**Nanaimo Operations Centre Value Management Report (V.2)**
**Applications and Limitations**

The attached report is a summary of the value management review of:

- Nanaimo Operations Centre 2021 Master Plan/Conceptual Plan (July 23, 2021);
- Nanaimo Operations Centre – Amendment to 2021 Master Plan/Conceptual Plan (April 26, 2022); and,
- Associated Class D cost estimates completed in May of 2022 and October of 2023.

Plans are conceptual level designs which still require refinement before implementation. Similarly, the cost estimates associated with these conceptual level designs are 'order of magnitude' estimates based on a limited level of detail that also require significant refinement as designs and market conditions evolve.

This value management review identified potential improvements to the value, utility, and costs associated with these conceptual plans. The value review team generated creative ideas which explored various alternatives. Preliminary cost savings for these ideas will help the City during detailed design of the Public Works Master Plan.

The creative ideas were developed to a 'back of the envelope' level of maturity. Many were completed without collaboration with affected City work groups. The ideas require additional development to see if they would be an improvement over the existing conceptual plans. Similarly, the rudimentary cost estimates associated with these creative ideas would require significant refinement as that development evolves.

We want to provide clarity and context while reading this report and readers are encouraged to remember that not all of these creative ideas, and their associated preliminary costs or savings, have been deemed viable. Many factors, including operational best practices, legislative requirements, expected community service levels, collective bargaining commitments, labour and material costs, and environmental stewardship, must be taken into account while evaluating which creative ideas should be carried into detailed designs.

THE CITY OF NANAIMO, BRITISH COLUMBIA

# NANAIMO OPERATIONS CENTRE (NOC)

## Value Management Study Report

**2023 OCTOBER 23 - 27**

MEMAR Value Strategies Inc.
Calgary, Alberta, Canada

| DOCUMENT STATUS | | | |
|---|---|---|---|
| **VERSION** | PRELIMINARY V.2 | | |
| **DATE** | 2023 DECEMBER 07<br>2023 NOVEMBER 08 (V.1.1) | | |
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## Figures and Tables





## Appendices

# 1.0 Executive Summary

This document summarizes the Value Management (VM) Study undertaken for the master plan of the Nanaimo Operations Centre (NOC). Value Management is a prescribed analytical and creative methodology that combines a set of established tools and techniques to find the optimum balance of benefits in relation to life cycle costs and associated risks. This VM Study was conducted by MEMAR Value Strategies Inc. in a workshop setting held in Nanaimo. Over twenty individuals, with a range of interests and relevant specialized skills, participated in this workshop. This team of participants i.e., the VM Team, applied VM method to the NOC master plan to analyze required functions of the expansion and upgrade of the Public Works Yard lands. The VM Team generated alternatives, identified options and new opportunities, and proposed modifications to the master plan, facility design and presented technical solutions to the issues that were identified in the proposed master plan.

## 1.1 General Outline

The “Nanaimo Operations Centre - Master Plan/ Conceptual Plan” (April 26, 2022) provides for the future expansion and upgrade of the lands available at the Public Works Yard located at 2020 Labieux Road, Nanaimo, BC V9T 6J9. The master plan was prepared and submitted to the City of Nanaimo by the firm of KASIAN Architecture, Interior Design and Planning Ltd.

The City of Nanaimo engaged MEMAR Value Strategies Inc. of Calgary to undertake this VM Study. The study was executed under the guidance and direction of the Engineering and Public Works division, the City of Nanaimo. It was held on October 23 – 27, 2023, over 4.5 days (38.0 hours) at a conference centre in downtown Nanaimo, in compliance with the VM standard, and procedures prescribed by SAVE International, USA (www.value-eng.org) and accredited by Value Analysis Canada (www.valueanalysis.ca).

The primary goals of the VM Study were:

- to identify any gaps, opportunities, and omissions in the proposed master plan, and
- to define the effectiveness of and find efficiencies in approaches and solutions identified by the study.

These goals enable clarity of purpose and direction for the future expansion and upgrade of the NOC.

The VM Study participants in the workshop were specialists in relevant disciplines. Areas of expertise represented included project management, facilities planning, management and operations, finance, cost analysis, purchasing and procurement, engineering, architecture and design, and construction. The VM Team members were drawn from both the City of Nanaimo administration (including personnel from the City’s Operations and Engineering teams) and several consulting firms (including Kasian’s project manager).

