0.09
Uniform Delay, d1	7.0	4.8		10.9	13.6	9.6		20.6	19.4		21.2	19.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.3		0.7	4.6	0.1		1.2	0.2		4.8	0.2
Delay (s)	8.4	5.0		11.6	18.1	9.7		21.8	19.6		26.0	19.6
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		6.0			15.7			20.6			22.6	
Approach LOS		A			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			13.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			54.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			68.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street

AM Background 2038 - Right Turn  
M'akola Nelson CARES


















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1	13	36	1	29	13	170	67	23	106	26
Future Volume (Veh/h)	10	1	13	36	1	29	13	170	67	23	106	26
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	1	16	44	1	35	16	207	82	28	129	32
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	544	554	159	518	529	282	174				308	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	531	540	140	503	515	282	155				308	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	98	90	100	95	99				98	
cM capacity (veh/h)	405	419	890	437	432	740	1402				1244	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	80	305	189								
Volume Left	12	44	16	28								
Volume Right	16	35	82	32								
cSH	580	532	1402	1244								
Volume to Capacity	0.05	0.15	0.01	0.02								
Queue Length 95th (m)	1.3	4.2	0.3	0.6								
Control Delay (s)	11.5	13.0	0.5	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.5	13.0	0.5	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.9								
Intersection Capacity Utilization				31.5%	ICU Level of Service				A			
Analysis Period (min)				15								



# HCM Unsignalized Intersection Capacity Analysis

















## 3: Cedar Street & Front Street

AM Background 2038 - Right Turn  
M'akola Nelson CARES

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Traffic Volume (veh/h)	128	524	16	72	726	13	0	0	6	0	0	58						
Future Volume (Veh/h)	128	524	16	72	726	13	0	0	6	0	0	58						
Sign Control	Free			Free			Stop			Stop								
Grade	0%			6%			6%			-3%								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92						
Hourly flow rate (vph)	139	570	17	78	789	14	0	0	7	0	0	63						
Pedestrians	17						4			10								
Lane Width (m)	3.6						3.6			3.6								
Walking Speed (m/s)	1.2						1.2			1.2								
Percent Blockage	1						0			1								
Right turn flare (veh)																		
Median type	None			None														
Median storage (veh)																		
Upstream signal (m)	228																	
pX, platoon unblocked				0.95			0.95			0.95	0.95	0.95	0.95					
vC, conflicting volume	813				591				1886	1830	582	1817	1831	823				
vC1, stage 1 conf vol																		
vC2, stage 2 conf vol																		
vCu, unblocked vol	813				547				1904	1846	538	1832	1847	823				
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2				
tC, 2 stage (s)																		
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3				
p0 queue free %	82				92				100	100	99	100	100	83				
cM capacity (veh/h)	794				982				33	54	520	45	53	365				
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1												
Volume Total	139	587	78	803	7	63												
Volume Left	139	0	78	0	0	0												
Volume Right	0	17	0	14	7	63												
cSH	794	1700	982	1700	520	365												
Volume to Capacity	0.18	0.35	0.08	0.47	0.01	0.17												
Queue Length 95th (m)	5.1	0.0	2.1	0.0	0.3	4.9												
Control Delay (s)	10.5	0.0	9.0	0.0	12.0	16.9												
Lane LOS	B		A		B	C												
Approach Delay (s)	2.0			0.8	12.0	16.9												
Approach LOS					B	C												
Intersection Summary																		
Average Delay				2.0														
Intersection Capacity Utilization				54.4%	ICU Level of Service				A									
Analysis Period (min)				15														

















# HCM Unsignalized Intersection Capacity Analysis 4: Cedar Street & Lake Street/Park Street

AM Background 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	1	0	0	6	5	0	1	71	19
Future Volume (Veh/h)	3	0	0	1	0	0	6	5	0	1	71	19
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	0	0	1	0	0	7	6	0	1	85	23
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	136	132	112	122	143	12	120				7	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136	132	112	122	143	12	120				7	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	819	751	935	843	739	1069	1466				1625	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	1	13	109								
Volume Left	4	1	7	1								
Volume Right	0	0	0	23								
cSH	819	843	1466	1625								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.0	0.1	0.0								
Control Delay (s)	9.4	9.3	4.0	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.4	9.3	4.0	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.8								
Intersection Capacity Utilization				19.4%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Background 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	66	0	0	114	5	58	18	25	6	0	106
Future Volume (Veh/h)	23	66	0	0	114	5	58	18	25	6	0	106
Sign Control		Free			Free			Stop			Stop	
Grade		-6%			12%			6%			-9%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	26	73	0	0	127	6	64	20	28	7	0	118
Pedestrians		62						14			19	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		5						1			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	152			87			449	291	87	312	288	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	152			87			449	291	87	312	288	211
tC, single (s)	4.1			4.1			7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			84	97	97	99	100	85
cM capacity (veh/h)	1418			1504			399	594	952	580	598	777
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	99	133	112	125								
Volume Left	26	0	64	7								
Volume Right	0	6	28	118								
cSH	1418	1700	501	762								
Volume to Capacity	0.02	0.08	0.22	0.16								
Queue Length 95th (m)	0.4	0.0	6.8	4.7								
Control Delay (s)	2.1	0.0	14.2	10.6								
Lane LOS	A		B	B								
Approach Delay (s)	2.1	0.0	14.2	10.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			Err%	ICU Level of Service					H			
Analysis Period (min)			15									

## Queues

## 1: Hall Street &amp; Front Street

PM Background 2038 - Right Turn

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	189	701	159	651	121	145	263	276	239
v/c Ratio	0.69	0.65	0.55	0.87	0.19	0.39	0.46	0.82	0.43
Control Delay	25.0	13.6	25.1	34.0	3.8	25.2	7.5	46.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	13.6	25.1	34.0	3.8	25.2	7.5	46.0	5.9
Queue Length 50th (m)	12.1	63.0	17.0	83.4	0.0	17.3	2.8	37.6	0.0
Queue Length 95th (m)	#39.1	98.6	36.7	#144.3	9.0	33.2	20.0	#76.1	15.9
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	275	1205	336	872	735	436	626	396	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.58	0.47	0.75	0.16	0.33	0.42	0.70	0.39

## Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

PM Background 2038 - Right Turn  
M'akola Nelson CARES
















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	633	40	153	625	116	47	92	252	198	67	229
Future Volume (vph)	181	633	40	153	625	116	47	92	252	198	67	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.91		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1861		1775	1863	1446		1793	1490		1782	1456
Flt Permitted	0.12	1.00		0.39	1.00	1.00		0.77	1.00		0.69	1.00
Satd. Flow (perm)	225	1861		720	1863	1446		1398	1490		1274	1456
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	189	659	42	159	651	121	49	96	262	206	70	239
RTOR Reduction (vph)	0	3	0	0	0	72	0	0	174	0	0	175
Lane Group Flow (vph)	189	698	0	159	651	49	0	145	89	0	276	64
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	39.7	39.7		27.6	27.6	27.6		18.2	18.2		18.2	18.2
Effective Green, g (s)	39.7	39.7		27.6	27.6	27.6		18.2	18.2		18.2	18.2
Actuated g/C Ratio	0.58	0.58		0.40	0.40	0.40		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	276	1080		290	751	583		371	396		338	387
v/s Ratio Prot	0.07	c0.38			c0.35							
v/s Ratio Perm	0.33			0.22		0.03		0.10	0.06		c0.22	0.04
v/c Ratio	0.68	0.65		0.55	0.87	0.08		0.39	0.22		0.82	0.16
Uniform Delay, d1	12.0	9.6		15.6	18.7	12.6		20.6	19.6		23.5	19.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	6.9	1.3		2.1	10.3	0.1		0.7	0.3		14.1	0.2
Delay (s)	18.9	11.0		17.7	29.0	12.7		21.2	19.9		37.6	19.5
Level of Service	B	B		B	C	B		C	B		D	B
Approach Delay (s)		12.7			25.0			20.4			29.2	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.1				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			68.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			84.1%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												



# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street



















PM Background 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	8	36	44	0	60	14	318	70	43	219	14
Future Volume (Veh/h)	22	8	36	44	0	60	14	318	70	43	219	14
Sign Control	Stop				Stop				Free			
Grade	-3%				3%				12%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	8	38	46	0	63	15	335	74	45	231	15
Pedestrians	50				33				2			
Lane Width (m)	3.6				3.6				3.6			
Walking Speed (m/s)	1.2				1.2				1.2			
Percent Blockage	4				3				0			
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	882	850	290	808	821	444	296	442				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	854	821	235	776	790	444	241	442				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	88	97	95	81	100	89	99	96				
cM capacity (veh/h)	198	263	740	248	274	581	1226	1098				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	109	424	291								
Volume Left	23	46	15	45								
Volume Right	38	63	74	15								
cSH	349	371	1226	1098								
Volume to Capacity	0.20	0.29	0.01	0.04								
Queue Length 95th (m)	5.8	9.6	0.3	1.0								
Control Delay (s)	17.8	18.7	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	17.8	18.7	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay				4.4								
Intersection Capacity Utilization				51.3%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

















## 3: Cedar Street & Front Street

PM Background 2038 - Right Turn  
M'akola Nelson CARES

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Traffic Volume (veh/h)	266	789	25	98	637	22	0	0	22	0	0	207			
Future Volume (Veh/h)	266	789	25	98	637	22	0	0	22	0	0	207			
Sign Control	Free			Free			Stop			Stop					
Grade	0%			6%			6%			-3%					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Hourly flow rate (vph)	286	848	27	105	685	24	0	0	24	0	0	223			
Pedestrians	38						7			21					
Lane Width (m)	3.6						3.6			3.6					
Walking Speed (m/s)	1.2						1.2			1.2					
Percent Blockage	3						1			2					
Right turn flare (veh)															
Median type	None			None											
Median storage (veh)															
Upstream signal (m)	228														
pX, platoon unblocked				0.82			0.82			0.82	0.82	0.82	0.82		
vC, conflicting volume	730				882			2596			2380	868	2372	2382	756
vC1, stage 1 conf vol															
vC2, stage 2 conf vol															
vCu, unblocked vol	730				747			2835			2572	731	2562	2574	756
tC, single (s)	4.1				4.1			7.1			6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)															
tF (s)	2.2				2.2			3.5			4.0	3.3	3.5	4.0	3.3
p0 queue free %	67				85			100			100	93	100	100	43
cM capacity (veh/h)	859				710			2			12	347	9	12	392
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1									
Volume Total	286	875	105	709	24	223									
Volume Left	286	0	105	0	0	0									
Volume Right	0	27	0	24	24	223									
cSH	859	1700	710	1700	347	392									
Volume to Capacity	0.33	0.51	0.15	0.42	0.07	0.57									
Queue Length 95th (m)	11.7	0.0	4.1	0.0	1.8	27.3									
Control Delay (s)	11.3	0.0	10.9	0.0	16.2	25.7									
Lane LOS	B			B	C		D								
Approach Delay (s)	2.8			1.4	16.2		25.7								
Approach LOS					C		D								
Intersection Summary															
Average Delay				4.7											
Intersection Capacity Utilization				57.7%			ICU Level of Service			B					
Analysis Period (min)				15											

















# HCM Unsignalized Intersection Capacity Analysis 4: Cedar Street & Lake Street/Park Street

PM Background 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	10	0	0	0	7	8	0	0	103	23
Future Volume (Veh/h)	15	0	10	0	0	0	7	8	0	0	103	23
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	19	0	13	0	0	0	9	10	0	0	132	29
Pedestrians	21											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	2											
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	196	196	168	188	210	10	182				10	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196	196	168	188	210	10	182				10	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	100	100	100	99				100	
cM capacity (veh/h)	741	687	867	751	673	1077	1381				1623	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	32	0	19	161								
Volume Left	19	0	9	0								
Volume Right	13	0	0	29								
cSH	788	1700	1381	1623								
Volume to Capacity	0.04	0.00	0.01	0.00								
Queue Length 95th (m)	1.0	0.0	0.2	0.0								
Control Delay (s)	9.8	0.0	3.6	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.8	0.0	3.6	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				1.8								
Intersection Capacity Utilization				20.3%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

PM Background 2038 - Right Turn  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	60	89	1	0	120	8	55	24	25	8	0	164												
Future Volume (Veh/h)	60	89	1	0	120	8	55	24	25	8	0	164												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	68	101	1	0	136	9	62	27	28	9	0	186												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	169				114				657	418	114	444	414	246										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	169				114				657	418	114	444	414	246										
tC, single (s)	4.1				4.1				7.2	6.5	6.2	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	95				100				74	94	97	98	100	75										
cM capacity (veh/h)	1392				1473				242	487	935	454	491	730										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	170	145	117	195																				
Volume Left	68	0	62	9																				
Volume Right	1	9	28	186																				
cSH	1392	1700	343	710																				
Volume to Capacity	0.05	0.09	0.34	0.27																				
Queue Length 95th (m)	1.2	0.0	11.8	8.9																				
Control Delay (s)	3.3	0.0	20.8	12.0																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.3	0.0	20.8	12.0																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				8.5																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				

## Queues

## 1: Hall Street &amp; Front Street

AM Total 2028 - Signalized

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	201	496	118	546	137	95	113	108	123
v/c Ratio	0.46	0.40	0.33	0.71	0.20	0.31	0.28	0.42	0.31
Control Delay	8.7	6.8	15.2	20.8	3.6	21.4	5.5	24.7	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	6.8	15.2	20.8	3.6	21.4	5.5	24.7	6.4
Queue Length 50th (m)	7.2	21.2	7.8	44.0	0.0	8.5	0.0	10.0	0.0
Queue Length 95th (m)	18.2	47.5	21.3	#99.0	9.0	19.3	8.6	22.3	10.0
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	435	1271	401	854	754	683	726	560	704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.39	0.29	0.64	0.18	0.14	0.16	0.19	0.17

## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.






















Queue shown is maximum after two cycles.



# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















AM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	444	12	109	502	126	18	69	104	74	26	113
Future Volume (vph)	185	444	12	109	502	126	18	69	104	74	26	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1820		1728	1863	1492		1721	1495		1714	1453
Flt Permitted	0.23	1.00		0.48	1.00	1.00		0.90	1.00		0.72	1.00
Satd. Flow (perm)	417	1820		877	1863	1492		1564	1495		1282	1453
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	483	13	118	546	137	20	75	113	80	28	123
RTOR Reduction (vph)	0	1	0	0	0	81	0	0	95	0	0	104
Lane Group Flow (vph)	201	495	0	118	546	56	0	95	18	0	108	19
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	32.6	32.6		20.9	20.9	20.9		7.9	7.9		7.9	7.9
Effective Green, g (s)	32.6	32.6		20.9	20.9	20.9		7.9	7.9		7.9	7.9
Actuated g/C Ratio	0.64	0.64		0.41	0.41	0.41		0.15	0.15		0.15	0.15
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	426	1163		359	763	611		242	231		198	225
v/s Ratio Prot	0.06	c0.27			c0.29							
v/s Ratio Perm	0.24			0.13		0.04		0.06	0.01		c0.08	0.01
v/c Ratio	0.47	0.43		0.33	0.72	0.09		0.39	0.08		0.55	0.08
Uniform Delay, d1	6.0	4.6		10.3	12.6	9.2		19.4	18.4		19.9	18.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.3		0.5	3.2	0.1		1.1	0.1		3.1	0.2
Delay (s)	6.9	4.8		10.8	15.8	9.3		20.4	18.6		22.9	18.6
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		5.4			13.9			19.4			20.6	
Approach LOS		A			B			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			51.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			64.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis







## 2: Hall Street & Lake Street

AM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	11	34	1	24	11	155	62	21	97	24
Future Volume (Veh/h)	9	1	11	34	1	24	11	155	62	21	97	24
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	1	13	41	1	29	13	189	76	26	118	29
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00		1.00					
vC, conflicting volume	495	508	146	471	484	261	160				284	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	491	504	142	467	480	261	155				284	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	91	100	96	99				98	
cM capacity (veh/h)	440	446	898	470	459	760	1417				1269	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	71	278	173								
Volume Left	11	41	13	26								
Volume Right	13	29	76	29								
cSH	599	557	1417	1269								
Volume to Capacity	0.04	0.13	0.01	0.02								
Queue Length 95th (m)	1.0	3.5	0.2	0.5								
Control Delay (s)	11.3	12.4	0.4	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.3	12.4	0.4	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				30.2%	ICU Level of Service				A			
Analysis Period (min)				15								

Queues  
3: Cedar Street & Front Street




















AM Total 2028 - Signalized  
M'akola Nelson CARES

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	125	537	73	732	22	73
v/c Ratio	0.46	0.53	0.17	0.73	0.08	0.22
Control Delay	10.7	6.8	4.6	10.7	13.3	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	6.8	4.6	10.7	13.3	9.4
Queue Length 50th (m)	3.3	14.9	1.6	24.3	0.6	0.8
Queue Length 95th (m)	13.6	34.5	5.8	58.0	5.6	9.7
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	420	1556	660	1541	820	911
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.35	0.11	0.48	0.03	0.08
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















AM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	478	16	67	662	11	9	2	9	10	4	53
Future Volume (vph)	115	478	16	67	662	11	9	2	9	10	4	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.94			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1714	1802		1748	1784			1684			1650	
Flt Permitted	0.27	1.00		0.42	1.00			0.84			0.95	
Satd. Flow (perm)	488	1802		766	1784			1450			1577	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	520	17	73	720	12	10	2	10	11	4	58
RTOR Reduction (vph)	0	2	0	0	1	0	0	8	0	0	47	0
Lane Group Flow (vph)	125	535	0	73	731	0	0	14	0	0	26	0
Confl. Peds. (#/hr)	10		4	4		10	17					17
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	5%	0%	0%	3%	3%	0%	0%	0%	0%	3%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.3	20.3		20.3	20.3			6.5			6.5	
Effective Green, g (s)	20.3	20.3		20.3	20.3			6.5			6.5	
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.18			0.18	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	276	1021		434	1011			263			286	
v/s Ratio Prot		0.30			c0.41							
v/s Ratio Perm	0.26			0.10				0.01			c0.02	
v/c Ratio	0.45	0.52		0.17	0.72			0.05			0.09	
Uniform Delay, d1	4.5	4.8		3.7	5.7			12.1			12.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.2	0.5		0.2	2.6			0.1			0.1	
Delay (s)	5.7	5.3		3.9	8.3			12.2			12.3	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		5.3			7.9			12.2			12.3	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		7.1						HCM 2000 Level of Service		A		
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		35.8						Sum of lost time (s)		9.0		
Intersection Capacity Utilization		62.8%						ICU Level of Service		B		
Analysis Period (min)		15										
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 4: Cedar Street & Lake Street/Park Street

















AM Total 2028 - Signalized  
M'akola Nelson CARES

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	3	0	0	1	0	0	3	5	0	1	66	18	
Future Volume (Veh/h)	3	0	0	1	0	0	3	5	0	1	66	18	
Sign Control	Stop			Yield			Free			Free			
Grade	-6%			12%			15%			-9%			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	
Hourly flow rate (vph)	4	0	0	1	0	0	4	6	0	1	79	21	
Pedestrians	12			1			3			5			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	1			0			0			0			
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (m)												60	
pX, platoon unblocked													
vC, conflicting volume	122	118	104	110	129	12	112						7
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	122	118	104	110	129	12	112						7
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	100	100	100	100	100	100	100						100
cM capacity (veh/h)	836	765	944	861	754	1069	1475						1625
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	4	1	10	101									
Volume Left	4	1	4	1									
Volume Right	0	0	0	21									
cSH	836	861	1475	1625									
Volume to Capacity	0.00	0.00	0.00	0.00									
Queue Length 95th (m)	0.1	0.0	0.1	0.0									
Control Delay (s)	9.3	9.2	3.0	0.1									
Lane LOS	A	A	A	A									
Approach Delay (s)	9.3	9.2	3.0	0.1									
Approach LOS	A	A											
Intersection Summary													
Average Delay				0.7									
Intersection Capacity Utilization				19.2%	ICU Level of Service				A				
Analysis Period (min)				15									



# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Total 2028 - Signalized  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	21	60	0	0	104	4	53	17	23	6	0	98												
Future Volume (Veh/h)	21	60	0	0	104	4	53	17	23	6	0	98												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90												
Hourly flow rate (vph)	23	67	0	0	116	4	59	19	26	7	0	109												
Pedestrians	62						14			19														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	5						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	139				81				416	266	81	286												
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	139				81				416	266	81	286												
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1												
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5												
p0 queue free %	98				100				86	97	97	99												
cM capacity (veh/h)	1434				1512				427	615	959	608												
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	90	120	104	116																				
Volume Left	23	0	59	7																				
Volume Right	0	4	26	109																				
cSH	1434	1700	530	775																				
Volume to Capacity	0.02	0.07	0.20	0.15																				
Queue Length 95th (m)	0.4	0.0	5.8	4.2																				
Control Delay (s)	2.0	0.0	13.4	10.5																				
Lane LOS	A		B	B																				
Approach Delay (s)	2.0	0.0	13.4	10.5																				
Approach LOS			B	B																				
Intersection Summary																								
Average Delay				6.5																				
Intersection Capacity Utilization				Err%	ICU Level of Service				H															
Analysis Period (min)				15																				

## Queues

PM Total 2028 - Signalized

## 1: Hall Street &amp; Front Street

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	172	642	146	597	111	132	238	255	218
v/c Ratio	0.59	0.61	0.49	0.85	0.18	0.33	0.42	0.75	0.40
Control Delay	17.3	12.8	22.8	32.5	3.7	21.8	5.5	36.9	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	12.8	22.8	32.5	3.7	21.8	5.5	36.9	5.6
Queue Length 50th (m)	9.9	49.6	13.8	67.3	0.0	13.8	0.0	30.4	0.0
Queue Length 95th (m)	#27.1	87.3	32.0	#128.5	8.1	27.5	14.8	#60.5	14.3
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	294	1172	346	821	703	515	667	440	641
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.55	0.42	0.73	0.16	0.26	0.36	0.58	0.34

## Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















PM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	580	36	140	573	107	42	84	228	183	61	209
Future Volume (vph)	165	580	36	140	573	107	42	84	228	183	61	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.92		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1861		1774	1863	1455		1794	1495		1784	1464
Flt Permitted	0.15	1.00		0.42	1.00	1.00		0.83	1.00		0.70	1.00
Satd. Flow (perm)	269	1861		786	1863	1455		1506	1495		1289	1464
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	172	604	38	146	597	111	44	88	238	191	64	218
RTOR Reduction (vph)	0	3	0	0	0	69	0	0	175	0	0	160
Lane Group Flow (vph)	172	639	0	146	597	42	0	132	63	0	255	58
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.3	35.3		23.7	23.7	23.7		16.6	16.6		16.6	16.6
Effective Green, g (s)	35.3	35.3		23.7	23.7	23.7		16.6	16.6		16.6	16.6
Actuated g/C Ratio	0.57	0.57		0.38	0.38	0.38		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	295	1052		298	707	552		400	397		342	389
v/s Ratio Prot	0.06	c0.34			c0.32							
v/s Ratio Perm	0.27			0.19		0.03		0.09	0.04		c0.20	0.04
v/c Ratio	0.58	0.61		0.49	0.84	0.08		0.33	0.16		0.75	0.15
Uniform Delay, d1	10.4	9.0		14.7	17.7	12.4		18.4	17.6		21.0	17.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.9	1.0		1.3	9.1	0.1		0.5	0.2		8.6	0.2
Delay (s)	13.3	10.0		16.0	26.8	12.4		18.9	17.7		29.5	17.7
Level of Service	B	A		B	C	B		B	B		C	B
Approach Delay (s)		10.7			23.1			18.2			24.1	
Approach LOS		B			C			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			18.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			62.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			79.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis







## 2: Hall Street & Lake Street

PM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	7	33	41	0	51	12	291	64	40	200	13
Future Volume (Veh/h)	20	7	33	41	0	51	12	291	64	40	200	13
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	7	35	43	0	54	13	306	67	42	211	14
Pedestrians	50			33			2			39		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	4			3			0			3		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												96
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	810	784	270	741	758	412	275	406				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	784	757	223	712	729	412	228	406				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	91	98	95	85	100	91	99	96				
cM capacity (veh/h)	229	291	757	280	301	606	1248	1132				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	63	97	386	267								
Volume Left	21	43	13	42								
Volume Right	35	54	67	14								
cSH	389	400	1248	1132								
Volume to Capacity	0.16	0.24	0.01	0.04								
Queue Length 95th (m)	4.6	7.5	0.3	0.9								
Control Delay (s)	16.0	16.9	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.0	16.9	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay	4.0											
Intersection Capacity Utilization	49.2%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues  
3: Cedar Street & Front Street

PM Total 2028 - Signalized  
M'akola Nelson CARES

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	257	805	99	647	33	214
v/c Ratio	0.64	0.69	0.35	0.59	0.12	0.50
Control Delay	14.4	9.2	8.1	7.3	12.5	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	9.2	8.1	7.3	12.5	9.1
Queue Length 50th (m)	8.4	27.5	2.5	19.8	0.7	0.8
Queue Length 95th (m)	#39.3	77.6	12.0	55.4	6.9	16.2
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	536	1557	380	1481	712	816
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.52	0.26	0.44	0.05	0.26

Intersection Summary




















# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















PM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	239	720	29	92	581	20	5	4	22	5	6	189
Future Volume (vph)	239	720	29	92	581	20	5	4	22	5	6	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.96	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.90			0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1754	1869		1747	1776			1645			1613	
Flt Permitted	0.35	1.00		0.25	1.00			0.95			0.99	
Satd. Flow (perm)	644	1869		457	1776			1576			1603	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	257	774	31	99	625	22	5	4	24	5	6	203
RTOR Reduction (vph)	0	2	0	0	2	0	0	20	0	0	169	0
Lane Group Flow (vph)	257	803	0	99	645	0	0	13	0	0	45	0
Confl. Peds. (#/hr)	21		7	7		21	38					38
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	2%	1%	0%	0%	3%	5%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7			7.3			7.3	
Effective Green, g (s)	27.7	27.7		27.7	27.7			7.3			7.3	
Actuated g/C Ratio	0.63	0.63		0.63	0.63			0.17			0.17	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	405	1176		287	1118			261			265	
v/s Ratio Prot		c0.43			0.36							
v/s Ratio Perm	0.40			0.22				0.01			c0.03	
v/c Ratio	0.63	0.68		0.34	0.58			0.05			0.17	
Uniform Delay, d1	5.0	5.3		3.9	4.7			15.4			15.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	3.2	1.7		0.7	0.7			0.1			0.3	
Delay (s)	8.3	7.0		4.6	5.5			15.5			16.0	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		7.3			5.4			15.5			16.0	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		7.6			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		44.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		72.2%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

PM Total 2028 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	9	0	0	0	2	9	0	0	95	21
Future Volume (Veh/h)	15	0	9	0	0	0	2	9	0	0	95	21
Sign Control	Stop				Yield				Free		Free	
Grade	-6%				12%				15%		-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	19	0	12	0	0	0	3	12	0	0	122	27
Pedestrians	21											
Lane Width (m)	3.6											
Walking Speed (m/s)	1.2											
Percent Blockage	2											
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												60
pX, platoon unblocked												
vC, conflicting volume	174	174	156	166	188	12	170				12	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	174	174	156	166	188	12	170				12	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	100	100	100	100				100	
cM capacity (veh/h)	768	709	879	780	695	1074	1395				1620	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	31	0	15	149								
Volume Left	19	0	3	0								
Volume Right	12	0	0	27								
cSH	807	1700	1395	1620								
Volume to Capacity	0.04	0.00	0.00	0.00								
Queue Length 95th (m)	1.0	0.0	0.1	0.0								
Control Delay (s)	9.6	0.0	1.5	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.6	0.0	1.5	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			1.6									
Intersection Capacity Utilization			20.0%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
5: Cedar Street & Vernon Street

PM Total 2028 - Signalized  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	56	81	1	0	109	8	50	22	23	8	0	151												
Future Volume (Veh/h)	56	81	1	0	109	8	50	22	23	8	0	151												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	64	92	1	0	124	9	57	25	26	9	0	172												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	157			105			614	390	104	412	386	234												
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	157			105			614	390	104	412	386	234												
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2												
tC, 2 stage (s)																								
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3												
p0 queue free %	95			100			79	95	97	98	100	77												
cM capacity (veh/h)	1406			1484			268	508	946	481	512	741												
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	157	133	108	181																				
Volume Left	64	0	57	9																				
Volume Right	1	9	26	172																				
cSH	1406	1700	373	722																				
Volume to Capacity	0.05	0.08	0.29	0.25																				
Queue Length 95th (m)	1.1	0.0	9.4	7.9																				
Control Delay (s)	3.4	0.0	18.5	11.6																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.4	0.0	18.5	11.6																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				8.0																				
Intersection Capacity Utilization				Err%	ICU Level of Service				H															
Analysis Period (min)				15																				

## Queues

AM Total 2028 - Right Turn

## 1: Hall Street &amp; Front Street

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	201	497	117	540	134	102	115	108	123
v/c Ratio	0.46	0.40	0.33	0.71	0.20	0.33	0.28	0.42	0.31
Control Delay	8.7	6.8	15.3	20.8	3.6	21.9	5.6	24.6	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	6.8	15.3	20.8	3.6	21.9	5.6	24.6	6.3
Queue Length 50th (m)	7.2	21.3	7.7	43.3	0.0	9.3	0.0	10.0	0.0
Queue Length 95th (m)	18.2	47.5	21.0	#97.3	8.9	20.6	8.9	22.4	10.0
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	437	1276	407	867	762	682	735	565	713
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.39	0.29	0.62	0.18	0.15	0.16	0.19	0.17

## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.






















Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

AM Total 2028 - Right Turn

M'akola Nelson CARES

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	443	14	108	497	123	23	71	106	74	26	113
Future Volume (vph)	185	443	14	108	497	123	23	71	106	74	26	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1819		1728	1863	1492		1722	1495		1714	1454
Flt Permitted	0.23	1.00		0.48	1.00	1.00		0.88	1.00		0.72	1.00
Satd. Flow (perm)	417	1819		876	1863	1492		1538	1495		1275	1454
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	482	15	117	540	134	25	77	115	80	28	123
RTOR Reduction (vph)	0	1	0	0	0	80	0	0	97	0	0	104
Lane Group Flow (vph)	201	496	0	117	540	54	0	102	18	0	108	19
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	32.2	32.2		20.4	20.4	20.4		7.8	7.8		7.8	7.8
Effective Green, g (s)	32.2	32.2		20.4	20.4	20.4		7.8	7.8		7.8	7.8
Actuated g/C Ratio	0.64	0.64		0.40	0.40	0.40		0.15	0.15		0.15	0.15
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	430	1159		353	752	602		237	230		196	224
v/s Ratio Prot	0.06	c0.27			c0.29							
v/s Ratio Perm	0.24			0.13		0.04		0.07	0.01		c0.08	0.01
v/c Ratio	0.47	0.43		0.33	0.72	0.09		0.43	0.08		0.55	0.08
Uniform Delay, d1	6.0	4.6		10.4	12.6	9.3		19.3	18.3		19.7	18.3
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.3		0.6	3.3	0.1		1.3	0.1		3.3	0.2
Delay (s)	6.8	4.8		10.9	15.9	9.4		20.6	18.4		23.1	18.5
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		5.4			14.1			19.4			20.6	
Approach LOS		A			B			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			50.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			64.7%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												



# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street



















AM Total 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	11	34	1	34	11	155	62	23	97	24
Future Volume (Veh/h)	9	1	11	34	1	34	11	155	62	23	97	24
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	1	13	41	1	41	13	189	76	28	118	29
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												96
pX, platoon unblocked	1.00	1.00	1.00	1.00	1.00		1.00					
vC, conflicting volume	511	512	146	475	488	261	160				284	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	508	509	142	472	485	261	156				284	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	99	91	100	95	99				98	
cM capacity (veh/h)	421	443	897	466	456	760	1417				1269	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	25	83	278	175								
Volume Left	11	41	13	28								
Volume Right	13	41	76	29								
cSH	584	576	1417	1269								
Volume to Capacity	0.04	0.14	0.01	0.02								
Queue Length 95th (m)	1.1	4.0	0.2	0.5								
Control Delay (s)	11.4	12.3	0.4	1.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.4	12.3	0.4	1.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.0								
Intersection Capacity Utilization				31.4%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















AM Total 2028 - Right Turn  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	117	478	15	67	662	11	0	0	9	0	0	53		
Future Volume (Veh/h)	117	478	15	67	662	11	0	0	9	0	0	53		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			6%			6%			-3%				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	127	520	16	73	720	12	0	0	10	0	0	58		
Pedestrians	17						4			10				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	1						0			1				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)	228													
pX, platoon unblocked				0.99			0.99			0.99	0.99	0.99	0.99	
vC, conflicting volume	742				540				1727	1674	532	1666	1676	753
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	742				529				1730	1676	520	1668	1678	753
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85				93				100	100	98	100	100	86
cM capacity (veh/h)	844				1033				48	74	551	62	73	401
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1								
Volume Total	127	536	73	732	10	58								
Volume Left	127	0	73	0	0	0								
Volume Right	0	16	0	12	10	58								
cSH	844	1700	1033	1700	551	401								
Volume to Capacity	0.15	0.32	0.07	0.43	0.02	0.14								
Queue Length 95th (m)	4.2	0.0	1.8	0.0	0.4	4.0								
Control Delay (s)	10.0	0.0	8.7	0.0	11.7	15.5								
Lane LOS	B			A			B	C						
Approach Delay (s)	1.9			0.8			11.7	15.5						
Approach LOS							B	C						
Intersection Summary														
Average Delay				1.9										
Intersection Capacity Utilization				50.8%		ICU Level of Service				A				
Analysis Period (min)				15										

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

AM Total 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	0	1	0	0	5	5	0	1	66	26
Future Volume (Veh/h)	5	0	0	1	0	0	5	5	0	1	66	26
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	6	0	0	1	0	0	6	6	0	1	79	31
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	132	128	110	118	143	12	122				7	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132	128	110	118	143	12	122				7	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	100	100	100	100	100	100				100	
cM capacity (veh/h)	824	755	938	848	740	1069	1463				1625	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	6	1	12	111								
Volume Left	6	1	6	1								
Volume Right	0	0	0	31								
cSH	824	848	1463	1625								
Volume to Capacity	0.01	0.00	0.00	0.00								
Queue Length 95th (m)	0.2	0.0	0.1	0.0								
Control Delay (s)	9.4	9.2	3.8	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.4	9.2	3.8	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.9								
Intersection Capacity Utilization				19.6%	ICU Level of Service				A			
Analysis Period (min)				15								










# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Total 2028 - Right Turn  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	21	60	0	0	104	4	53	17	23	6	0	98												
Future Volume (Veh/h)	21	60	0	0	104	4	53	17	23	6	0	98												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90												
Hourly flow rate (vph)	23	67	0	0	116	4	59	19	26	7	0	109												
Pedestrians	62						14			19														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	5						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	139				81				416	266	81	286	264	199										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	139				81				416	266	81	286	264	199										
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	98				100				86	97	97	99	100	86										
cM capacity (veh/h)	1434				1512				427	615	959	608	618	789										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	90	120	104	116																				
Volume Left	23	0	59	7																				
Volume Right	0	4	26	109																				
cSH	1434	1700	530	775																				
Volume to Capacity	0.02	0.07	0.20	0.15																				
Queue Length 95th (m)	0.4	0.0	5.8	4.2																				
Control Delay (s)	2.0	0.0	13.4	10.5																				
Lane LOS	A		B	B																				
Approach Delay (s)	2.0	0.0	13.4	10.5																				
Approach LOS			B	B																				
Intersection Summary																								
Average Delay				6.5																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				

Queues  
1: Hall Street & Front Street

PM Total 2028 - Right Turn  
M'akola Nelson CARES

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	172	642	146	594	110	136	241	255	218
v/c Ratio	0.58	0.61	0.49	0.85	0.18	0.35	0.42	0.75	0.40
Control Delay	16.8	12.8	22.8	32.3	3.7	22.0	5.5	36.8	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	12.8	22.8	32.3	3.7	22.0	5.5	36.8	5.6
Queue Length 50th (m)	9.9	49.5	13.8	66.9	0.0	14.3	0.0	30.4	0.0
Queue Length 95th (m)	#23.1	87.5	32.0	#127.6	8.0	28.3	14.9	#60.5	14.3
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	296	1172	346	822	703	510	669	441	641
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.55	0.42	0.72	0.16	0.27	0.36	0.58	0.34

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
























# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















PM Total 2028 - Right Turn

M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	577	39	140	570	106	45	85	231	181	63	209
Future Volume (vph)	165	577	39	140	570	106	45	85	231	181	63	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.92		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1860		1774	1863	1455		1792	1495		1786	1464
Flt Permitted	0.15	1.00		0.42	1.00	1.00		0.82	1.00		0.70	1.00
Satd. Flow (perm)	274	1860		786	1863	1455		1491	1495		1289	1464
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	172	601	41	146	594	110	47	89	241	189	66	218
RTOR Reduction (vph)	0	3	0	0	0	68	0	0	177	0	0	160
Lane Group Flow (vph)	172	639	0	146	594	42	0	136	64	0	255	58
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.3	35.3		23.7	23.7	23.7		16.6	16.6		16.6	16.6
Effective Green, g (s)	35.3	35.3		23.7	23.7	23.7		16.6	16.6		16.6	16.6
Actuated g/C Ratio	0.57	0.57		0.38	0.38	0.38		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	297	1052		298	707	552		396	397		342	389
v/s Ratio Prot	0.06	c0.34			c0.32							
v/s Ratio Perm	0.27			0.19		0.03		0.09	0.04		c0.20	0.04
v/c Ratio	0.58	0.61		0.49	0.84	0.08		0.34	0.16		0.75	0.15
Uniform Delay, d1	10.3	9.0		14.7	17.6	12.4		18.5	17.6		21.0	17.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	2.7	1.0		1.3	8.9	0.1		0.5	0.2		8.6	0.2
Delay (s)	13.0	10.0		16.0	26.5	12.4		19.0	17.8		29.5	17.7
Level of Service	B	A		B	C	B		B	B		C	B
Approach Delay (s)		10.6			22.9			18.2			24.1	
Approach LOS		B			C			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			18.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			62.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			79.6%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis 2: Hall Street & Lake Street


