Led by a Certified Value Specialist (CVS®), this team of experts applied Value Management’s structured approach to review and analyze the overall master plan and its specific components. The VM Team developed an in-depth understanding of the City’s strategic requirements, current challenges, and how this was addressed by the proposed master plan. It then generated alternatives and evaluated creative options using master plan horizon considerations, operations requirements, and operational efficiencies at a balanced total cost. By the conclusion of the workshop, the VM Team identified value improvement opportunities and developed proposals regarding the future of the NOC.

The VM Study generated 135 creative ideas, which after evaluation, resulted in 43 VM Alternatives including programmatic/ project/ design suggestions and technical solutions. These were developed into business cases presented in this report. The VM Team categorized these business cases into the following broad themes:

1. Project Planning and Development
2. Operations Workflow Modifications and Adjustments
3. Site Layout and Configuration
4. Building/ Facility Configuration

## 1.2 Value Management Study Approach

Value Management Study uses the international "Value Methodology Standard" established by SAVE International®, USA (www.value-eng.org) and accredited by Value Analysis Canada (www.valueanalysis.ca). "Value Methodology" is the general term that describes the structure and process for executing the VM Study. It is a specific six-phase structured method, executed in a workshop format with a multidisciplinary team to improve the value of a program, a project, or a process through the analysis of functions and the identification of targets of opportunity for value improvement. These six-phases are:

1. Information Phase
2. Function Analysis Phase
3. Creativity Phase
4. Evaluation Phase
5. Development Phase
6. Presentation Phase

**Defining Value**

Within the context of Value Management, 'Value' is expressed by the following relationship:

$$\text{Value} \sim \frac{\text{Function}}{\text{Resources}}$$

- **Functions** are measured by the performance requirements of the customer/ owner, such as mission, objectives, scope and quality improvements.
- **Resources** are measured in materials, labor, price, time, risk reduction etc. required to accomplish the specific function.

VM Study focuses on improving 'Value' by identifying the most resource efficient way to reliably accomplish a function that meets the performance expectations of the customer/ owner. This expression is presented further as:

| | | | | |
|---|---|---|---|---|
| Value ~ | Function | Performance | Benefits or Outcome | Strategic Goals/ Objectives |
| | Resources | Cost | Expenditure | Investment |

With this method, the VM Team identifies the essential program/ project functions and alternative ways to achieve those functions. It then selects the best alternatives to develop into workable solutions for value improvements. Ideally, the VM Team looks for opportunities to increase function and concurrently find ways to reduce resource requirements, where applicable. This will achieve the best value solution. Understanding how 'Value' is affected by changes in function and resources provides the foundation for all Value Management studies.

## 1.3 Nanaimo Operations Centre (NOC) VM Study Context

The NOC VM Study is based on:

- the 'Nanaimo Operations Centre - Amendment to 2021 Master Plan / Conceptual Plan' (dated April 26, 2022) report, and
- the Class D estimate by BTY Group (Program Estimate # 1.4' dated October 22, 2023).

Note that a revised capital cost estimate of $68.1 M approx. was used as a baseline cost. A Function Analysis Systems Technique (FAST) Diagram of the NOC master plan is presented in Appendix B. The VM Study participants consisted of disciplinary experts from multiple organizations as listed in the table below.