PM Total 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	8	33	41	0	59	12	290	65	45	200	12
Future Volume (Veh/h)	20	8	33	41	0	59	12	290	65	45	200	12
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			3%			12%			-6%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	8	35	43	0	62	13	305	68	47	211	13
Pedestrians		50			33			2			39	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		4			3			0			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											96	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	828	794	270	750	766	411	274			406		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	802	767	223	722	738	411	227			406		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	97	95	84	100	90	99			96		
cM capacity (veh/h)	219	286	758	274	296	607	1249			1132		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	64	105	386	271								
Volume Left	21	43	13	47								
Volume Right	35	62	68	13								
cSH	376	405	1249	1132								
Volume to Capacity	0.17	0.26	0.01	0.04								
Queue Length 95th (m)	4.9	8.2	0.3	1.0								
Control Delay (s)	16.5	17.0	0.4	1.8								
Lane LOS	C	C	A	A								
Approach Delay (s)	16.5	17.0	0.4	1.8								
Approach LOS	C	C										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			51.9%	ICU Level of Service						A		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















PM Total 2028 - Right Turn  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	243	720	23	92	581	20	0	0	22	0	0	190		
Future Volume (Veh/h)	243	720	23	92	581	20	0	0	22	0	0	190		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			6%			6%			-3%				
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Hourly flow rate (vph)	261	774	25	99	625	22	0	0	24	0	0	204		
Pedestrians	38						7			21				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	3						1			2				
Right turn flare (veh)														
Median type	None			None										
Median storage veh)														
Upstream signal (m)	228													
pX, platoon unblocked				0.86			0.86			0.86	0.86	0.86		
vC, conflicting volume	668				806		2380		2182	794	2175	2183	695	
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	668				694		2523		2292	679	2284	2293	695	
tC, single (s)	4.1				4.1		7.1		6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)														
tF (s)	2.2				2.2		3.5		4.0	3.3	3.5	4.0	3.3	
p0 queue free %	71				87		100		100	94	100	100	52	
cM capacity (veh/h)	906				780		6		21	389	16	21	424	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1								
Volume Total	261	799	99	647	24	204								
Volume Left	261	0	99	0	0	0								
Volume Right	0	25	0	22	24	204								
cSH	906	1700	780	1700	389	424								
Volume to Capacity	0.29	0.47	0.13	0.38	0.06	0.48								
Queue Length 95th (m)	9.6	0.0	3.5	0.0	1.6	20.4								
Control Delay (s)	10.6	0.0	10.3	0.0	14.9	21.1								
Lane LOS	B			B			B	C						
Approach Delay (s)	2.6			1.4			14.9	21.1						
Approach LOS							B		C					
Intersection Summary														
Average Delay				4.1										
Intersection Capacity Utilization				53.5%		ICU Level of Service				A				
Analysis Period (min)				15										

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

PM Total 2028 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	9	0	0	0	6	9	0	0	95	25
Future Volume (Veh/h)	21	0	9	0	0	0	6	9	0	0	95	25
Sign Control		Stop			Yield			Free			Free	
Grade		-6%			12%			15%			-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	27	0	12	0	0	0	8	12	0	0	122	32
Pedestrians		21										
Lane Width (m)		3.6										
Walking Speed (m/s)		1.2										
Percent Blockage		2										
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	187	187	159	178	203	12	175			12		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187	187	159	178	203	12	175			12		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	99	100	100	100	99			100		
cM capacity (veh/h)	751	695	876	763	680	1074	1389			1620		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	39	0	20	154								
Volume Left	27	0	8	0								
Volume Right	12	0	0	32								
cSH	786	1700	1389	1620								
Volume to Capacity	0.05	0.00	0.01	0.00								
Queue Length 95th (m)	1.3	0.0	0.1	0.0								
Control Delay (s)	9.8	0.0	3.1	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.8	0.0	3.1	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				2.1								
Intersection Capacity Utilization				20.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis  
5: Cedar Street & Vernon Street

PM Total 2028 - Right Turn  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	56	81	1	0	109	8	50	22	23	8	0	151												
Future Volume (Veh/h)	56	81	1	0	109	8	50	22	23	8	0	151												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	64	92	1	0	124	9	57	25	26	9	0	172												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	157				105				614	390	104	412	386	234										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	157				105				614	390	104	412	386	234										
tC, single (s)	4.1				4.1				7.2	6.5	6.2	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	95				100				79	95	97	98	100	77										
cM capacity (veh/h)	1406				1484				268	508	946	481	512	741										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	157	133	108	181																				
Volume Left	64	0	57	9																				
Volume Right	1	9	26	172																				
cSH	1406	1700	373	722																				
Volume to Capacity	0.05	0.08	0.29	0.25																				
Queue Length 95th (m)	1.1	0.0	9.4	7.9																				
Control Delay (s)	3.4	0.0	18.5	11.6																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.4	0.0	18.5	11.6																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				8.0																				
Intersection Capacity Utilization				Err%	ICU Level of Service			H																
Analysis Period (min)				15																				



Queues  
1: Hall Street & Front Street

AM Total 2038 - Signalized  
M'akola Nelson CARES

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	221	544	129	598	149	103	124	120	135
v/c Ratio	0.54	0.43	0.37	0.77	0.21	0.32	0.30	0.45	0.33
Control Delay	11.3	7.2	16.3	23.3	3.4	23.4	7.0	27.3	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	7.2	16.3	23.3	3.4	23.4	7.0	27.3	7.1
Queue Length 50th (m)	8.7	26.0	9.2	53.2	0.0	10.2	0.0	12.3	0.0
Queue Length 95th (m)	#24.1	57.5	24.5	#115.9	9.4	22.4	11.4	26.7	11.8
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	411	1317	453	1007	868	671	710	546	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.41	0.28	0.59	0.17	0.15	0.17	0.22	0.19






















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

















## 1: Hall Street & Front Street

AM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	487	14	119	550	137	19	75	114	81	29	124
Future Volume (vph)	203	487	14	119	550	137	19	75	114	81	29	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1820		1728	1863	1490		1720	1494		1715	1451
Flt Permitted	0.19	1.00		0.46	1.00	1.00		0.90	1.00		0.72	1.00
Satd. Flow (perm)	346	1820		839	1863	1490		1569	1494		1277	1451
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	529	15	129	598	149	21	82	124	88	32	135
RTOR Reduction (vph)	0	1	0	0	0	87	0	0	104	0	0	114
Lane Group Flow (vph)	221	543	0	129	598	62	0	103	20	0	120	21
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.2	35.2		22.6	22.6	22.6		8.6	8.6		8.6	8.6
Effective Green, g (s)	35.2	35.2		22.6	22.6	22.6		8.6	8.6		8.6	8.6
Actuated g/C Ratio	0.65	0.65		0.42	0.42	0.42		0.16	0.16		0.16	0.16
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	405	1179		349	775	620		248	236		202	229
v/s Ratio Prot	0.07	c0.30			c0.32							
v/s Ratio Perm	0.28			0.15		0.04		0.07	0.01		c0.09	0.01
v/c Ratio	0.55	0.46		0.37	0.77	0.10		0.42	0.08		0.59	0.09
Uniform Delay, d1	7.1	4.8		10.9	13.6	9.7		20.6	19.5		21.2	19.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.3		0.7	4.8	0.1		1.1	0.2		4.6	0.2
Delay (s)	8.6	5.1		11.6	18.4	9.7		21.7	19.6		25.9	19.7
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		6.1			15.9			20.6			22.6	
Approach LOS		A			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			13.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			54.3				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			68.7%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												







# HCM Unsignalized Intersection Capacity Analysis 2: Hall Street & Lake Street

AM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1	13	37	1	26	13	170	67	23	106	26
Future Volume (Veh/h)	10	1	13	37	1	26	13	170	67	23	106	26
Sign Control	Stop				Stop				Free		Free	
Grade	-3%				3%				12%		-6%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	1	16	45	1	32	16	207	82	28	129	32
Pedestrians	13				19				1		15	
Lane Width (m)	3.6				3.6				3.6		3.6	
Walking Speed (m/s)	1.2				1.2				1.2		1.2	
Percent Blockage	1				2				0		1	
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												96
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	542	554	159	518	529	282	174	308				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	528	540	139	503	515	282	155	308				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	97	100	98	90	100	96	99	98				
cM capacity (veh/h)	408	419	890	437	432	740	1402	1244				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	78	305	189								
Volume Left	12	45	16	28								
Volume Right	16	32	82	32								
cSH	583	525	1402	1244								
Volume to Capacity	0.05	0.15	0.01	0.02								
Queue Length 95th (m)	1.3	4.1	0.3	0.6								
Control Delay (s)	11.5	13.0	0.5	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.5	13.0	0.5	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

Queues  
3: Cedar Street & Front Street




















AM Total 2038 - Signalized  
M'akola Nelson CARES

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	138	590	79	803	22	80
v/c Ratio	0.47	0.51	0.17	0.71	0.10	0.28
Control Delay	10.5	6.0	4.2	9.4	15.0	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	6.0	4.2	9.4	15.0	10.8
Queue Length 50th (m)	3.9	17.1	1.8	28.9	1.0	1.4
Queue Length 95th (m)	17.1	40.2	6.4	71.0	5.6	10.5
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	353	1373	548	1357	635	723
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.43	0.14	0.59	0.03	0.11
Intersection Summary						

# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

AM Total 2038 - Signalized  
M'akola Nelson CARES

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	524	18	73	726	13	9	2	9	11	5	58
Future Volume (vph)	127	524	18	73	726	13	9	2	9	11	5	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.94			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1714	1802		1747	1784			1683			1649	
Flt Permitted	0.26	1.00		0.39	1.00			0.84			0.95	
Satd. Flow (perm)	463	1802		722	1784			1440			1575	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	570	20	79	789	14	10	2	10	12	5	63
RTOR Reduction (vph)	0	2	0	0	1	0	0	8	0	0	53	0
Lane Group Flow (vph)	138	588	0	79	802	0	0	14	0	0	27	0
Confl. Peds. (#/hr)	10		4	4		10	17					17
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	5%	5%	0%	0%	3%	3%	0%	0%	0%	0%	3%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7			6.6			6.6	
Effective Green, g (s)	27.7	27.7		27.7	27.7			6.6			6.6	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.15			0.15	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	296	1152		461	1141			219			240	
v/s Ratio Prot		0.33			c0.45							
v/s Ratio Perm	0.30			0.11				0.01			c0.02	
v/c Ratio	0.47	0.51		0.17	0.70			0.06			0.11	
Uniform Delay, d1	4.0	4.2		3.2	5.1			15.7			15.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.2	0.4		0.2	2.0			0.1			0.2	
Delay (s)	5.2	4.6		3.3	7.1			15.8			16.0	
Level of Service	A	A		A	A			B			B	
Approach Delay (s)		4.7			6.8			15.8			16.0	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		6.4					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		43.3					Sum of lost time (s)		9.0			
Intersection Capacity Utilization		67.2%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												



# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

AM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	0	0	1	0	0	3	5	0	1	73	20
Future Volume (Veh/h)	4	0	0	1	0	0	3	5	0	1	73	20
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	5	0	0	1	0	0	4	6	0	1	87	24
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												60
pX, platoon unblocked												
vC, conflicting volume	132	128	114	119	140	12	123				7	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132	128	114	119	140	12	123				7	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	100	100	100	100	100	100				100	
cM capacity (veh/h)	824	756	932	849	743	1069	1462				1625	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	5	1	10	112								
Volume Left	5	1	4	1								
Volume Right	0	0	0	24								
cSH	824	849	1462	1625								
Volume to Capacity	0.01	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.0	0.1	0.0								
Control Delay (s)	9.4	9.2	3.0	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.4	9.2	3.0	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.7								
Intersection Capacity Utilization				19.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis  
5: Cedar Street & Vernon Street

AM Total 2038 - Signalized  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	23	66	0	0	114	5	58	18	25	6	0	107		
Future Volume (Veh/h)	23	66	0	0	114	5	58	18	25	6	0	107		
Sign Control	Free			Free			Stop			Stop				
Grade	-6%			12%			6%			-9%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	26	73	0	0	127	6	64	20	28	7	0	119		
Pedestrians	62						14			19				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	5						1			2				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	152				87				450	291	87	312	288	211
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	152				87				450	291	87	312	288	211
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				100				84	97	97	99	100	85
cM capacity (veh/h)	1418				1504				397	594	952	580	598	777
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	99	133	112	126										
Volume Left	26	0	64	7										
Volume Right	0	6	28	119										
cSH	1418	1700	500	762										
Volume to Capacity	0.02	0.08	0.22	0.17										
Queue Length 95th (m)	0.4	0.0	6.8	4.7										
Control Delay (s)	2.1	0.0	14.3	10.7										
Lane LOS	A		B	B										
Approach Delay (s)	2.1	0.0	14.3	10.7										
Approach LOS			B	B										
Intersection Summary														
Average Delay				6.7										
Intersection Capacity Utilization				Err%	ICU Level of Service			H						
Analysis Period (min)				15										

## Queues

PM Total 2038 - Signalized

## 1: Hall Street &amp; Front Street

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	189	705	159	654	122	144	260	278	239
v/c Ratio	0.71	0.66	0.56	0.87	0.19	0.39	0.46	0.82	0.43
Control Delay	26.1	13.7	25.2	33.0	3.7	25.1	7.4	46.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	13.7	25.2	33.0	3.7	25.1	7.4	46.3	5.9
Queue Length 50th (m)	12.1	63.5	17.0	82.9	0.0	17.1	2.7	38.0	0.0
Queue Length 95th (m)	#39.3	99.6	36.8	#143.2	8.9	32.9	19.8	#76.8	15.9
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	268	1211	334	889	749	440	627	398	617
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.58	0.48	0.74	0.16	0.33	0.41	0.70	0.39

## Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

















## 1: Hall Street & Front Street

PM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	636	40	153	628	117	46	92	250	200	67	229
Future Volume (vph)	181	636	40	153	628	117	46	92	250	200	67	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.91		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1861		1775	1863	1446		1794	1490		1782	1456
Flt Permitted	0.13	1.00		0.37	1.00	1.00		0.77	1.00		0.69	1.00
Satd. Flow (perm)	232	1861		700	1863	1446		1407	1490		1275	1456
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	189	662	42	159	654	122	48	96	260	208	70	239
RTOR Reduction (vph)	0	3	0	0	0	72	0	0	172	0	0	175
Lane Group Flow (vph)	189	702	0	159	654	50	0	144	88	0	278	64
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	39.5	39.5		27.9	27.9	27.9		18.2	18.2		18.2	18.2
Effective Green, g (s)	39.5	39.5		27.9	27.9	27.9		18.2	18.2		18.2	18.2
Actuated g/C Ratio	0.58	0.58		0.41	0.41	0.41		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	268	1077		286	762	591		375	397		340	388
v/s Ratio Prot	0.06	c0.38			c0.35							
v/s Ratio Perm	0.34			0.23		0.03		0.10	0.06		c0.22	0.04
v/c Ratio	0.71	0.65		0.56	0.86	0.08		0.38	0.22		0.82	0.16
Uniform Delay, d1	12.0	9.7		15.4	18.3	12.3		20.4	19.5		23.4	19.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.2	1.4		2.3	9.5	0.1		0.7	0.3		14.1	0.2
Delay (s)	20.2	11.1		17.7	27.8	12.4		21.1	19.8		37.5	19.4
Level of Service	C	B		B	C	B		C	B		D	B
Approach Delay (s)		13.0			24.1			20.2			29.1	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			20.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			68.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			84.1%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis 2: Hall Street & Lake Street

PM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	8	36	45	0	56	14	319	70	43	219	14
Future Volume (Veh/h)	22	8	36	45	0	56	14	319	70	43	219	14
Sign Control	Stop				Stop				Free			
Grade	-3%				3%				12%			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	8	38	47	0	59	15	336	74	45	231	15
Pedestrians	50				33				2			
Lane Width (m)	3.6				3.6				3.6			
Walking Speed (m/s)	1.2				1.2				1.2			
Percent Blockage	4				3				0			
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												96
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	880	852	290	808	822	445	296	443				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	851	822	236	777	791	445	242	443				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	89	97	95	81	100	90	99	96				
cM capacity (veh/h)	201	263	740	248	273	581	1226	1097				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	106	425	291								
Volume Left	23	47	15	45								
Volume Right	38	59	74	15								
cSH	352	364	1226	1097								
Volume to Capacity	0.20	0.29	0.01	0.04								
Queue Length 95th (m)	5.7	9.5	0.3	1.0								
Control Delay (s)	17.7	18.9	0.4	1.6								
Lane LOS	C	C	A	A								
Approach Delay (s)	17.7	18.9	0.4	1.6								
Approach LOS	C	C										
Intersection Summary												
Average Delay	4.4											
Intersection Capacity Utilization	51.3%			ICU Level of Service					A			
Analysis Period (min)	15											

Queues  
3: Cedar Street & Front Street

PM Total 2038 - Signalized  
M'akola Nelson CARES

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	282	881	109	709	35	235
v/c Ratio	0.72	0.80	0.59	0.84	0.20	0.64
Control Delay	39.5	18.4	49.2	28.4	18.8	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	18.4	49.2	28.4	18.8	14.5
Queue Length 50th (m)	38.0	78.0	15.7	81.5	1.3	1.7
Queue Length 95th (m)	#83.1	163.1	#43.2	#171.3	9.5	21.7
Internal Link Dist (m)		204.2		118.5	35.6	46.7
Turn Bay Length (m)						
Base Capacity (vph)	446	1335	189	1012	408	598
Starvation Cap Reductn	0	4	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.66	0.58	0.70	0.09	0.39

Intersection Summary




















# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



# HCM Signalized Intersection Capacity Analysis

## 3: Cedar Street & Front Street

















PM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	262	789	31	101	637	22	5	4	24	6	6	207
Future Volume (vph)	262	789	31	101	637	22	5	4	24	6	6	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			6%			6%			-3%	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.90			0.87	
Flt Protected	0.95	1.00		0.95	1.00			0.99			1.00	
Satd. Flow (prot)	1770	1869		1751	1775			1640			1584	
Flt Permitted	0.95	1.00		0.95	1.00			0.84			0.99	
Satd. Flow (perm)	1770	1869		1751	1775			1386			1573	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	282	848	33	109	685	24	5	4	26	6	6	223
RTOR Reduction (vph)	0	1	0	0	1	0	0	23	0	0	198	0
Lane Group Flow (vph)	282	880	0	109	708	0	0	12	0	0	37	0
Confl. Peds. (#/hr)	21		7	7		21	38					38
Confl. Bikes (#/hr)						1						2
Heavy Vehicles (%)	2%	1%	0%	0%	3%	5%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	15.9	42.0		7.6	33.7			7.8			7.8	
Effective Green, g (s)	15.9	42.0		7.6	33.7			7.8			7.8	
Actuated g/C Ratio	0.22	0.59		0.11	0.48			0.11			0.11	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	396	1107		187	843			152			173	
v/s Ratio Prot	c0.16	c0.47		0.06	0.40							
v/s Ratio Perm								0.01			c0.02	
v/c Ratio	0.71	0.79		0.58	0.84			0.08			0.21	
Uniform Delay, d1	25.4	11.1		30.1	16.2			28.3			28.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.0	4.0		4.6	7.4			0.2			0.6	
Delay (s)	31.3	15.1		34.7	23.6			28.5			29.4	
Level of Service	C	B		C	C			C			C	
Approach Delay (s)		19.1			25.1			28.5			29.4	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			70.9			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			77.9%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

