| Value Management Study Participants | | |
|---|---|---|
| **NAME** | **DISCIPLINE/ ROLE** | **ORGANIZATION** |
| Art Groot | Director, Facility & Parks Operations | City of Nanaimo |
| Bill Sims | GM, Engineering & Public Works | City of Nanaimo |
| Brandon Miller | Manager, Fleet Operations | City of Nanaimo |
| David Edmunds | Architect | GEC Architecture |
| David Myles | Manager, Utilities | City of Nanaimo |
| Dragana Perusinovic | Consulting Architect | Kasian Arch. & Interior Design |
| Jane Rushton | Manager, Purchasing & Stores | City of Nanaimo |
| Jim Mann | Architect | HDR Architecture |
| John Elliot | Director, Public Works | City of Nanaimo |
| Laura Mercer | Director, Finance | City of Nanaimo |
| Marcus van Zyl | Manager, Construction Projects | City of Nanaimo |
| Michael Lonsdale | Senior Project Manager | City of Nanaimo |
| Mike Strain | City's Former PM of NOC | Capex Projects |
| Mike Squire | Manager, Water Resources | City of Nanaimo |
| Mushtaq Rabbi | CVS, VM Team Leader/ Facilitator | MEAMR Value Strategies Inc. |
| Peter Lejcar | Civil Engineer | Associated Engineering |
| Ping Pang | Cost Analyst | BTY Group |
| Poul Rosen | Director, Engineering | City of Nanaimo |
| Stacy McGhee | Manager, Strategic Facilities Planning | District of Saanich |
| Steven Wiebe | Fleet Management | Innotech Fleet Strategies |
| Tobin Hwang | Senior Project Manager | Colliers Project Leaders (Saanich) |

## 1.4 Background of NOC Master Plan

### Context

The purpose of the NOC master plan is to address the enduring and increasingly unsustainable health, safety, environmental and operational shortcomings of the Public Works Yard in a fiscally responsible manner.

In 2021, Kasian developed a master plan for NOC (revised April 2022) through a combination of information obtained from prior master planning exercises. There were inputs from the City's steering committee and user groups, followed by a review of existing site conditions. The master plan addressed specific planning concerns i.e., a focus on safety by design, establishing and maintaining critical operational adjacencies, establishing safe and effective circulation patterns (pedestrian, vehicular and operational) and striking a balance between short-term economy and long-term operational value.

**Fig. 1 Current Site Layout**

The primary strategy outlined in the master plan is the continued and uninterrupted operation of the existing Public Works Yard. To that end, the 'Phasing Plan' divided the work necessary to execute the master plan into four phases.[1] The phasing represented an approach for the execution of the master plan, which would prioritize deployment of new facility as quickly as possible while maintaining continuous operation of the site. The phases were organized so that site areas are redeveloped only once, and work functions are relocated to their final location wherever possible.[2]

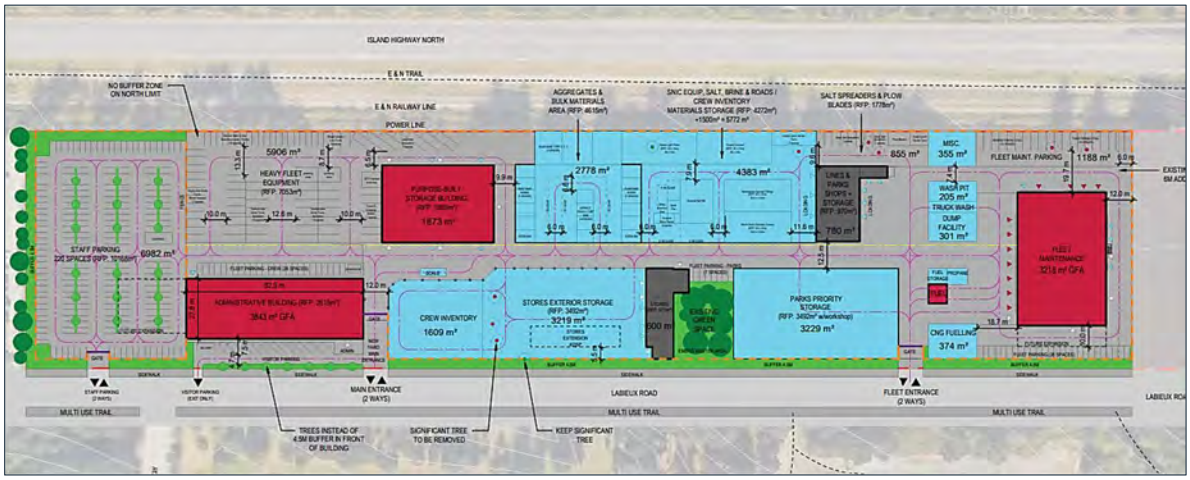



**Fig. 2 Proposed Master Plan**

## 1.5 Objectives of the Value Management Study

- To confirm if the proposed layout and design efficiently accommodate all necessary operational functions and equipment or, alternatively, to determine, if there is a need to consider other locations to house services or workgroups.