## 4: Cedar Street & Lake Street/Park Street

PM Total 2038 - Signalized  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	10	0	0	0	2	10	0	0	104	23
Future Volume (Veh/h)	16	0	10	0	0	0	2	10	0	0	104	23
Sign Control		Stop			Yield			Free			Free	
Grade		-6%			12%			15%			-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	21	0	13	0	0	0	3	13	0	0	133	29
Pedestrians		21										
Lane Width (m)		3.6										
Walking Speed (m/s)		1.2										
Percent Blockage		2										
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											60	
pX, platoon unblocked												
vC, conflicting volume	188	188	168	180	202	13	183			13		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188	188	168	180	202	13	183			13		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	98	100	100	100	100			100		
cM capacity (veh/h)	753	697	866	762	683	1073	1380			1619		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	34	0	16	162								
Volume Left	21	0	3	0								
Volume Right	13	0	0	29								
cSH	792	1700	1380	1619								
Volume to Capacity	0.04	0.00	0.00	0.00								
Queue Length 95th (m)	1.1	0.0	0.1	0.0								
Control Delay (s)	9.7	0.0	1.4	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.7	0.0	1.4	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization				20.3%	ICU Level of Service				A			
Analysis Period (min)				15								

# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

PM Total 2038 - Signalized  
M'akola Nelson CARES

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	61	89	1	0	120	9	55	24	25	8	0	165	
Future Volume (Veh/h)	61	89	1	0	120	9	55	24	25	8	0	165	
Sign Control	Free				Free				Stop		Stop		
Grade	-6%				12%				6%		-9%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	69	101	1	0	136	10	62	27	28	9	0	188	
Pedestrians	81								12		24		
Lane Width (m)	3.6								3.6		3.6		
Walking Speed (m/s)	1.2								1.2		1.2		
Percent Blockage	7								1		2		
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	170			114				662	422	114	446	417	246
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	170			114				662	422	114	446	417	246
tC, single (s)	4.1			4.1				7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100				74	94	97	98	100	74
cM capacity (veh/h)	1391			1473				240	485	935	451	489	729
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	171	146	117	197									
Volume Left	69	0	62	9									
Volume Right	1	10	28	188									
cSH	1391	1700	340	709									
Volume to Capacity	0.05	0.09	0.34	0.28									
Queue Length 95th (m)	1.3	0.0	12.0	9.1									
Control Delay (s)	3.4	0.0	21.1	12.0									
Lane LOS	A		C	B									
Approach Delay (s)	3.4	0.0	21.1	12.0									
Approach LOS			C	B									
Intersection Summary													
Average Delay			8.6										
Intersection Capacity Utilization			Err%		ICU Level of Service				H				
Analysis Period (min)			15										

## Queues

AM Total 2038 - Right Turn

## 1: Hall Street &amp; Front Street

M'akola Nelson CARES



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	221	544	129	592	147	112	126	120	135
v/c Ratio	0.53	0.43	0.37	0.77	0.21	0.35	0.31	0.45	0.33
Control Delay	11.2	7.3	16.4	23.3	3.5	24.0	6.9	27.2	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	7.3	16.4	23.3	3.5	24.0	6.9	27.2	7.1
Queue Length 50th (m)	8.7	26.0	9.2	52.4	0.0	11.1	0.0	12.2	0.0
Queue Length 95th (m)	#23.9	57.8	24.5	#114.6	9.4	24.2	11.5	26.7	11.8
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	414	1320	456	1013	872	661	714	545	696
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.41	0.28	0.58	0.17	0.17	0.18	0.22	0.19

## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.






















Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

















AM Total 2038 - Right Turn

M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	486	15	119	545	135	25	78	116	81	29	124
Future Volume (vph)	203	486	15	119	545	135	25	78	116	81	29	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00		0.96	1.00
Satd. Flow (prot)	1734	1819		1728	1863	1490		1721	1494		1715	1451
Flt Permitted	0.19	1.00		0.46	1.00	1.00		0.88	1.00		0.71	1.00
Satd. Flow (perm)	351	1819		839	1863	1490		1536	1494		1267	1451
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	528	16	129	592	147	27	85	126	88	32	135
RTOR Reduction (vph)	0	1	0	0	0	86	0	0	106	0	0	114
Lane Group Flow (vph)	221	543	0	129	592	61	0	112	20	0	120	21
Confl. Peds. (#/hr)	14		6	6		14	22		13	13		22
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	4%	0%	4%	2%	4%	0%	9%	4%	7%	4%	6%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	35.0	35.0		22.4	22.4	22.4		8.6	8.6		8.6	8.6
Effective Green, g (s)	35.0	35.0		22.4	22.4	22.4		8.6	8.6		8.6	8.6
Actuated g/C Ratio	0.65	0.65		0.41	0.41	0.41		0.16	0.16		0.16	0.16
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	408	1176		347	771	616		244	237		201	230
v/s Ratio Prot	0.07	c0.30			c0.32							
v/s Ratio Perm	0.28			0.15		0.04		0.07	0.01		c0.09	0.01
v/c Ratio	0.54	0.46		0.37	0.77	0.10		0.46	0.08		0.60	0.09
Uniform Delay, d1	7.0	4.8		11.0	13.6	9.7		20.6	19.4		21.1	19.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.3		0.7	4.6	0.1		1.4	0.2		4.7	0.2
Delay (s)	8.5	5.1		11.7	18.2	9.8		22.0	19.5		25.8	19.6
Level of Service	A	A		B	B	A		C	B		C	B
Approach Delay (s)		6.1			15.8			20.7			22.5	
Approach LOS		A			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			13.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			54.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			68.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis 2: Hall Street & Lake Street

AM Total 2038 - Right Turn  
M'akola Nelson CARES



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1	13	37	1	36	13	170	68	25	106	26
Future Volume (Veh/h)	10	1	13	37	1	36	13	170	68	25	106	26
Sign Control	Stop			Stop			Free			Free		
Grade	-3%			3%			12%			-6%		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	1	16	45	1	44	16	207	83	30	129	32
Pedestrians	13			19			1			15		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			2			0			1		
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												96
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	558	559	159	522	534	282	174				309	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	544	545	139	508	519	282	155				309	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	97	100	98	90	100	94	99				98	
cM capacity (veh/h)	391	415	891	433	429	740	1402				1243	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	90	306	191								
Volume Left	12	45	16	30								
Volume Right	16	44	83	32								
cSH	568	543	1402	1243								
Volume to Capacity	0.05	0.17	0.01	0.02								
Queue Length 95th (m)	1.3	4.7	0.3	0.6								
Control Delay (s)	11.7	12.9	0.5	1.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.7	12.9	0.5	1.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay	3.1											
Intersection Capacity Utilization	32.7%			ICU Level of Service					A			
Analysis Period (min)	15											



# HCM Unsignalized Intersection Capacity Analysis

















## 3: Cedar Street & Front Street

AM Total 2038 - Right Turn  
M'akola Nelson CARES

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	128	524	16	73	726	13	0	0	9	0	0	58	
Future Volume (Veh/h)	128	524	16	73	726	13	0	0	9	0	0	58	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			6%			6%			-3%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	139	570	17	79	789	14	0	0	10	0	0	63	
Pedestrians	17						4			10			
Lane Width (m)	3.6						3.6			3.6			
Walking Speed (m/s)	1.2						1.2			1.2			
Percent Blockage	1						0			1			
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)	228												
pX, platoon unblocked				0.95			0.95			0.95	0.95	0.95	
vC, conflicting volume	813				591		1888		1832	582	1822	1833	823
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	813				547		1906		1848	538	1838	1849	823
tC, single (s)	4.1				4.1		7.1		6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)													
tF (s)	2.2				2.2		3.5		4.0	3.3	3.5	4.0	3.3
p0 queue free %	82				92		100		100	98	100	100	83
cM capacity (veh/h)	794				981		33		54	520	44	53	365
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	139	587	79	803	10	63							
Volume Left	139	0	79	0	0	0							
Volume Right	0	17	0	14	10	63							
cSH	794	1700	981	1700	520	365							
Volume to Capacity	0.18	0.35	0.08	0.47	0.02	0.17							
Queue Length 95th (m)	5.1	0.0	2.1	0.0	0.5	4.9							
Control Delay (s)	10.5	0.0	9.0	0.0	12.1	16.9							
Lane LOS	B			A			B	C					
Approach Delay (s)	2.0			0.8			12.1	16.9					
Approach LOS					B		C						
Intersection Summary													
Average Delay				2.0									
Intersection Capacity Utilization				54.4%		ICU Level of Service				A			
Analysis Period (min)				15									

















# HCM Unsignalized Intersection Capacity Analysis 4: Cedar Street & Lake Street/Park Street

AM Total 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	0	0	1	0	0	6	5	0	1	73	28
Future Volume (Veh/h)	6	0	0	1	0	0	6	5	0	1	73	28
Sign Control	Stop			Yield			Free			Free		
Grade	-6%			12%			15%			-9%		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	7	0	0	1	0	0	7	6	0	1	87	33
Pedestrians	12			1			3			5		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	1			0			0			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	142	138	118	130	155	12	132				7	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	142	138	118	130	155	12	132				7	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	99	100	100	100	100	100	100				100	
cM capacity (veh/h)	810	744	927	834	728	1069	1451				1625	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	7	1	13	121								
Volume Left	7	1	7	1								
Volume Right	0	0	0	33								
cSH	810	834	1451	1625								
Volume to Capacity	0.01	0.00	0.00	0.00								
Queue Length 95th (m)	0.2	0.0	0.1	0.0								
Control Delay (s)	9.5	9.3	4.1	0.1								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.5	9.3	4.1	0.1								
Approach LOS	A	A										
Intersection Summary												
Average Delay				1.0								
Intersection Capacity Utilization				19.9%	ICU Level of Service				A			
Analysis Period (min)				15								










# HCM Unsignalized Intersection Capacity Analysis 5: Cedar Street & Vernon Street

AM Total 2038 - Right Turn  
M'akola Nelson CARES

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	23	66	0	0	114	5	58	18	25	6	0	107		
Future Volume (Veh/h)	23	66	0	0	114	5	58	18	25	6	0	107		
Sign Control	Free			Free			Stop			Stop				
Grade	-6%			12%			6%			-9%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	26	73	0	0	127	6	64	20	28	7	0	119		
Pedestrians	62						14			19				
Lane Width (m)	3.6						3.6			3.6				
Walking Speed (m/s)	1.2						1.2			1.2				
Percent Blockage	5						1			2				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	152				87				450	291	87	312	288	211
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	152				87				450	291	87	312	288	211
tC, single (s)	4.1				4.1				7.1	6.5	6.3	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				100				84	97	97	99	100	85
cM capacity (veh/h)	1418				1504				397	594	952	580	598	777
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	99	133	112	126										
Volume Left	26	0	64	7										
Volume Right	0	6	28	119										
cSH	1418	1700	500	762										
Volume to Capacity	0.02	0.08	0.22	0.17										
Queue Length 95th (m)	0.4	0.0	6.8	4.7										
Control Delay (s)	2.1	0.0	14.3	10.7										
Lane LOS	A		B	B										
Approach Delay (s)	2.1	0.0	14.3	10.7										
Approach LOS			B	B										
Intersection Summary														
Average Delay				6.7										
Intersection Capacity Utilization				Err%	ICU Level of Service				H					
Analysis Period (min)				15										

Queues  
1: Hall Street & Front Street

PM Total 2038 - Right Turn  
M'akola Nelson CARES

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	189	704	159	651	121	148	264	278	239
v/c Ratio	0.69	0.65	0.56	0.87	0.19	0.41	0.46	0.82	0.43
Control Delay	25.0	13.7	25.3	34.1	3.8	25.6	7.5	46.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	13.7	25.3	34.1	3.8	25.6	7.5	46.3	5.9
Queue Length 50th (m)	12.1	63.4	17.1	83.4	0.0	17.7	3.0	38.0	0.0
Queue Length 95th (m)	#39.1	99.1	36.9	#144.3	9.0	33.9	20.2	#76.7	15.9
Internal Link Dist (m)		55.8		204.2		72.1		53.2	
Turn Bay Length (m)							10.0		
Base Capacity (vph)	275	1203	333	871	735	427	626	396	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.59	0.48	0.75	0.16	0.35	0.42	0.70	0.39

Intersection Summary






















# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

# HCM Signalized Intersection Capacity Analysis

## 1: Hall Street & Front Street

PM Total 2038 - Right Turn

















M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	633	43	153	625	116	49	93	253	198	69	229
Future Volume (vph)	181	633	43	153	625	116	49	93	253	198	69	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.91		1.00	0.96		1.00	0.92
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00		0.99	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)	1736	1860		1775	1863	1445		1792	1490		1783	1456
Flt Permitted	0.12	1.00		0.38	1.00	1.00		0.75	1.00		0.69	1.00
Satd. Flow (perm)	224	1860		713	1863	1445		1373	1490		1274	1456
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	189	659	45	159	651	121	51	97	264	206	72	239
RTOR Reduction (vph)	0	3	0	0	0	72	0	0	174	0	0	175
Lane Group Flow (vph)	189	701	0	159	651	49	0	148	90	0	278	64
Confl. Peds. (#/hr)	36		10	10		36	38		33	33		38
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	4%	1%	0%	1%	2%	2%	0%	2%	2%	1%	0%	2%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	39.7	39.7		27.6	27.6	27.6		18.3	18.3		18.3	18.3
Effective Green, g (s)	39.7	39.7		27.6	27.6	27.6		18.3	18.3		18.3	18.3
Actuated g/C Ratio	0.58	0.58		0.40	0.40	0.40		0.27	0.27		0.27	0.27
Clearance Time (s)	5.5	5.3		5.3	5.3	5.3		5.2	5.2		5.2	5.2
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	275	1077		287	750	582		366	398		340	388
v/s Ratio Prot	0.07	c0.38			c0.35							
v/s Ratio Perm	0.33			0.22		0.03		0.11	0.06		c0.22	0.04
v/c Ratio	0.69	0.65		0.55	0.87	0.08		0.40	0.23		0.82	0.16
Uniform Delay, d1	12.1	9.7		15.7	18.8	12.6		20.6	19.6		23.5	19.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.0	1.4		2.3	10.4	0.1		0.7	0.3		14.1	0.2
Delay (s)	19.1	11.1		18.0	29.2	12.7		21.4	19.9		37.6	19.4
Level of Service	B	B		B	C	B		C	B		D	B
Approach Delay (s)		12.8			25.1			20.4			29.2	
Approach LOS		B			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.2				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			68.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			84.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Unsignalized Intersection Capacity Analysis

## 2: Hall Street & Lake Street

PM Total 2038 - Right Turn  
M'akola Nelson CARES



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	8	36	45	0	64	14	318	71	49	219	14
Future Volume (Veh/h)	22	8	36	45	0	64	14	318	71	49	219	14
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			3%			12%			-6%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	8	38	47	0	67	15	335	75	52	231	15
Pedestrians		50			33			2			39	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		4			3			0			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)											96	
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	901	866	290	822	836	444	296			443		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	873	836	235	791	805	444	240			443		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	97	95	81	100	88	99			95		
cM capacity (veh/h)	190	256	740	241	267	581	1226			1097		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	114	425	298								
Volume Left	23	47	15	52								
Volume Right	38	67	75	15								
cSH	339	367	1226	1097								
Volume to Capacity	0.20	0.31	0.01	0.05								
Queue Length 95th (m)	6.0	10.4	0.3	1.2								
Control Delay (s)	18.3	19.1	0.4	1.9								
Lane LOS	C	C	A	A								
Approach Delay (s)	18.3	19.1	0.4	1.9								
Approach LOS	C	C										
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			54.4%		ICU Level of Service				A			
Analysis Period (min)			15									



# HCM Unsignalized Intersection Capacity Analysis

















## 3: Cedar Street & Front Street

PM Total 2038 - Right Turn  
M'akola Nelson CARES

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	266	789	25	101	637	22	0	0	24	0	0	208	
Future Volume (Veh/h)	266	789	25	101	637	22	0	0	24	0	0	208	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			6%			6%			-3%			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Hourly flow rate (vph)	286	848	27	109	685	24	0	0	26	0	0	224	
Pedestrians	38						7			21			
Lane Width (m)	3.6						3.6			3.6			
Walking Speed (m/s)	1.2						1.2			1.2			
Percent Blockage	3						1			2			
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)	228												
pX, platoon unblocked				0.82			0.82			0.82	0.82	0.82	
vC, conflicting volume	730				882		2606		2388	868	2382	2390	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	730				746		2848		2583	730	2576	2585	
tC, single (s)	4.1				4.1		7.1		6.5	6.2	7.1	6.5	
tC, 2 stage (s)													
tF (s)	2.2				2.2		3.5		4.0	3.3	3.5	4.0	
p0 queue free %	67				85		100		100	92	100	100	
cM capacity (veh/h)	859				710		2		12	347	8	12	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1							
Volume Total	286	875	109	709	26	224							
Volume Left	286	0	109	0	0	0							
Volume Right	0	27	0	24	26	224							
cSH	859	1700	710	1700	347	392							
Volume to Capacity	0.33	0.51	0.15	0.42	0.08	0.57							
Queue Length 95th (m)	11.7	0.0	4.3	0.0	1.9	27.6							
Control Delay (s)	11.3	0.0	11.0	0.0	16.2	25.8							
Lane LOS	B			B	C		D						
Approach Delay (s)	2.8			1.5	16.2		25.8						
Approach LOS					C		D						
Intersection Summary													
Average Delay				4.8									
Intersection Capacity Utilization				57.7%		ICU Level of Service				B			
Analysis Period (min)				15									

