[1] For additional details refer to Section 2.1 Implementation/ Phasing Strategy, City of Nanaimo, Operations Centre, Amendment to 2021 Master Plan (p. 5-11).
[2] Nanaimo Operations Centre - Amendment to 2021 Master Plan / Conceptual Plan, April 26, 2022, p.5, KASIAN Architecture, Interior Design and Planning Ltd.

- To determine if the master plan for NOC can meet current and future space programming needs, accommodating anticipated future growth, providing flexibility to respond to changes in service levels, or introducing new services or existing services be removed.
- To identify any redundancies or omissions on the site and building layouts and determine what design improvements can be introduced for more efficient workflows, collaboration and inclusion.
- To explore possibilities for improvements to service delivery without impacting the vision for the NOC.
- To identify opportunities to minimize future maintenance concerns and extend facility lifecycle.
- To ensure facility design incorporates sustainable and eco-friendly features that support the achievement of City of Nanaimo's environmental stewardship goals.
- To identify how the NOC site can best be screened from the adjacent neighbourhoods and roads while maintaining critical security requirements.

The City's baseline expectations from the VM Study are:

- A streamlined workspace that meets all day-to-day operation and maintenance requirements within the limited resources available.
- A well-managed project with a view to the future, with lifecycle cost impacts, i.e., maintenance, operational activity, and construction costs considered and balanced.
- Propose enhancements to the work environment (i.e., workspace and work-culture), to eliminate existing gender and mobility inequalities experienced by the City's workforce in existing facilities and to community connections that provide accessible spaces that are welcoming and inclusive to all.
- Resolution of any existing environmental issues while enhancing the City's ability to reach its environmental stewardship as well as energy and GHG reduction goals in the future.

## 1.6 Baseline Estimate of Capital Investment

The City of Nanaimo had proposed the following information to be used as baseline cost, representing 85.4% of the capital budget, as a target for value improvement:

| Table 1. Labieux Works Yard Components | Est. Cost in C$ (Oct 22, 2023) |
|---|---|
| New Admin Bldg. | 20,143,900 |
| Fleet Maintenance Bldg. | 15,034,300 |
| Outdoor Yards + Site Development | 12,459,600 |
| Purpose Built Storage Bldg. | 6,616,300 |
| Demolition/ Site Preparation | 4,241,100 |
| Site Development | 4,191,600 |
| Reno. Lines & Parks Shop + Storage | 1,706,500 |
| Electric Charging Stations | 1,430,400 |
| Renovated Stores Bldg. | 1,034,900 |
| Relocation of Existing Facilities | 398,800 |
| CNG Fueling Station | 356,400 |
| Relocation of Existing Plant, Eqpt. + Materials | 341,900 |
| Sprinkler System (2) | 131,100 |
| **TOTAL EST. CONSTRUCTION COST** | 68,086,800 |

**Economic Data for Life Cycle Cost Analysis**
To express life cycle costs, the Value Alternatives have been presented based on discounted present worth cost. The economic criteria used by the VM Team were as follows:

**Table 2. Economic Data for Life Cycle Cost Analysis**

| Year of Analysis | 2023 |
|---|---|
| **Analysis Period** | 50 years |
| **Gross Discount Rate** | 10.0% per year |
| **Inflation Rate** | 5.0 % per year |
| **Net Discount Rate** | 5.0 % per year |

## 1.7 Value Target Functions

The VM Team targeted functions in the project where value could be increased by optimizing proposed solution or identifying new opportunities, resulting in greater performance and/or capital or life cycle cost avoidance/ addition while enhancing or maintaining necessary functions and objectives. The result was 135 creative ideas for Labieux Works Yard (NOC master plan) across the seven value target functions shown in the table below. The abbreviations shown are used in the numbering of the creative ideas as presented in Appendix D.

| Value Target Function | Abbreviation |
|---|---|
| **Control/ Access Inventory** | CI |
| **Define Sustainability Targets** | DT |
| **Enhance Work Environment** | EE |
| **Enhance Operations Flexibility** | EF |
| **Improve Circulation** | IC |
| **Improve Spatial Efficiency** | IE |
| **Optimize Operational Capability** | OC |