# HCM Unsignalized Intersection Capacity Analysis 4: Cedar Street & Lake Street/Park Street

PM Total 2038 - Right Turn  
M'akola Nelson CARES

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	0	10	0	0	0	7	10	0	0	104	27
Future Volume (Veh/h)	22	0	10	0	0	0	7	10	0	0	104	27
Sign Control		Stop			Yield			Free			Free	
Grade		-6%			12%			15%			-9%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	28	0	13	0	0	0	9	13	0	0	133	35
Pedestrians		21										
Lane Width (m)		3.6										
Walking Speed (m/s)		1.2										
Percent Blockage		2										
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	202	202	172	194	220	13	189			13		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	202	202	172	194	220	13	189			13		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	98	100	100	100	99			100		
cM capacity (veh/h)	734	681	862	743	665	1073	1373			1619		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	41	0	22	168								
Volume Left	28	0	9	0								
Volume Right	13	0	0	35								
cSH	770	1700	1373	1619								
Volume to Capacity	0.05	0.00	0.01	0.00								
Queue Length 95th (m)	1.3	0.0	0.2	0.0								
Control Delay (s)	9.9	0.0	3.2	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.9	0.0	3.2	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			20.5%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
5: Cedar Street & Vernon Street

PM Total 2038 - Right Turn  
M'akola Nelson CARES

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	61	89	1	0	120	9	55	24	25	8	0	165												
Future Volume (Veh/h)	61	89	1	0	120	9	55	24	25	8	0	165												
Sign Control	Free			Free			Stop			Stop														
Grade	-6%			12%			6%			-9%														
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88												
Hourly flow rate (vph)	69	101	1	0	136	10	62	27	28	9	0	188												
Pedestrians	81						12			24														
Lane Width (m)	3.6						3.6			3.6														
Walking Speed (m/s)	1.2						1.2			1.2														
Percent Blockage	7						1			2														
Right turn flare (veh)																								
Median type	None			None																				
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	170				114				662	422	114	446	417	246										
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	170				114				662	422	114	446	417	246										
tC, single (s)	4.1				4.1				7.2	6.5	6.2	7.1	6.5	6.2										
tC, 2 stage (s)																								
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3										
p0 queue free %	95				100				74	94	97	98	100	74										
cM capacity (veh/h)	1391				1473				240	485	935	451	489	729										
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																				
Volume Total	171	146	117	197																				
Volume Left	69	0	62	9																				
Volume Right	1	10	28	188																				
cSH	1391	1700	340	709																				
Volume to Capacity	0.05	0.09	0.34	0.28																				
Queue Length 95th (m)	1.3	0.0	12.0	9.1																				
Control Delay (s)	3.4	0.0	21.1	12.0																				
Lane LOS	A		C	B																				
Approach Delay (s)	3.4	0.0	21.1	12.0																				
Approach LOS			C	B																				
Intersection Summary																								
Average Delay				8.6																				
Intersection Capacity Utilization				Err%	ICU Level of Service				H															
Analysis Period (min)				15																				



*The attached information is provided to support the agency's review process  
and shall not be distributed to other parties without written consent from  
Bunt & Associates Engineering Ltd.*

## APPENDIX D

### TAC Signal Warrant Analysis



## City of Nelson - Traffic Signal Warrant Analysis

Main Street (name)	Front Street	Direction (EW or NS)	EW
Side Street (name)	Cedar Street	Direction (EW or NS)	NS
Quadrant / Int #		Comments	
for Warrant Calculation Results, please hit 'Page Down'			
CHECK SHEET			

Road Authority:	City of Nelson
City:	Nelson
Analysis Date:	2025 Mar 03, Mon
Count Date:	2024 Nov 06, Wed
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Front Street	WB	1				1		600	1
Front Street	EB	1				1		230	1
Cedar Street	NB				1				
Cedar Street	SB				1				

Are the Cedar Street NB right turns significantly impeded by through movements? (y/n) **y**

Are the Cedar Street SB right turns significantly impeded by through movements? (y/n) **y**

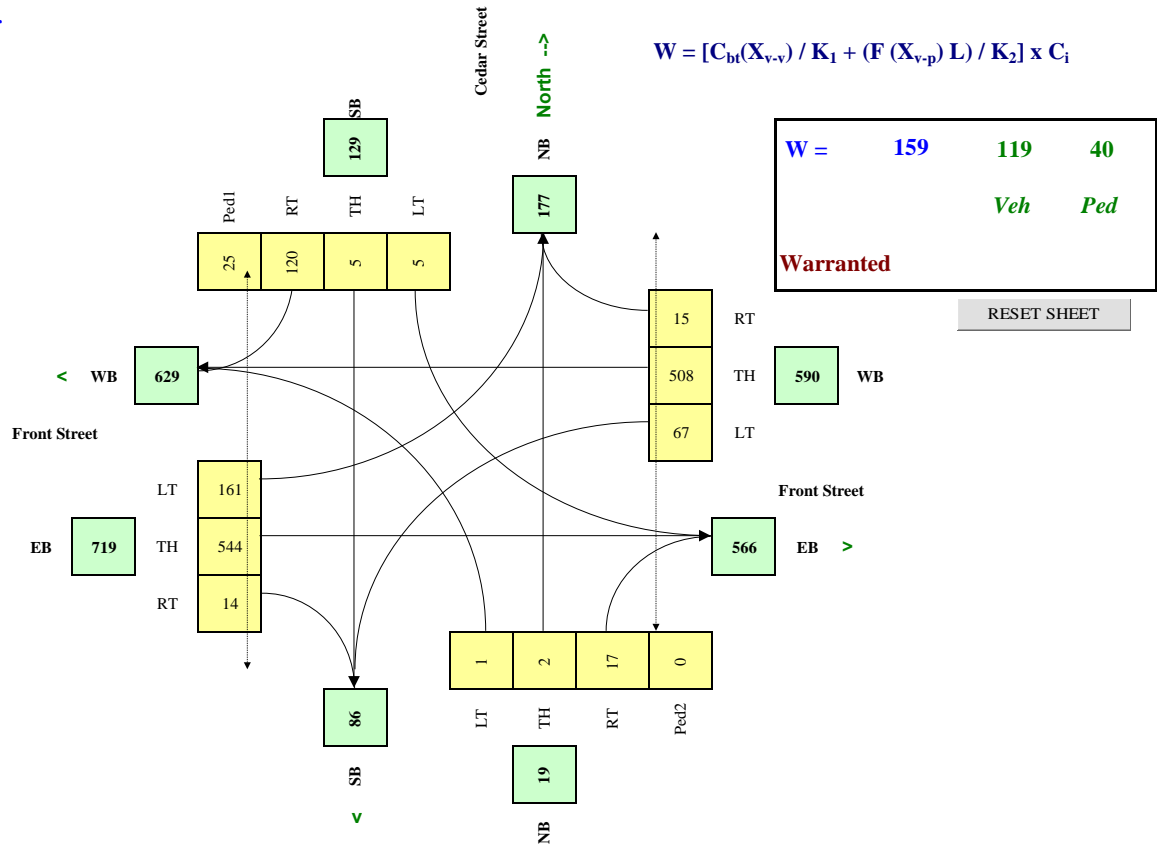
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	y
Pathway to School	(y/n)	n
Metro Area Population	(#)	11,198
Central Business District	(y/n)	y

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Front Street	EW	50	2.0%	y	0.0
Cedar Street	NS		0.0%	n	

Set Peak Hours													Ped1	Ped2	Ped3	Ped4
Traffic Input	NB			SB			WB			EB			NS	NS	EW	EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	1	1	6	6	3	33	40	415	11	83	290	4	6	0	10	1
8:00 - 9:00	1	1	5	10	4	51	63	637	11	111	460	14	17	0	10	4
12:00 - 13:00	1	2	15	4	4	140	66	430	15	177	533	17	29	0	16	5
13:00 - 14:00	1	1	24	2	5	136	64	439	14	159	561	12	25	0	10	2
15:15 - 16:15	1	3	19	5	5	182	86	559	19	230	692	22	38	0	21	7
16:15 - 17:15	1	1	31	2	6	176	83	570	18	206	729	16	33	0	13	3
Total (6-hour peak)	6	9	100	29	27	718	402	3,050	88	966	3,265	85	148	0	80	22
Average (6-hour peak)	1	2	17	5	5	120	67	508	15	161	544	14	25	0	13	4

### Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v-v}) / K_1 + (F(X_{v-p}) L) / K_2] \times C_i$$









# What We Heard Report

## Nelson CARES Society Community Feedback for Proposed Front Street Development



FEBRUARY 2025

Prepared For: City of Nelson

Prepared By: M'akola Development Services on behalf of Nelson CARES Society



# Attachment 8

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# Attachment 8

## INTRODUCTION AND CONTEXT

Nelson CARES Society (NCARES) and M'akola Development Services (MDS) hosted a Community Open House on January 27, 2025, for residents to learn about the development. Attendees were asked to share their comments with a feedback form. Feedback forms were available for two weeks, from January Monday, 27<sup>th</sup>, 2025 to Monday, February 10<sup>th</sup>, 2025. The feedback form and all information presented at the open house was posted on the NCARES website. A total of 74 responses were received, transcribed, and categorised by theme. This report summarizes key themes from the feedback.

## ABOUT THE OPEN HOUSE

The open house took place from 5:00 to 7:00 PM on Monday, January 27<sup>th</sup> at the Prestige Lakeside Resort. All participants were asked to sign-in and fill in feedback forms. NCARES staff welcomed people to the event and signed in a total of 140 people.

The open house was promoted through the following channels:

- A notification went to neighbours within 60 m radius of the proposed development (as required by the City).
- Two newspaper advertisements in the Nelson Star (January 16<sup>th</sup>, 2025 and January 23<sup>rd</sup>, 2025).
- Email invitation (including a sharable virtual invite) was sent to community groups (both those who have expressed opposition and support).
- Email invitation to Mayor and Council.
- Virtual invitation posted on NCARES' webpage.

### ***Virtual Invitation for NCARES Open House***



The virtual invitation is a flyer with a dark blue header. It contains text about the proposed building, an invitation to an open house, a date and time, a location, and a QR code. It also features two images: a rendering of the building and a map of the site.

Nelson CARES Society is proposing a new, mixed-use building that will provide long-term affordable rental housing. This will include an expansion to the NDCC recreation facility as proposed by the RDCK.

**Please join us for an Open House to discuss the proposed project at 818-824 Front Street**

**Date:** Monday, January 27, 2025  
**Time:** 5:00 PM to 7:00 PM  
**Location:** Prestige Lakeside Resort (701 Lakeside Drive)

**All are welcome! Please scan the QR Code for more details.**

## Attachment 8

### FEEDBACK FORM RESPONSE RATE

Out of the 74 responses total, 83% (61) are homeowners, 16% (12) are renters, and 1% (1) are unspecified.

**Figure 1: Responses by Homeowner vs. Renter Status**

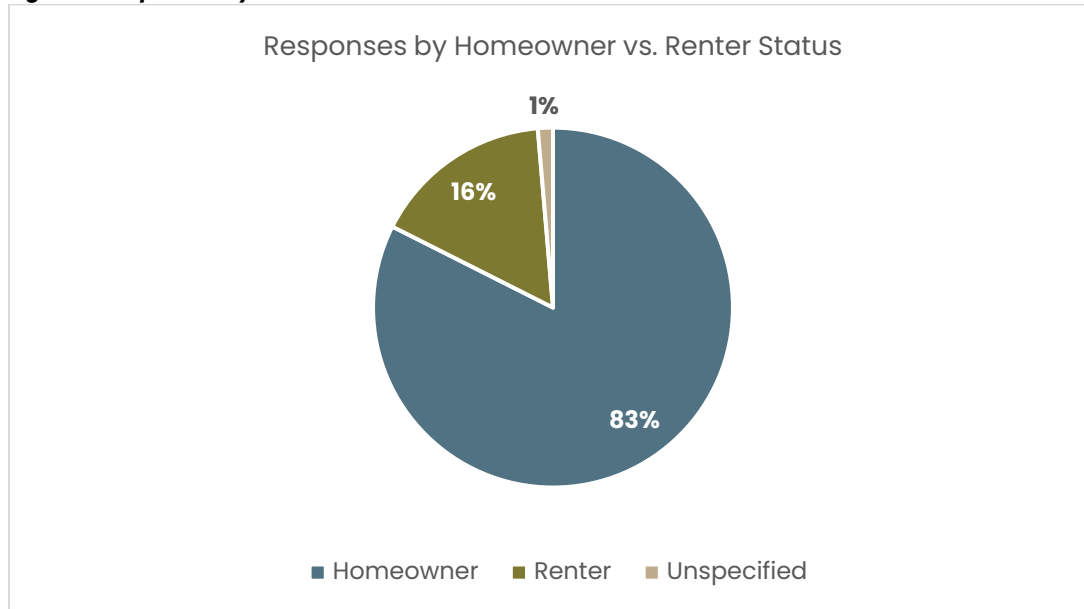
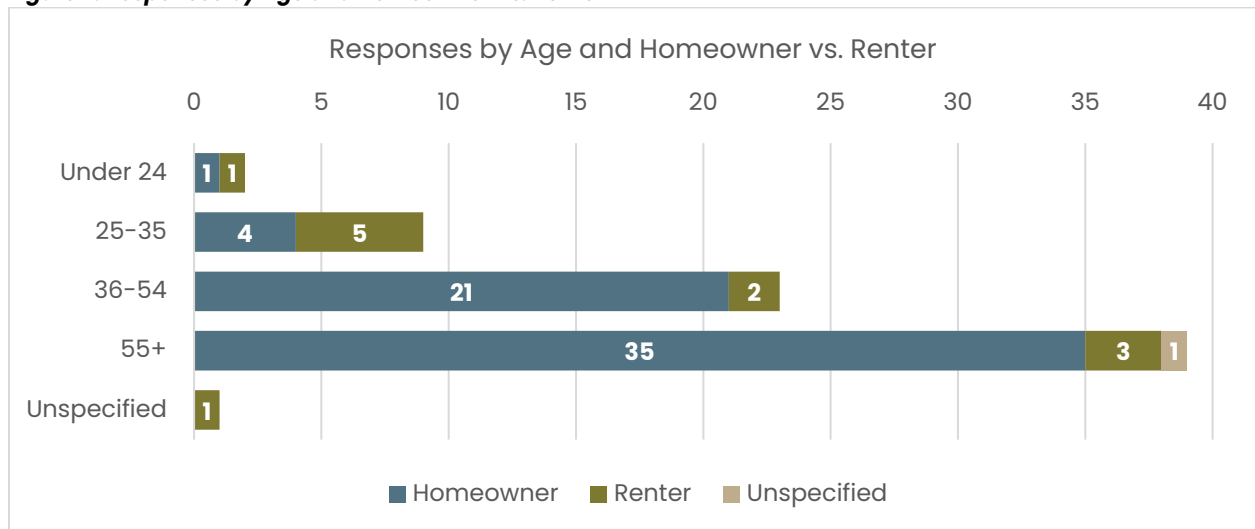


Figure 2 provides a breakdown of responses by age and homeowner vs renter status. In total, 53% (39) of respondents are over 55 years old, 31% (23) are between 31-54 years old, 12% (9) are in the 25-30 range, and 3% (2) are under 24 years old. The remaining 1% (1) did not identify their age.

**Figure 2: Responses by Age and Homeowner vs. Renter**



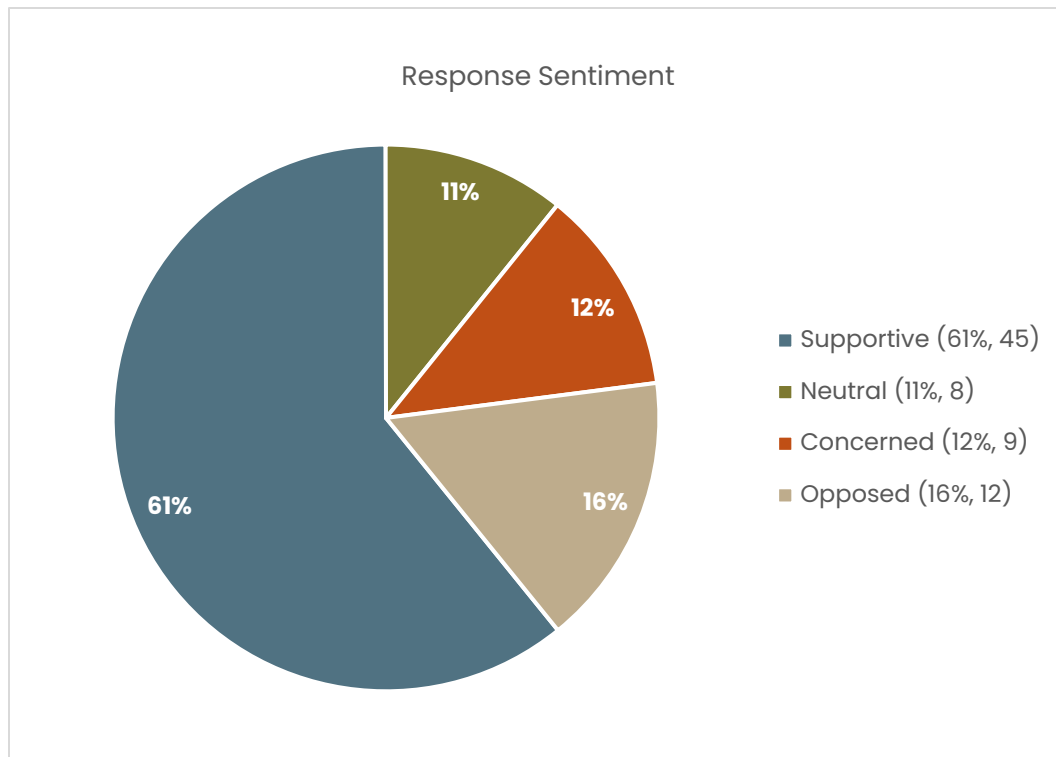


## Attachment 8

### RESPONSE SENTIMENT

Respondents were asked to provide feedback on the proposed development in the feedback form. Responses were categorised as generally supportive of the development (61%, n=45), neutral (11%, n=8), concerned (12%, n=9), or opposed (16%, n=12) based on the comments received (Figure 3).