## 1.8 Functional Attributes or Performance Criteria

The following Functional Attributes or Performance Criteria were prioritized by the City of Nanaimo and VM Team to evaluate and shortlist various Value Alternatives for developing proposals:

| Functional Attributes / Performance Criteria | Definition |
|---|---|
| **Functional Suitability** | ▪ Perform facility functions and create an environment in compliance with vision, mission, and regulatory requirements.<br>▪ Integrates HSE (health, safety, and environment) best practices within the design. |
| **Financial Viability** | ▪ Project will need to be completed within the approved budget allocations. |
| **Ease of O&M** | ▪ Operation and maintenance functions and activities within the site and within the facilities can be executed unhindered. |
| **Space Programming & Efficiency** | ▪ Workflow and space allocation fit for purpose. |
| **Future Adaptability** | ▪ Purposeful flexibility that allows NOC to be easily adaptable to future operational changes.<br>▪ Enhances the City's resiliency and emergency/post-disaster response abilities. |

## 1.9 Summary of VM Results

The evaluation of the 135 creative ideas resulted in 43 VM Alternatives. An “Alternatives Summary” sheet is presented at the beginning of Section 2 of this report, listing the VM Alternatives along with their description and cost implications (where applicable).

Decisions on implementation by the City of Nanaimo will determine the ultimate cost implications. However, the VM team acknowledges the City of Nanaimo project team may prefer a different combination of the VM Alternatives upon further analysis. All the VM Alternatives, as developed during the VM Session, are included in Section 2, following the “Summary of Value Alternatives” sheets.

The overall observations and proposed approach by the VM Team to address master plan development for the NOC at the end of this study are shown below in Table 3. Some of these Alternatives are mutually exclusive and/ or can be combined with other Alternatives for better results upon implementation.

## 1.10 Alternatives Accepted by the City of Nanaimo

Following review of the Final VM Study report, Engineering Services personnel of the City of Nanaimo will make consensus decisions on VM Study proposals via internal team analysis, and in discussion with Kasian Architecture & Interior Design team, the consultant of record.

## 1.11 Acknowledgements

MEMAR Value Strategies Inc. wishes to thank Engineering Services, the City of Nanaimo, for their leadership on this critical initiative. We appreciate their cooperation and support in preparation for this VM Study, and especially for their attendance and participation during the VM session. The thoughtful reception of the VM Team’s proposals during the Presentation Phase from Engineering and Public Works Services, the City of Nanaimo team was much appreciated.

Finally, we thank the disciplinary experts of KASIAN Architecture, Interior Design and Planning Ltd., GEC Architecture, HDR Architecture, Associated Engineering, Capex Projects, Innotech Fleet Strategies, BTY Group, the District of Saanich, BC, Colliers Project Leaders and the City of Nanaimo’s Engineering and Operations Services for their expertise, input and active participation during the VM Study.

**1.9 Table 3. Summary of VM Results (Alternatives and Project/ Design Suggestions)**

## VM TEAM'S OBSERVATIONS AND PROPOSED APPROACH FOR THE DEVELOPMENT AND THE EXECUTION OF THE NANAIMO OPERATIONS CENTRE (NOC)