**Figure 3: Response Sentiment**



## Attachment 8

### KEY THEMES FOR ALL RESPONDENTS

In addition to general sentiment, several key themes from the responses were identified. Many responses were multifaceted and covered multiple themes. Table 1 provides an overview of the key themes identified. The top two themes are the need for affordable housing and the need for recreation facilities. The top five overarching themes include:

1. Affordable Housing
2. Recreation
3. Community Development
4. Parking/Traffic
5. Location

**Table 1: Details on the Top Five Themes**

Theme	Count (n=74)	Percentage (n=74)
<b>Affordable housing</b>	<b>39</b>	<b>53%</b>
Need affordable housing	26	35%
Support affordable housing	10	14%
Residents are being priced out	3	4%
Critical of housing targets	3	4%
<b>Recreation</b>	<b>39</b>	<b>53%</b>
Need more recreation facilities	17	23%
Like NDCC Expansion	14	19%
Concern about future recreation needs	11	15%
Questions/suggestions for use of future NDCC space	7	9%
<b>Community Development</b>	<b>27</b>	<b>36%</b>
Good for community/economy	13	18%
Like collaborative/partnership model	7	9%
Community/individual health	6	8%
Safety	6	8%
Need for additional supports/services (e.g., to promote mental health, for people with disabilities, harm reduction)	5	7%
Opportunities for local workers	3	4%
Encourages diversity	3	4%
<b>Parking/Traffic</b>	<b>21</b>	<b>28%</b>
Parking (suggestion)	8	11%
Traffic/congestion on street	7	9%
Traffic/congestion at entrances/exits	6	8%
Parking (public/street)	6	8%
Parking (reduce stalls)	2	3%
Parking (tenants)	2	3%
<b>Location</b>	<b>20</b>	<b>27%</b>
Dislike location	10	14%
Good location	10	14%
Close to amenities	3	4%

## Attachment 8

### KEY THEMES FOR RESPONSES IN SUPPORT

Table 2 breaks down the key themes among the supportive responses. The three most prevalent themes include:

1. Affordable housing – 71% of supportive responses (n=32)
2. Community development – 47% of supportive responses (n=21)
3. Recreation – 36% of supportive responses (n=16)

**Table 2: Key themes in responses in support of the development**

Theme	Count (n=45)	Percentage (n=45)
<b>Affordable housing</b>	<b>32</b>	<b>71%</b>
Need affordable housing	24	53%
Support affordable housing	8	18%
Residents are being priced out	3	7%
<b>Community Development</b>	<b>21</b>	<b>47%</b>
Good for community/economy	13	29%
Like collaborative/partnership model	7	16%
Community/individual health	3	7%
Safety	3	7%
Opportunities for local workers	3	7%
Encourages diversity	3	7%
Need for additional supports/services (e.g., to promote mental health, for people with disabilities, harm reduction)	2	4%
<b>Recreation</b>	<b>16</b>	<b>36%</b>
Like NDCC Expansion	14	31%
Questions/suggestions for use of future NDCC space	3	7%
<b>Parking/Traffic</b>	<b>11</b>	<b>24%</b>
Parking (suggestion)	7	16%
Traffic/congestion at entrances/exits	4	9%
Traffic/congestion on street	2	4%
Parking (public/street)	2	4%
Parking (reduce stalls)	2	4%
Parking (tenants)	2	4%
<b>Location</b>	<b>10</b>	<b>22%</b>
Good location	10	22%
Close to amenities	3	7%
Infrastructure/Transportation	8	18%
Public transit/active transportation	7	16%
Pedestrian improvements	2	4%
Infrastructure capacity	1	2%
Design	7	16%

## Attachment 8

Like design	4	9%
More artwork/colour in final design	3	7%
Don't like design	2	4%
Like mixed use	6	13%
Family units	3	7%
Sustainability	3	7%
Public consultation	2	4%

### KEY THEMES FOR RESPONSES IN OPPOSITION

Table 3 details the key themes identified in the responses opposed to the development. The top three themes include:

1. Recreation Needs – 100% of opposed responses (n=12)
2. Disliked Location – 58% of opposed responses (n=7)
3. Lack of Public Consultation – 42% of opposed responses (n=5)

**Table 3: Key themes in responses opposed to the development**

Theme	Count (n=12)	Percentage (n=12)
<b>Recreation</b>	<b>12</b>	<b>100%</b>
Need more recreation facilities	11	92%
Concern about future recreation needs	2	17%
<b>Location</b>	<b>7</b>	<b>58%</b>
Dislike location	7	58%
<b>Public Consultation</b>	<b>5</b>	<b>42%</b>
Public consultation	5	42%
Community Recreation Campus Resident Survey results	2	17%
<b>Affordable housing</b>	<b>4</b>	<b>33%</b>
Critical of housing targets	2	17%
Need affordable housing	1	8%
Support affordable housing	1	8%
Community Development	3	25%
Community/individual health	1	8%
Safety	2	17%
Need for additional supports/services (e.g., to promote mental health, for people with disabilities, harm reduction)	2	17%
Parking/Traffic	3	25%
Traffic/congestion on street	2	17%
Parking (public/street)	1	8%
Infrastructure/Transportation	3	25%
Infrastructure capacity	3	25%
Wary of attracting new residents	3	25%

## Attachment 8

### KEY THEMES FOR RESPONSES WITH CONCERNS

Table 4 breaks down the key themes among the concerned responses. The three most prevalent themes include:

1. Recreation – 100% of concerned responses (n=9)
2. Parking/Traffic – 44% of concerned responses (n=4)
3. Public Consultation – 33% of concerned responses (n=3)

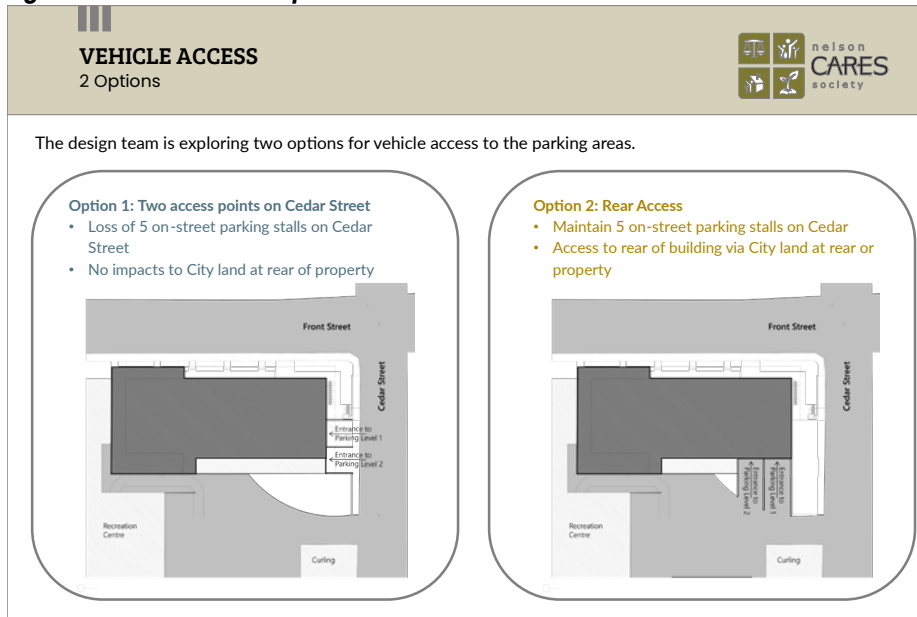
**Table 4: Key themes in responses concerned with the development**

Theme	Count (n=9)	Percentage (n=9)
<b>Recreation</b>	<b>9</b>	<b>100%</b>
Concern about future rec needs	8	89%
Need more recreation facilities	6	67%
Questions/suggestions for use of future NDCC space	2	22%
<b>Parking/Traffic</b>	<b>4</b>	<b>44%</b>
Traffic/congestion on street	3	33%
Parking (public/street)	2	22%
Traffic/congestion at entrances/exits	1	11%
<b>Public Consultation</b>	<b>3</b>	<b>33%</b>
Public consultation	3	33%
Community Recreation Campus Resident Survey results	2	22%
<b>Location</b>	<b>3</b>	<b>33%</b>
Dislike location	3	33%
<b>Affordable housing</b>	<b>3</b>	<b>33%</b>
Need affordable housing	1	11%
Support affordable housing	1	11%
Critical of housing targets	1	11%
Design	2	22%
Don't like design	2	22%
Wary of attracting new residents	2	22%
Community Development	1	11%
Community/individual health	1	11%

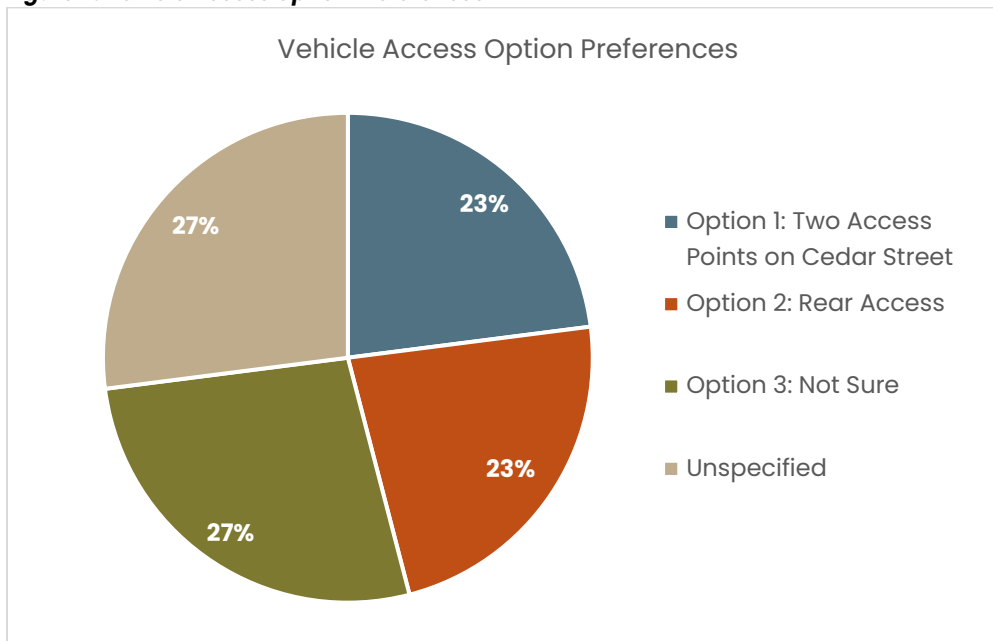
## PARKING ACCESS

The feedback form included a question about the preferred access for the development. Figure 4 illustrates Option 1 (Double Driveway Access off Cedar) and Option 2 (Rear Lane Access). Respondents were also asked to choose which vehicle access option they prefer (Figure 5). Responses were evenly split between Options 1 and 2, with 23% of respondents (n=17) preferring each. 27% of responses (n=20) indicating they were not sure and a further 27% (n=20) did not respond to the question.

**Figure 4: Vehicle Access Option**



**Figure 5: Vehicle Access Option Preferences**





## Attachment 8

### **APPENDIX A – FEEDBACK FORM RESPONSES**

Feedback forms are enclosed. Personal information has been redacted.

Attachment 8

APPENDIX A – FEEDBACK FORM RESPONSES

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
1	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street		N/A
2	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	It seems to be that it would be safer to have the access to the parking spaces to be at the back of the building rather than off of cedar street.	Neutral
3	Unspecified	Renter	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	Like to ensure that deeply affordable units can still access some parking stalls, even though they'll be less likely to have a vehicle.	Supportive
4	25-35	Renter	3-Not Sure	-the development needs more than 1 bike storage per unit, especially in 2-3 bed units. -more family units too! Grossly underrepresented -after this point I read the housing needs assessment piece but I do think thought should be had for growing families. The assessment indicates young folks need support but those people might want to start a family in the future. -I think we need less near market options because that is quite a high threshold. Personally, most of my friends fit in this category. -I fully support more initiatives like this. We need mixed options in Nelson to keep our community diverse. My only comment would be to consider the design. It currently doesn't represent our community well and I'd prefer if it were more like the houses already in town. Give it some charm!	Supportive
5	55+	Renter	1-Access to level 1 & 2 from Cedar Street	As with anything Nelson CARES undertakes – well thought out and with the most concern for our fellow citizens in need of housing. We need to do this. All affordable spaces fill quickly. This can't wait. Thanks for the thoughtful presentation and information.	Supportive
6	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	Looks like a solid, well researched plan. Housing continues to be an issue – glad there are plans to accommodate different income levels so Nelson can be diverse as possible.	Supportive
7	36-54	Homeowner		Recreation only. This is NOT the space for housing. STOP shortchanging our youth & recreation facilities. STOP!	Opposed
8	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	Hi! It seems to make sense to enter the parking garage right off of Cedar. I drive by 2X a day and never see any congestion there. Keep it simple. The building looks GREAT! I really like the portion of the building that is an extension of the recreation centre. I find it interesting and thoughtful that there are studio units right off the sidewalk – usually those spots are for posh townhouses. I like the idea of those units being accessible to those with disabilities (having mobility issues in the past makes this important to me) and that the units can change for tenants needs (again, changes in health). Great location and an important development for the community. To keep Nelson vibrant, we need places (secure, beautiful, functional) for all to live. Hopefully the building includes cooling systems for the residential units to keep everyone safe in the hot weather.	Supportive
9	25-35	Renter	1-Access to level 1 & 2 from Cedar Street	I'm in desperate need of housing.	Supportive
10	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I agree with the proposed plan including added space for the NDCC. Although I think its better for option 1, parking access from Cedar, I think it's best not to lose public street parking. I vote Option 2 access.	Supportive
11	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street		N/A
12	55+	Renter	1-Access to level 1 & 2 from Cedar Street	It is exciting to see this cooperative approach for additional housing. As a 77 year old, I have been waiting over two years for affordable housing such as Hall St. This offers hope for being able to live downtown and access to amenities without having a car. The need is also great for people who work in low and moderate paying jobs who need close access to their work. I appreciate that there is always controversy and as this world changes, the need to provide basics such as affordable housing is increasing. Wishing you all the best!	Supportive
13	36-54	Homeowner	3-Not Sure	-So glad to see an affordable housing project!! -I like the inclusion of the 3 bedroom units -The crosswalk at Cedar and the highway is very dangerous and will require an upgrade to make this development access safe -also like the recreation addition	Supportive
14	36-54	Homeowner	3-Not Sure	My concerns are primarily with the fact that the recreational component is inadequate to provide support or solutions to the present recreational priorities of the RECREATIONAL COMMUNITY and its user groups. The Rec. Commission is a political body that does not actually represent the interests of the local Rec. groups. It is largely a political entity. We (Nelson Hoops Association) have concerns about why the RDCK Reed Campus Survey Results are not going to inform this project. It seems as though this project will be on track for proceeding before the Rec Survey results are made public. I also have concerns that more of the Rec. campus land will be annexed for housing leaving less long-term options for future rec. needs of the community. The Rec component of this project would not be adequate for NHA needs.	Concerned
15	36-54	Homeowner	3-Not Sure	I am not happy with this project proceeding before the results of the recreational community survey are completed. Nelson is a growing community with growing recreational needs. The fact that there is a recreation space in the plan with no plan as to the purpose means that there is little chance it will fit the needs of the community. You are trying to put a square peg in a round hole. This is the last recreation space available and once gone there is little chance that we can expand recreation services. There is other land available that can be used to provide housing. This doesn't have to be it. A small recreation space will only further increase competition between user groups and will not solve current issues/concerns. Healthy community also include recreation for all.	Concerned
16	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	Important to increase affordable housing in Nelson. Need is great for affordable housing for overall well being of the community. Unlikely that the Regional District will use property to develop that small parcel of land if this project does not go ahead. Fully support project.	Supportive
17	19-24	Renter	3-Not Sure	I strongly support the re-zoning in order to increase housing available in Nelson. Front & Cedar is an ideal location for housing, as it is within walking distance of all major amenities and many workplaces. As a young person, I am particularly impacted by unaffordable housing and believe this rezoning would provide a benefit to young people (workers) in our community. Without places for workers to live, our local small businesses and Nelson as a whole cannot thrive.	Supportive
18	55+	Homeowner		It's a great project BUT how can we as parents push CLBC to include a staffed residential model such as Hall St place into this new build. I will continue to advocate with CLBC but it would be important to include this. Or alternative using one of the 3 bed apartments. This is such an important opportunity to address the inclusive model of housing.	Supportive
19	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I think this is a good use of the land. Thank you for all the careful planning and for giving us an opportunity to contribute. It's great to see some more solutions to the lack of housing issue. Thank you. I'm glad to see recreation space included, and environmental housing/EV consideration taken into account.	Supportive
20	55+	Homeowner	3-Not Sure	This is a great idea – rec and housing. Perfect funding idea and it ticks the boxes for a healthy community. Full support.	Supportive
21	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I would prefer not to lose parking spaces as they are at a premium in Nelson, especially the long term spots on Cedar.	Neutral
22	55+	Homeowner	3-Not Sure	Strongly support this project. Nelson desperately needs the affordable housing. The NLC expansion is a bonus.	Supportive
23	55+	Homeowner		-concern about additional traffic in area – entrances -lack of parking which is already a problem -not enough space for recreation area – this is a growing city and there won't be any more space to expand! -I do not think the location is a good one. -will this housing be for Nelson residents only? -will it bring more people to Nelson that need affordable housing? Or serve those who are here already? -is this part of a sustainable tax base for everyone in Nelson? We don't have a Celgar or Cominco... -Please make it prettier	Concerned
24	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	Traffic flow – Front St is busy now Help or hinder tax base? Will this be for Nelson residents or attract more outsiders? What will be in recreation area? To be determined... Question? Sq. footage of units? The design is boxy	Concerned