| | PROJECT PLANNING/ DEVELOPMENT | | | WORKFLOW MODIFICATIONS/ ADJUSTMENTS | | | SITE LAYOUT/ CONFIGURATION | | | BUILDING CONFIGURATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Idea #** | **Title** | LCC Avoidance/ Increase | **Idea #** | **Title** | LCC Avoidance/ Increase | **Idea #** | **Title** | LCC Avoidance/ Increase | **Idea #** | **Title** | LCC Avoidance/ Increase |
| DT-02 | DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.) | $1,966,600 | CI-02 | DEVELOP CONTROL STRATEGY FOR STORES | $2,604,500 | EF-02 | COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING | $4,969,900 | EE-06 | ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT | $1,103,200 |
| DT-03 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO | $1,038,700 | EF-05 | CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), PUBLIC WORKS AND CONSTRUCTION | $916,500 | IE-41 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 1 | DS | EF-04 | LONG SPAN BEAMS IN ADMIN BLDG FOR FUTURE FLEXIBILITY | $1,259,000 |
| EE-08 | ADD STAFF TRAINING AND CHANGE MANAGEMENT AS PART OF THE PROGRAM | DS | IC-07 | MOVE HV TRUCK DUMP FACILITY OFF SITE | $62,500 | IE-43:48 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 2 - 7 | DS | EF-14 | ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM | $455,800 |
| EF-11 | RE-EVALUATE PROJECT DELIVERY METHOD | DS | IE-01 | DEVELOP OFF SITE STORAGE | $4,965,100 | EF-09 | INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE | $312,500 | EF-18 | REGULARIZE STRUCTURAL BAYS IN THE FLEET BLDG. | DS |
| IE-40 | COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN | DS | IE-04 | ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA | $747,900 | EF-17 | REEVALUATE STRATEGIC GROWTH TO REFLECT WITHIN THE MASTER PLAN OF NOC | DS | IC-04 | COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG | $1,141,800 |
| OC-04 | RECALCULATE BUDGET CONTINGENCY | DS | IE-06 | ELIMINATE ON SITE FUELING | $1,443,800 | IC-13 | SEPARATE INGRESS AND EGRESS POINTS TO THE SITE | $956,300 | IE-11 | INCLUDE CARPENTRY INTO FLEET MAINTENANCE | $1,038,900 |
| OC-11 | DIVIDE THE PROJECT INTO TWO PHASES ONLY (FOR BORROWING) | $83,719,600 | IE-16 | OUTSOURCE LIGHT DUTY FLEET | $873,900 | IE-03 | DEVELOP A STRATEGY FOR CONTROLLED GROWTH | DS | IE-12 | INTRODUCE THREE LEVELS IN THE FACILITIES | $1,205,400 |
| DT-14 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0 | $1,091,900 | OC-09 | REVISIT BUSINESS PROCESS/ MODEL FOR GREATER EFFICIENCY | DS | IE-05 | DEVELOP OFF SITE STAFF PARKING | $1,079,800 | IE-49 | ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG | $1,732,500 |
| DT-15 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 3.0 | $1,187,100 | OC-12 | INTRODUCE SATELLITE OWC | $2,106,600 | IE-28 | WHAT IF THE CURRENT HOUSING DEVELOPMENT PARCEL NOT AVAILABLE | DS | IE-50 | ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0 | $1,732,500 |
| | | | OC-13 | CONSIDER STAGING AREAS FOR CONSTRUCTION AND EQUIPMENTS | DS | | | | OC-15 | RIGHTSIZE THE FLEET MAINTENANCE BLDG. | DS |

# 2.0 Value Management Alternatives

A “Summary of Value Alternatives and Design Suggestions” on the following pages elaborates the results of the Value Management Study workshop. It identifies the Alternative Number, Descriptive Alternative Title, Alternative Category, Mutual Exclusivity, and Potential Impact on First (Capital) Costs (expressed as capital investment/ cost avoidance), Present worth of Future Costs, and the resulting Life Cycle Cost over a 50-year service life, depending on specifics of a solution proposed.

The 43 VM Alternatives (26 Quantitative and 17 Project/ Design Suggestions) developed as part of the VM Study presented in their entirety on the pages following the “Summary of Value Alternatives”, according to Value Target Functions.

**Note:** all the developed Value Alternatives are not peer reviewed, may not reflect the current design standards, and are meant to be demonstrative - offering value improvement opportunities rather than prescriptive.

# Alternatives Summary

## Creative and Evaluation Phase Results

| Ideas As: | No. of Ideas |
|---|---|
| Alternative | 26 |
| Design Suggestion | 17 |
| Estimate Correction | 0 |
| Group with Other Alternative | 42 |
| Already Being Done | 20 |
| Dropped during Development | 30 |
| Eliminated by Evaluation | 0 |
| **Total Creative Ideas** | **135** |

| Value Target Functions |
|---|
| CONTROL/ ACCESS INVENTORY (CI) |
| DEFINE SUSTAINABILITY TARGETS (DT) |
| ENHANCE WORK ENVIRONMENT (EE) |
| ENHANCE OPERATIONS FLEXIBILITY (EF) |
| IMPROVE CIRCULATION (IC) |
| IMPROVE SPATIAL EFFICIENCY (IE) |
| OPTIMIZE OPERATIONAL CAPABILITY (OC) |

## Legend - Alternative Types

| | Alternative Types | Description |
|---|---|---|
| Qnt(+) | Quantitative | An alternative that results in a positive capital and life cycle cost avoidance while maintaining required functionality and performance, i.e. improved value. |
| Qlt(-) | Qualitative | An alternative that results in additional capital and/or life cycle costs (negative cost avoidance) while improving required functionality and performance, i.e. improved value. |
| DS | Design Suggestion | An alternative for which the team cannot define a reasonable cost impact during the workshop or that may simply be a suggestion to consider as design proceeds. |
| EC | Estimate Correction | An alternative to identify the cost impact of a significant issue discovered with the cost estimate during the workshop. |
| CR | Cost Reduction | An alternative that results in reduced costs without improving value. |

# Summary of Alternatives and Design Suggestions

| Alter. No. | Alternative Title | Initial Costs | O&M Costs (PW) | Life Cycle Costs |
|---|---|---|---|---|
| No. | (Vetted by Facilitator) | (Capital Costs) | Future Costs) | Life Cycle Costs |
| CI-02 | DEVELOP CONTROL STRATEGY FOR STORES | $ 2,205,500 | $ 399,000 | $ 2,604,500 |
| DT-02 | DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.) | $ (2,198,600) | $ 232,000 | $ (1,966,600) |
| DT-03 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO | $ 803,200 | $ 235,500 | $ 1,038,700 |
| DT-14 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0 | $ (1,376,700) | $ 284,800 | $ (1,091,900) |
| DT-15 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 3.0 | $ (1,406,200) | $ 219,100 | $ (1,187,100) |
| EE-06 | ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT | $ (1,103,200) | $ - | $ (1,103,200) |
| EE-08 | ADD STAFF TRAINING AND CHANGE MANAGEMENT AS PART OF THE PROGRAM | $ - | $ - | $ - |
| EF-02 | COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING | $ 4,549,800 | $ 420,100 | $ 4,969,900 |
| EF-04 | LONG SPAN BEAMS IN ADMIN BLDG FOR FUTURE | $ (1,259,000) | $ - | $ (1,259,000) |
| EF-05 | CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), PUBLIC WORKS AND CONSTRUCTION | $ 220,200 | $ 696,300 | $ 916,500 |
| EF-09 | INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE | $ (312,500) | $ - | $ (312,500) |
| EF-11 | RE-EVALUATE PROJECT DELIVERY METHOD | $ - | $ - | $ - |
| EF-14 | ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM | $ (830,400) | $ 374,600 | $ (455,800) |
| EF-17 | REEVALUATE STRATEGIC GROWTH TO REFLECT WITHIN THE MASTER PLAN OF NOC | $ - | $ - | $ - |
| EF-18 | REGULARIZE STRUCTURAL BAYS IN THE FLEET BLDG. | $ (263,100) | $ - | $ (263,100) |
| IC-04 | COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG | $ 680,700 | $ 461,100 | $ 1,141,800 |
| IC-07 | MOVE HV TRUCK DUMP FACILITY OFF SITE | $ 62,500 | $ - | $ 62,500 |
| IC-13 | SEPARATE INGRESS AND EGRESS POINTS TO THE SITE | $ (956,300) | $ - | $ (956,300) |
| IE-01 | DEVELOP OFF SITE STORAGE | $ 3,815,000 | $ 1,150,100 | $ 4,965,100 |
| IE-03 | DEVELOP A STRATEGY FOR CONTROLLED GROWTH | $ - | $ - | $ - |
| IE-04 | ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA | $ 720,500 | $ 27,400 | $ 747,900 |
| IE-05 | DEVELOP OFF SITE STAFF PARKING | $ (1,077,100) | $ (2,700) | $ (1,079,800) |
| IE-06 | ELIMINATE ON SITE FUELING | $ 308,700 | $ (1,752,500) | $ (1,443,800) |
| IE-11 | INCLUDE CARPENTRY INTO FLEET MAINTENANCE | $ 803,400 | $ 235,500 | $ 1,038,900 |
| IE-12 | INTRODUCE THREE LEVELS IN THE FACILITIES | $ 1,205,400 | $ - | $ 1,205,400 |
| IE-16 | OUTSOURCE LIGHT DUTY FLEET | $ 700,800 | $ 173,100 | $ 873,900 |
| IE-28 | WHAT IF THE CURRENT HOUSING DEVELOPMENT PARCEL NOT AVAILABLE | $ - | $ - | $ - |
| IE-40 | COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN | $ - | $ - | $ - |
| IE-41 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 1 | $ - | $ - | $ - |
| IE-43 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 2 | $ - | $ - | $ - |
| IE-44 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 3 | $ - | $ - | $ - |
| IE-45 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 4 | $ - | $ - | $ - |