Attachment 8

APPENDIX A – FEEDBACK FORM RESPONSES

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
25	55+	Homeowner	3-Not Sure	1. Parking entrance/exit access is a concern. Having cars scooting down Edgewood is a concern. 2. The proposed design is, respectfully, not very attractive. Thanks for all the work and involvement! Also, will the added sq ft of rec area meet the needs of the userbase?	Neutral
26	25-35	Homeowner	3-Not Sure	I like that you have identified private car ownership as an unaffordable transportation mode. It is also unsustainable. I support even fewer stalls and increased carshare stalls, a 4-season bus stop, and other similar/affordable, low carbon transportation options! Thanks!	Supportive
27	36-54	Renter	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	This is a great initiative. Thank you for you hard work.	Supportive
28	55+	Homeowner	3-Not Sure	I question site selection, given rec. centre future needs – quite possibly, they would need this site. November 2022 I took part in rock physical therapy program – post heart surgery – it was not pleasant having to do program in arena area – concrete tools. Has CARES prepared an inventory of other potential sites? As to your annual report – dating is missing, other than 2023-2024. Letter from board chair/exec director – undated Further, appears current board not same as board pictured in annual report.	Concerned
29	55+	Homeowner	3-Not Sure	My priority for the proposed recreation space is that an appropriately heated studio room is available and accessible for classes aimed at people with disabilities like post stroke and post cardiac surgery patients.	Neutral
30	55+	Homeowner		The City does not have enough space for the recreational needs of current residents. We need more facilities for the current population, not a bigger population. Please put the needs of existing residents – at this location, on the recreational campus – before adding more housing.	Opposed
31	55+	Homeowner		The 818-824 Front St. property intended for use as part of the recreation campus, not housing! The housing requirement being addresses should be located elsewhere in the city – other properties need to be explored. As a taxpayer, it seems that this proposal has been snowballed and the wool pulled over the taxpayers’ eyes! Keep the recreation campus in tact!	Opposed
32	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	I'm supportive of this project overall. Kudos on adding 50 units to Nelson! I just hope the building would have a more varied exterior – looks a bit institutional in the drawings. Thanks, Nelson CARES leadership!	Supportive
33	55+	Homeowner		Shame! Do I disagree with affordable housing – of course not! But to use land that is perfectly situated for recreation is ridiculous. If you can't afford to build on the land now, then wait. This project needs to stop until the RDCK and City get together and actually come up with viable information and vision. Infrastructure – Infrastructure – we don't have it.	Opposed
34	55+	Unspecified		-Did Nelson CARES Front/Hall St. influence the decision to offer Front/Cedar Lot? -Was/is Nelson CARES concerned re: future recreational use of 818-824 Front St? -Did Nelson CARES attend the Recreation Public Engagement Meetings? If so, did Nelson CARES revive its plans to line with public feedback? -Will Nelson CARES allow the Community Recreation Plan to be completed before rezoning? -How does/would the housing project fit into the Community Recreation Plan? -Traffic impact assessment/parking study – who will conduct the study? I have a concern with potential Cedar/Front intersection congestion, especially that it is a component of the highway system. -City council Dec meeting – confusion expressed by some councillors that 20/30/50% for this housing initiative doesn't align with city's housing report to the province.	Concerned
35	36-54	Homeowner	3-Not Sure	100% in support of this – rezone and redesignation. Why so many single bedroom and studio units? Where do families get to live?	Supportive
36	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I fully support this project and additional housing for all – senior, individuals, and families.	Supportive
37	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I support this project 100%! Affordable housing has consistently been a key issue and concern for Nelson residents for a long time now. Id like to see more residential development of this kind in Nelson generally and on the Rec Centre site specifically.	Supportive
38	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I like the three levels of rental market, income based and deep subsidy. It is good to build community by having diversity. I think saving 5 parking spots might be smart. I wonder what kind of recreation will be in the recreation space.	Supportive
39	25-35	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I think that the multipurpose use of the site is a great way to provide 2 much needed benefits for the community. It's a bold proposal that brings together a bunch of different groups and it would be great to see it happen. I like the proposed design, it suits the site and connects well to the NDCC and is an appropriate scale/height for Front Street. The balconies will have great views and provide nice outdoor space for the occupants. Nelson is a colourful place so I hope that some colour is incorporated into the final design.	Supportive
40	36-54	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	The proposed design is consistent with the rhythm, scale and proportion of Front Street. The City desperately needs additional affordable housing and the partnership to expand the NDCC is sensible. The building's appearance is very encouraging and appealing. It is a nice departure from “colonial flavored” architecture. The masonry base makes sense for durability, metal up top for affordability and the pop of colour is very pleasant. Some wood finished in the lobby would warm up the appearance of the building from Front Street. So far it looks so much better than the other (Nelson CARES Society) building down the street. Great work! Keep going and thank you for advocating for the members of are community who are less fortunate.	Supportive
41	55+	Homeowner		While not opposed to affordable housing, I feel that the property would be better utilized as recreation designation, even/or an expansion to the existing recreation center. Just to be clear, this is not for me, but for future generations.	Concerned
42	Under 18	Homeowner	3-Not Sure	I think it would be a great idea and everyone is doing great and keep doing it. This is a great idea.	Supportive
43	36-54	Renter	3-Not Sure	I think this is an exciting proposal! I hope BC Housing approves. No real concerns at this time. Thank you to Nelson CARES for working on this proposed development.	Supportive
44	36-54	Homeowner	3-Not Sure	I'm pleased to see a thoughtful densification project that provides a response to a clear municipal and regional priority, while also attending to increased recreational space. I appreciate the partnership model and congratulate the RDCK in taking this important step. Many towns don't have the skills, experience, and capacity that Nelson CARES brings to the table and I'm so glad they are willing and able to take on another project of this size. Economies being what it is, I'm glad that BC Housing recognizes the strength of the proposal and is also willing to invest in housing in Nelson. If there is any way to augment the initiative with development that provides opportunities to engage local trades/subtrades and engage apprentices/training that would be most excellent.	Supportive
45	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I'm pleased with the development of more affordable housing. I work with a group of students (adults) who have diversabilites and the prospect of more affordable housing in this area of town is ideal and really appeals to that unique group of individuals. Although this location is tight and high density, it is a great location for those with diversabilities and Nelson CARES Society will be a supportive and essential agency as a housing provider/landlord. There is a housing need. We need more affordable housing and I'm happy to see this come forward!	Supportive
46	36-54	Homeowner	3-Not Sure	I think this proposed affordable housing and recreation facility is awesome. As a home owner that is fortunate to have stable shelter, I see many of my friends struggling in the community with the affordability crisis. Housing prices and rents have sky rocketed and people who have grown up here are having a diffiult time remaining in the community they grew up in. In fact, I think Nelson needs more social zero barrier housing with greater access to mental health and addictions supports and harm reduction facilities.	Supportive
47	36-54	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	Nelson's charm comes from it's heritage. How will this project support the work already done to support the historic themes and values of quality building for generations	Neutral
48	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I think mixed use would be great on this site. Preserving some recreation use on main floor, and addressing affordable housing needs on other floors. Thank you for the energy and work put into the project so far, and keep up the momentum!	Supportive
49	36-54	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	I'm concerned that the rec centre is over-capacity and this proposed expansion is insufficient for our growing community's recreational needs. The weight room is currently operating at a dangerously high capacity. Will this project hinder a proper expansion of the NDCC?	Concerned
50	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	Do it!	Supportive
51	36-54	Homeowner		Terrible idea! Area should be 100% rec	Opposed
52	36-54	Homeowner		N/A	N/A



Attachment 8

APPENDIX A – FEEDBACK FORM RESPONSES

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
53	55+	Homeowner	3-Not Sure	-Reserve the land for expansion of recreation as land is already zoned for -Please release results of community survey -Have Cover Architecture draw up plan (for comparison) of a multipurpose recreational facility	Opposed
54	36-54	Homeowner		I opposed this zoning amendment. This property should be reserved for community recreation. Downtown areas should not and do not need to be the only location for low income housing. Once Nelson CARES builds this complex, there is no longer any community control of what they do with the property. Our downtown is turning into a violent and drug infested slum, and Nelson CARES and the city are not addressing the problems they are causing. The City should retain ownership of any facility and not give up control/amenity decision making.	Opposed
55	36-54	Homeowner	3-Not Sure	I am deeply concerned that Nelson has become unsafe for my family. I no longer feel safe taking my two young children downtown during the day, and certainly not after dark. We need to focus on the impact that new developments have on our community services like policing. How will Nelson CARES address increased policing needs? NPD does not have the capacity to address speeding, etc. because they are fully responding to overdoses (230+ calls in a year). What is going to be done to address traffic? The city and Nelson CARES does not seem to consider the majority of residents. Please keep in mind that young children frequent the NDCC and this space needs to be maintained as a safe place to go. We have already been pushed out of downtown. More people requires more policing. It's time Nelson CARES contributes to the NPD budget!	Opposed
56	55+	Homeowner		I opposed this development. The property needs to be maintained as city owned and used for recreation!	Opposed
				I do not object to residential units (low income and low market) on this site.	Supportive
57	55+	Homeowner		My comments are solely about rezoning this site and not a change to the OCP generally. I favour the creation of low-income and possibly low market units. Nelson needs more housing to accommodate people with long-term connections to Nelson who are getting priced out of their home community. It is especially sad when seniors are forced out of their long term rentals.	Supportive
58	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	-Since the units are small – need to ensure good size windows and light. -It's a very plain building – I would like to suggest a beautiful mural – to be approved not only by the city but more importantly the residents of the building. I think parking lot access would be better off the alley to prevent traffic backup on Cedar.	Supportive
59	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I am supportive of this project and think it is a great use of space. What I would like to see, and anticipate the big issues is, how this will affect vulnerable road users (pedestrians, cyclists, wheelchair users) and welcome any active transportation improvements to the Front/Cedar intersections and path to the mall and waterfront. If traffic consultants on Ministry of Transportation have proposal for what to do, I hope they consult with local user groups before construction.	Supportive
60	25-35	Renter		Looks good to me! Transit and the reduction of the total number of cars would be my strongest suggestion. I suspect that this is a bylaw or code requirement, but if there's any way to reduce the number of parking spots, that would encourage transit usage. Parking spots encourage the presence of more cars, which creates more traffic, which perpetuates the problem. Reduce car counts and encourage the transit build up!	Supportive
61	25-35	Renter		I think the location is great and the opportunity to increase NDCC programming space will be a great asset to the community. I hope that this building will integrate aesthetically with the bright, colourful, and playful design of the recreation centre it will be connected to. The render looks like it will be a great contemporary addition to Nelson's architectural landscape. I like that the entrances face cedar and front street. I think this building and entrances will go a long ways to activate this area. It would be great if the NDCC space had a ceiling high enough for volleyball or other court sports. Exciting project! Would love to see some yellow or brightness on the exterior of the building.	Supportive
62	25-35	Renter	3-Not Sure	I would really like to live here with 1 cat as I rent and it is very expensive for me. I think the location is great because I don't have a car and have mobility issues. If there is a no pet policy I would still like to live here.	Supportive
63	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	I think it's great for the community to have more affordable housing and support the rezoning and OCP changes. Concern I have is parking – not just for the tenants but for visitors. How is this being addressed?	Supportive
64	55+	Homeowner		1. Overall, our community deserves better than this. At the first rec planning consultation meeting, attendees were told that this land was one asset to be considered as part of an overall park & recreation. The council has made a mockery of the consultation process and this is not okay! Work on this housing project should stop. 2. I support and value Nelson CARES, however... I have read about 5-6 new housing projects, in addition to what we already have. That is a huge number of units for a city of 11000 people. Has work been done that ensures there is a need for this much housing? Has consideration been given to impact on infrastructure? Access to doctors? Access to services? Are these units for people in Nelson currently in need of housing or are they to attract new residents? What kind of regional planning is being done? Trail, Castlegar, Rossland need to be included and potential may be better sites for new builds.	Opposed
65	55+	Renter		824 Front Street.  Following a series of housing meetings which I have attended: -city council "housing workshop" - City of Nelson Housing Report to the province -city council meeting re NelsonCares first request for financial assistance -city council meeting re NelsonCares second request for financial assistance -NelsonCares' OpenHouse -January 27th.  I have various observations and questions.  -in response to a question from the Open House meeting; what city owned lands were offered for housing development, Kevin Cormack stated the Fell Street and Front Street lots. In a previous meeting with the CAO re the availability of the 10th Street city owned property for recreational use, Kevin indicated that some of the property is to be allocated to Selkirk College with those lands -field beyond Mary Hall- will be retained for housing including the slope along the roadway. The exception is the lot previously allocated for the new climbing facility. Was this land offered for the Front Street housing initiative? -in response to another meeting question re: how many affordable housing units have been and are to be built in Nelson relative to Trail, Castlegar, it seemed that Nelson's numbers were considerable beyond other communities, including Cranbrook. Could you please share such data? I understand from Trail that they are experiencing difficulties obtaining approval from BC Housing for their projects. -a follow-up to the above-mentioned question, I asked a city councillor for clarity, they responded "how many \$1,000,000 properties are in Nelson?" When I responded that I didn't know, they implied that there is a provincial formula consisting of the number of high-value properties and affordable housing units. Is this the case? -Parking has been a stressor on the Recreation Campus for many years. During a 2024 Recreation Commission meeting the Commission once again deliberated heavily over parking, I suggested that the Commission utilize the Front Street lot for multi-level parking to which the Mayor strongly responded, via zoom, that parking will never occur on the lots. SO NOW two levels will be parking. How does the Mayor and NelsonCares reconcile this conflict? The lot can be utilized to accommodate housing whereas months earlier the Mayor would not entertain parking to accommodate recreation and	Opposed
66	36-54	Homeowner	1-Access to level 1 & 2 from Cedar Street	I have no comments or concerns. Green light.	Supportive

Attachment 8

APPENDIX A – FEEDBACK FORM RESPONSES

Response ID	Age	Renter/Homeowner	Vehicle Access Option	Comments	Sentiment
67	55+	Homeowner		<p>-I support the construction of more subsidized housing in Nelson. The Front Street location seems like an obvious choice. I am pleased to see that the building is intended for a mix of tenant income levels from well below market to near or at market. However, I do wish that the terminology of the taxation subsidized housing industry would be more transparent and black and white. Some housing forms, for some residents of our society need to be directly subsidized by those lucky enough to be able to do so financially. I would appreciate having the terminology for different public rental housing forms transparently stated in black and white terms. A little less 'planner speak' and a lot more explicit, non-judgemental terminology would be most welcome.</p> <p>-The parkade vehicle access should be determined by optimizing the building architectural program dictates and a traffic study. I assume that the entry onto Cedar street is best if conducted further south and uphill on the existing lane access, as this will reduce traffic congestion at the Cedar Street - Front Street intersection. The access should also take into consideration Fire Department access for this Nelson Cares proposed building and the existing recreation campus, including that required for a new Fire Ladder truck which can access six storey buildings (slope gradients and vehicle axle weights).</p> <p>CITY of NELSON</p> <p>-Nelson is experiencing the construction or proposed construction of six storey buildings, which will change the Fire Department emergency response requirements. Presumably, the City of Nelson Fire Department will request a new ladder truck to access buildings of this height. From a brief conversation had with the City Manager during the open house, it seems that the existing ladder truck replacement is anticipated, but as six storey buildings are driving (pun not intended) a replacement with an appropriate ladder engine, the City should communicate, adjunct to the open house feedback: anticipated replacement date, budget, existing reserve balance. The City should also clarify whether or not the existing firehall location will be suitable for a ladder engine that can access six storey buildings. If not, then other capital budget considerations such as firehall replacement should also be clarified with the most specific detail available, including taxation impacts.</p> <p>-I would appreciate Nelson Cares, the City of Nelson and the Ministry of Highways clarifying construction impacts of the proposed construction project on the Front Street, Hall, Hendryx and Cedar Street intersections. I would also ask the City to clarify, how existing water, sewer and storm sewer infrastructure will be affected. The existing sewer plant at Grohman Narrows is at or near end of life replacement. Can the existing plant sustain the additional loads directed towards it from</p>	Supportive
68	55+	Homeowner	1-Access to level 1 & 2 from Cedar Street	<p>I know we need more housing – of course.</p> <p>We also need more recreational opportunities for the broader community e.g., indoor basketball courts, bowling lands, curling rink</p> <p>As a frequent user of NDCC, I know parking is already a big issue. I am concerned about how this will be addressed in the proposed development.</p>	Concerned
69	55+	Homeowner		<p>I respectfully ask that Nelson Cares withdraws this proposal. The project is highly commendable, but not on this site. The OCP should not be amended without the capacity for the public to more fully weigh in on the matter. One open house where we could not freely ask questions was not that opportunity. That was a PR opportunity for your project only. The last recreation survey was 2014. A lot has changed since then. This project should not use land currently zoned for recreation unless the recreational plan has been updated. We do not have data from the 2024 survey. If the city pushes through proposals without 360* consultation it will create more divisiveness for the community which is not upholding the values of inclusivity and collaboration. Population of Nelson is now growing more rapidly. We may need more facilities.</p>	Opposed
70	36-54	Homeowner		<p>As a taxpaying Nelson resident, I am writing to voice my objection to the proposed long term affordable housing project at 816-824 Front Street. I do NOT support the rezoning of this property and would like to see the property in its entirety be devoted and dedicated to enhancement, expansion and development of much needed recreational infrastructure for Nelson and area residents. Over the years Nelson Cares has been instrumental in developing much needed affordable housing projects in this community. The need is great and your contributions have been incredible, however, this is is NOT the site for additional housing. The youth of this community lack access to sufficient recreational infrastructure to keep them engaged in sport, committed to sport, learning and focused on the betterment of their selves, so that they can become functioning, healthy and contributing members to this community and society. Housing can be developed on a wide ranges of properties, on hills or further out of the immediate city core. Recreational facilities cannot, they require flat land, proximity to amenities and transportation routes, and access to parking. Regional communities like Salmo, Castlegar, Grand Forks, etc. etc. can begin to prioritize affordable housing for the Kootenays, it does not all need to happen in Nelson. Nelson is home to incredible youth and adults who deserve as taxpayers, to have a say in how their communities are developed. This is why we have an OCP and Zoning already established for this area. The community has loudly stated that they want and need more recreational infrastructure on this property. As a resident trying to raise a family in this community, I wholeheartedly echo this sentiment. I do not want this prime piece of property and the neighbouring roads situated adjacent to the existing NDCC to be further congested with vehicles belonging to owners in another affordable housing building, nor do I want any of my tax dollars to be used to support any development of housing on this site or for any ongoing utility or maintenance costs of said housing. I want the existing community taxpayers to have access to additional recreational infrastructure that meets the demonstrated and stated needs of the community. This is NOT the location for additional affordable housing in Nelson.</p>	Opposed
71	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	<p>-The partnership – City, RDCK, Chamber – is a brilliant way to increase both housing and recreation</p> <p>-The mix of housing seems practical and contributes to affordable housing</p> <p>-The “green” aspects – heat pumps, future of EV plug-ins – is great</p>	Supportive
72	55+	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	<p>I am in full support of the proposed development, and the necessary re-zoning and OCP amendment to facilitate this.</p> <p>At this time, I believe the creation of affordable, adequate, secure housing should be the top priority.</p> <p>Let's be part of the solution to tackling this every growing housing crisis, which directly or indirectly affects us all.</p>	Supportive
73	25-35	Homeowner	3-Not Sure	<p>I think that having an affordable housing development for low and even no income folks is by far the best use of this land. Housing costs in Nelson have become so high that many people can't afford to rent, and the vacancy rate is so low that it's very difficult to even find somewhere to live.</p> <p>Housing is a human right and a basic need, so the City of Nelson should be doing everything it can to work on housing the homeless folks in our community, while not providing any barriers to that housing. I know that this lot will be used for mixed-income housing, with some market rate housing as well, but everything possible should be done to ensure that tenants don't have to pay more than 30% of their income to live there. Preferably less.</p>	Supportive
74	25-35	Homeowner	2-Access to level 1 & 2 parking from City land (existing, informal lane) at the rear of the building	<p>I strongly support the creation of this affordable housing development. It is a vital need of our community to increase access to affordable housing, and I think it is a clever use of both city and RDCK land to build housing in walkable distance to the recreation campus, along with other shops and amenities. This offers a great benefit to the low income tenants who will have access to the low cost recreation at the NDCC.</p> <p>I also urge Nelson CARES to support the creation of a tenants association so that there is a democratic body to address governance issues, interpersonal issues, and to collectively bargain with the landlord. This is an essential part of ensuring this housing remains truly affordable, accessible, and democratic. Please support this crucial facet of tenants rights.</p>	Supportive



# Attachment 9

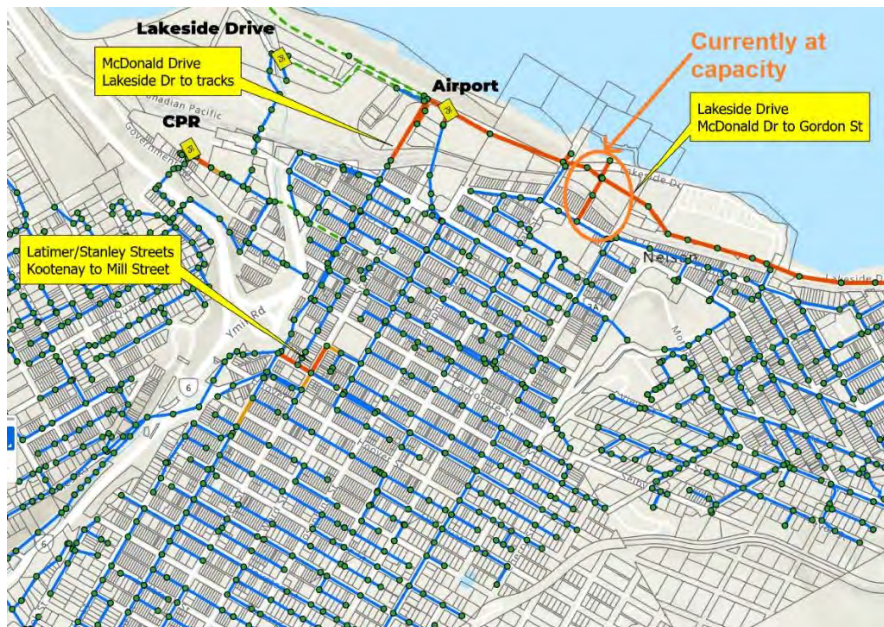
## Engineering and Public Works referral comments for 818-824 Front Street

The Front Street property is not currently serviced but has adjacent mains that can provide servicing. The work Highways did a few years ago will likely have Highways requesting that the servicing go into Cedar Street (as opposed to cutting into Front St). It is assumed that Highways will request a TMP for this location. It is also assumed that Highways will not want access from Front Street (currently appears to be accessed from Cedar). Additionally, it looks like the current access to the back of the RDCK will be impacted by this project.

There is a 6" Sanitary Sewer under the sidewalk along front street. The sanitary from this development will connect to a system that has been shown to be currently at capacity.

There is an 8" Storm Sewer that runs along Cedar Street.

There is a 6" Water Main on Cedar Street. The proponent will need to have some flow testing done to determine if suitable fire flows are available.



I have asked Charlie to provide a servicing estimate. If the proponent wants the City to perform the work, they will need to enter into a servicing agreement and provide a deposit.

Colin Innes, Director of Engineering, Capital & Special Projects



## Attachment 9



Thanks,

Colin Innes



05 February 2025

Ken Bourdeau  
[kboudeau@nelson.ca](mailto:kboudeau@nelson.ca)  
West Kootenay Transit System

**RE:        Application for Rezoning and OCP Amendment at 818-824 Front St, Nelson BC**

Dear Ken Bourdeau,

Based on the plans received 20<sup>th</sup> January 2025, BC Transit staff have completed a detailed review of the proposal to assess if this development could be considered 'transit ready', and to provide recommendations on changes to the proposal which may help this development integrate into your existing transportation network and aid in increasing transit ridership.

The attached document outlines the BC Transit recommendations based on your submission. After reviewing the information enclosed within this letter, you are welcome to request a meeting with members of our team if you have any questions or if clarification is needed.

Should you have any questions or concerns, please contact me at 778-584-2050 or by email at [JGetz@BCTransit.com](mailto:JGetz@BCTransit.com).

Sincerely,

Jen Getz  
Transit Planner  
BC Transit  
778-584-2050  
[JGetz@BCTransit.com](mailto:JGetz@BCTransit.com)



## Development Referral Feedback

**Development Address:** 818-824 Front St & north-east portion of 305 Hall St  
**Local Government:** City of Nelson  
**Date Plans Received:** 20 January 2025  
**Date Referral Feedback Sent:** 05 February 2025

Context Overview	
<b>Land Use Typology</b>	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural <input type="checkbox"/> Suburban
<b>Local Context</b>	<input checked="" type="checkbox"/> Urban Infill <input type="checkbox"/> Urban-Suburban Fringe <input type="checkbox"/> Suburban Infill <input type="checkbox"/> Suburban-Rural Fringe <input type="checkbox"/> Rural <input type="checkbox"/> Exurban <input type="checkbox"/> Suburban
<b>Nearest Existing Transit Stop to the Development</b>	625 Metres
<b>Service Frequency of Existing Transit to the Development</b>	<input type="checkbox"/> Rapid (15-minute headways or better with limited stops) <input checked="" type="checkbox"/> Frequent (15-minute headways or better) <input type="checkbox"/> Local (15 to 60-minute headways) <input type="checkbox"/> Targeted <input type="checkbox"/> Other:

# Attachment 9

## Feedback Related to Use and Density

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The following comments relate to the proposed use and proposed densities of the development in question.

- The development application seeks approval to rezone from I1 Institutional Use Zone to CD10 Residential and Recreation Use Zone; and re-designated the OCP Schedule B Land Use Designations Map from Institutional to Mixed Use Core.
- The proposed development represents an opportunity to merge the lands into approximately 0.39-acre parcel for the creation of a six-storey residential and recreational development comprised of 50 purpose-built, affordable rental units. The proposed development would provide a mix of studio suites, one-, two-, and three-bedroom units, prioritized for low-to-moderate income Nelson residents.
- The site is within 1000 Metres of essential services, including a recreational complex (Nelson & District Community Complex Facility), grocery store, mall, commercial buildings, and restaurants. It is also served by several transit routes.
- The site is surrounded by mixed-use, making the proposed development conducive to high transit ridership.
- The existing street design along Front Street and Hall Street modestly supports transit use and walkability. The lack of setbacks along these streets reduces pedestrian comfort, and lack of bus stop amenities (benches, waste receptacle, shelter) may discourage people from choosing transit.
- Proposed density is high enough to rationalize transit service
- The proposed uses are consistent with current transit plans.

## Feedback Related to Design and Connectivity

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The following recommendations relate to the proposed design of the development, and how it may be altered so as to better integrate with existing or future transit service, in addition to how its design changes may improve ridership or modal split numbers.

- Install sidewalks and street lighting to improve pedestrian access to transit stops and nearby amenities, enhancing walkability and safety.
- Construct on-site pathways to connect buildings and key areas to public sidewalks.
- Provide the minimum-required vehicle parking.
- Locate all on-site parking away from street frontages to improve streetscape aesthetics and pedestrian accessibility.
- Ensure vehicle entrances and exits do not interfere with transit operations or create safety hazards.
- Install on-site cyclist facilities in intuitive locations, and cyclist-friendly pathways to encourage active transportation.
- Incorporate universal accessibility features such as ramps, wide doorways, and tactile signage.
- Enhance safety and crime prevention through environmental design by integrating ample lighting, building setbacks, clear sightlines, and natural surveillance features.

## Assessment of Transit Readiness

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The following section assesses the transit readiness of the location that this development is proposed within. This assessment considers both the existing and planned services accessible to the development, but also the existing and planned infrastructure. For information on infrastructure design, please refer to BC Transit's [On-Street Infrastructure Design Guide](#).

### 1. Current transit service:

- Route 2 Fairview (Frequent Transit Service)
  - Operates between Selkirk College 10<sup>th</sup> Street Campus to the downtown Nelson transit exchange weekdays and Saturdays
- Route 10 North Shore (Local Transit Service)
  - Operates between the downtown Nelson transit exchange and the Balfour Ferry terminal weekdays and Saturdays.
- Route 76 Kaslo-Nelson (Health Connections)
  - Operates between Kootenay Lake Hospital in Nelson and Kaslo City Hall Tuesdays, Wednesdays, and Thursdays.

### 2. Current transit infrastructure:

- Bus Stops:
  - Hall St at Front St (northbound) stop ID 160350. This stop provides northbound service for routes 2 Fairview, 10 North Shore, and 76 Kaslo-Nelson. This stop could be improved by adding a shelter, bench, waste receptacle, and bike racks.
  - Hall St at Front St (southbound) stop ID 160351. This stop provides northbound service for routes 2 Fairview, 10 North Shore, and 76 Kaslo-Nelson. This stop could be improved by adding a shelter, bench, waste receptacle, and bike racks.
  - Vernon St at Hendryx St (eastbound) stop ID 160358. This stop provides eastbound service for routes 2 Fairview and 10 North Shore. This stop could be improved by adding bike racks.
- Existing downtown Nelson transit exchange
  - Located at Ward Street at Baker Street.
  - 2,200 Metres away from subject site.

### 3. Planned Transit Infrastructure:

- New downtown Nelson transit exchange
  - Relocation from the existing exchange at Ward Street and Baker Street to Victoria Street between Kootenay Street and Stanley Street.
  - Minor routing changes will be implemented.
  - Construction completion is targeted for 2025.

February 7<sup>th</sup>, 2025

Ken Bourdeau, Senior Planner  
City of Nelson  
Suite 101-310 Ward St  
Nelson, B.C  
V1L 5S4

*Sent via email:*

RE: Application for Rezoning and OCP Amendment – 818-824 Front Street & north-east portion of 305 Hall Street, Nelson BC

Dear Ken Bourdeau,

Thank you for the opportunity to provide comments on this proposal. It is our understanding that this application is regarding the Rezoning and OCP Amendment for 818-824 Front Street, Nelson, B.C on behalf of Nelson CARES Society (NCARES). The proposal is to rezone the properties at 818-824 Front Street for the development of a six-storey residential complex with 50 affordable rental units, as well as a recreational space that will connect to the Nelson & District Community Complex Facility.

This referral has been reviewed from Healthy Community Development perspective and the following is for your consideration.

This application aligns with the [City of Nelson 2013 OCP](#) and the [2024 Housing Needs Report](#) in which housing affordability and availability were the primary issues for residents. As mentioned in the Housing Needs Report, the rental vacancy rate since 2014 has been between 0% and 0.5%, while a healthy rate is generally considered to be between 3% to 5%. There is increased demand for all types of housing, with growing waitlists for affordable housing services both from residents and employers who have cited housing availability and affordability as the largest impediment to staff recruitment and retention. As such, the proposed rezoning supports the community in meeting the targeted 851 subsidized affordable housing units needed by 2041 to meet demand.

Housing is a prerequisite for health and a basic human right. According to the [United Nations Human Rights Commission](#), housing is the basis of stability and security for individuals and families, and is the

Interior Health would like to recognize and acknowledge the traditional, ancestral, and unceded territories of the Däkelh Dené, Ktunaxa, Nlaka'pamux, Secwépemc, St'át'imc, syilx, and Tšilhqot'in Nations where we live, learn, collaborate and work together.



## Attachment 9

centre of our social, emotional, and economic lives. Improved housing conditions can save lives, prevent disease, increase quality of life, reduce poverty, and help mitigate climate change. Poor housing conditions are one of the mechanisms through which social and environmental inequality translates into unequal health outcomes, which further affects quality of life and well-being. A lack of healthy housing increases our risk of injury, infectious and chronic diseases, and vulnerability to climate change emergencies, like weather extremes and natural disasters (WHO, 2018).

The [HBE linkages toolkit 2018.pdf \(bccdc.ca\)](#) is an evidence-based resource which links planning principles to health outcomes. Prioritizing a variety of diverse housing forms, including long term affordable housing, which are accessible, and close to amenities and local services, can help to meet the diverse needs of all community members.

Additionally, having accessible recreation will allow for residents to stay active and age in place. The central location of this proposed development is near basic amenities, such as grocery stores, clinics, and green spaces. To further promote access for future residents and recreation space users, you could consider an additional covered bus shelter on the Front Street-facing side of the building. This could result in a reduction in both car traffic and air pollution, thereby reducing greenhouse gas emissions.

We commend the City of Nelson for their ongoing work in the housing realm, and we support this application for rezoning which continues our collective progress in addressing an urgent community need. Interior Health is committed to continuing to work collaboratively with the City of Nelson and partnering organizations in support of healthy and sustainable community development. If you have any questions, or wish to discuss further, feel free to email me at [hbe@interiorhealth.ca](mailto:hbe@interiorhealth.ca)

Sincerely,



Kelly McCafferty  
Community Health Facilitator



Mike Adams  
Team Lead, Healthy Community Development

Interior Health would like to recognize and acknowledge the traditional, ancestral, and unceded territories of the Dákelh Dené, Ktunaxa, Nlaka'pamux, Secwépemc, St'át'imc, Syilx, and Tšilhqot'in Nations where we live, learn, collaborate and work together.

## Attachment 9

**From:** [Zone 5 Property Referrals](#)  
**To:** [Ken Bourdeau](#)  
**Subject:** RE: OCP & Zoning Bylaw Amendment (Rezoning) – 818-824 Front St & portion of 305 Hall St, Fortis Property Referral #2025-83 - Due Feb 7 - Nelson  
**Date:** January 23, 2025 8:57:17 AM  
**Attachments:** [image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)  
[image009.png](#)

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Good day,

With respect to the above noted file, FortisBC Energy Inc. (Gas) has reviewed the subject proposal and has no objections or concerns.

Please note that existing gas facilities within the area may, depending on the development's load requirements, not have sufficient capacity and upgrading related facilities may be required.

**Note that there is an existing gas service line to 305 Hall St. If an abandonment or alteration is required due to demolition, renovation or building on the gas meter line location, please contact: 1-888-224-2710 or visit [FortisBC.com\(here\)](#) to guide an online application in order to initiate the planning process.**

Thank you,

**Ryan Mohr** - ASCT – EIT – PMP

Planning and Design Technologist II

Kelowna, BC

Office: 250-258-1431

Email: [Ryan.Mohr@fortisbc.com](mailto:Ryan.Mohr@fortisbc.com)



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**From:** Referrals <[Referrals@fortisbc.com](mailto:Referrals@fortisbc.com)>

**Sent:** Tuesday, January 21, 2025 12:14 PM

**To:** Zone 5 Property Referrals <[Zone5PropertyReferrals@fortisbc.com](mailto:Zone5PropertyReferrals@fortisbc.com)>

**Subject:** OCP & Zoning Bylaw Amendment (Rezoning) – 818-824 Front St & portion of 305 Hall St, Fortis Property Referral #2025-83 - Due Feb 7 - Nelson

[Fortis Property Referral #2025-83](#)

Please review the attached / below and provide your comments directly to [kbourdeau@nelson.ca](mailto:kbourdeau@nelson.ca) by **February 7, 2025**.

If a Statutory Right of Way is required, please copy [referrals@fortisbc.com](mailto:referrals@fortisbc.com) in on your response so

## Attachment 9

that we may update our records.

Thank you,

**Liz Dell**

**Lands Department, Property Services Assistant**

**16705 Fraser Highway | Surrey BC V4N 0E8**

**P: 778-578-8038 / [referrals@fortisbc.com](mailto:referrals@fortisbc.com)**

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**From:** Ken Bourdeau <[kbourdeau@nelson.ca](mailto:kbourdeau@nelson.ca)>

**Sent:** Monday, January 20, 2025 3:56 PM

**To:** Colin Innes <[CInnes@nelson.ca](mailto:CInnes@nelson.ca)>; NHDesign <[NHDesign@nelson.ca](mailto:NHDesign@nelson.ca)>; Referrals <[Referrals@fortisbc.com](mailto:Referrals@fortisbc.com)>; Charlie Henderson <[chenderson@nelson.ca](mailto:chenderson@nelson.ca)>; Jeff Hebert - Fire Dept. <[JHebert@nelson.ca](mailto:JHebert@nelson.ca)>; Bruce McNeil <[BMcNeil@nelson.ca](mailto:BMcNeil@nelson.ca)>; [developmentreferrals@bctransit.com](mailto:developmentreferrals@bctransit.com); [hbe@interiorhealth.ca](mailto:hbe@interiorhealth.ca); Baron Gould <[bgould@nelson.ca](mailto:bgould@nelson.ca)>; [info@sd8.bc.ca](mailto:info@sd8.bc.ca); Shannon Mackinnon <[smackinnon@nelson.ca](mailto:smackinnon@nelson.ca)>

**Subject:** [External Email] - Referral for OCP & Zoning Bylaw Amendment (Rezoning) – 818-824 Front St & portion of 305 Hall St, Nelson

**CAUTION:** This is an external email.

**Do not respond, click on links or open attachments unless you recognize the sender.**

**RE: Referral for OCP & Zoning Bylaw Amendment (Rezoning) – 818-824 Front Street & north-east portion of 305 Hall Street , Nelson**

PID: 007-487-240; 007-487-231; 013-691-341; 013-691-198; 013-691-171; 027-011-151  
(portion of)

Legal: If required, please request

This is an application for an Official Community Plan Amendment and Zoning Bylaw Amendment (Rezoning) for 818-824 Front Street & a portion of the north-east portion of 305 Hall Street, Nelson, BC. The purpose of this application is to ensure appropriate OCP designation & zoning are in place to allow for the construction of a **50 unit multi-unit apartment building** and **490 sq m (5,275 sq ft) addition to the Nelson & District Community Complex (NDCC) building** on the subject site.

There are three components to this application:

- the purpose of the OCP amendment is to amend the land use designation from 'Institutional' to 'Mixed-Use Core'; and
- the purpose of the rezoning is to amend the zoning from 'I1 – Institutional' to 'CD10 – Residential & Recreation Use Zone'.

In the attached document you will find:

- Proposal summary;

# Attachment 9

- Proposal site plan;
- Proposal renders; and
- Site Location Map.

## NOTES:

- If the proposed OCP Amendment and Rezoning are approved by Council, a separate Development Permit application will be submitted that includes complete architectural & landscape drawings. A separate referral will be sent for that application.
- The drawings currently show parking ramps directly off of Cedar Street. Through the public engagement process, the proponent is gather feedback on whether the community prefers access directly from Cedar (per the drawings), or off the rear of the property (through a right-of-way) on the City owned lot (302 Cedar Street - where the curling rink sits).
- **Please provide your comments by February 7, 2025.** If you have questions please contact me. If we do not receive a response we will understand you have no comments or objections to this application.

Thank You,

### Ken Bourdeau, RPP, MCIP (He/Him) | Senior Planner

Development Services & Climate Leadership

Suite 101-310 Ward St. Nelson, BC V1L 5S4

Tel: 250.352.8202 | Ext. 202



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# Attachment 9

**From:** [Swan, Crystal MOTI:EX](#)  
**To:** [Ken Bourdeau](#)  
**Subject:** Referral Response for a Re-zoning and OCP Amendment | 818-824 Front St/Hwy 3A, Nelson | File # 2409002 | MoTT # 2025-00299  
**Date:** February 4, 2025 8:58:33 AM

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Hi Ken,

Thank you for the opportunity to review and provide comments on above noted re-zoning and OCP amendment referral.

The Ministry has no concerns over the requested re-zoning or OCP amendment.

The Ministry would like to provide the following comments on this development:

- Direct access onto Highway 3A/Front Street will not be permitted. This development will need to access off of Cedar Street, with the access point being as far south on the property as can be managed.
- A Structure Setback permit will be required for all portions of this development that are taller than 0.6m and within the first 4.5m from the property line.
- Although the adjacent sidewalks fall under the responsibility of the City of Nelson, the Ministry would like the following items to be considered:
  - That there be sufficient space for snow removal, so that pedestrian mobility is not restricted during the winter months
  - That the sidewalk maintains a minimum width of 1.5m, which might be difficult with the proposed plan given the location of existing telephone poles and/or luminaire standards.

Please reach out if you have any questions.

Have a great day,  
Crystal

**Crystal Swan**  
**Development Services Officer**  
**Ministry of Transportation and Transit | West Kootenay District**  
4th Floor 310 Ward St. Nelson, BC V1L 5S4  
Phone: (778) 463-5605

[Learn more about Highway Use Permits](#)  
[Learn more about Subdividing Land](#)

*I am grateful to live, learn and work on the territories of the Syilx Okanagan, Sinixt, and Ktunaxa peoples.*