# Summary of Alternatives and Design Suggestions

| Alter. No. | Alternative Title | Initial Costs | O&M Costs (PW) | Life Cycle Costs |
|---|---|---|---|---|
| IE-46 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 5 | $ - | $ - | $ - |
| IE-47 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 6 | $ - | $ - | $ - |
| IE-48 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 7 | $ - | $ - | $ - |
| IE-49 | ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG | $ 1,732,500 | $ - | $ 1,732,500 |
| IE-50 | ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0 | $ 1,732,500 | $ - | $ 1,732,500 |
| OC-04 | RECALCULATE BUDGET CONTINGENCY | $ - | $ - | $ - |
| OC-09 | REVISIT BUSINESS PROCESS/ MODEL FOR GREATER EFFICIENCY | $ - | $ - | $ - |
| OC-11 | DIVIDE THE PROJECT INTO TWO PHASES ONLY | $ 83,719,600 | $ - | $ 83,719,600 |
| OC-12 | INTRODUCE SATELLITE OWC | $ 1,943,800 | $ 162,800 | $ 2,106,600 |
| OC-13 | CONSIDER STAGING AREAS FOR CONSTRUCTION AND EQUIPMENTS | $ - | $ - | $ - |
| OC-15 | RIGHTSIZING THE FLEET MAINTENANCE BLDG. | $ - | $ - | $ - |

# Appendix A

## Value Management Alternatives by Function

# FUNCTION:
## CONTROL/ ACCESS INVENTORY (CI)

# Quantitative Value Alternative

**Title** **CI-02**

***DEVELOP CONTROL STRATEGY FOR STORES***

## Original Concept



Stores is in the process of developing a control strategy for receiving and dispensing materials to ensure an accurate accounting for the City's material purchasing and usage. At this time, Stores does not accept 'gently used' returns and will accept back only new inventory which has been recently 'checked out' and is in the same condition as it was upon checkout. This strategy is anticipated to include a scale for bulk material receiving and dispensing within the NOC site.

## Alternative Concept

This is a suggestion of timing, controls, and strategies for more closely aligning the workflows of Stores with their goals and the desires of their customers. Concerns were raised during the VM review that the existing workflows and lack of alignment between customer desires and Stores' goals is resulting in costly duplications in planned storage facilities. It is believed that implementing elements of this control strategy as soon as possible will reduce the immediate strains on Public Works Yard storage areas and the amount of space within NOC dedicated to storage.

## Advantages

- Provide an enhanced level of control for Stores over their inventory
- Better align Stores' services with their customers desires
- Optimize inventory levels and increase product turnover rates
- Reduce the area required for storage of materials

## Disadvantages

- This may be costly to set up
- Specialized IT infrastructure may be required
- Additional staffing may be required
- Space and maintenance requirements for scales are significant

## Discussion / Justification

There are several opportunities for developing a control strategy for Stores. Technology, including CCTV, RFID, barcode scanning, and an electronic scale could be employed to ensure 'check out' of materials by crews are easy, accurate, and accountable. Outsourcing some Stores functions, for example large watermain pipes and appurtenances, while maintaining a minimal on-site supply of common materials required for emergencies would reduce the area required for storing materials while maintaining the City's ability to respond in an emergency when vendors may not be available. Finally, introducing a 'return policy' for goods checked out of Stores but not used, and an 'as-is' area for used materials which can be used again will reduce the current trend of crews storing those items elsewhere and creating duplicate storage areas.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 8,270,400 | $ 1,196,800 | $ 9,467,200 |
| **Alternative Concept** | $ 6,064,900 | $ 797,800 | $ 6,862,700 |
| **Difference** | **$ 2,205,500** | **$ 399,000** | **$ 2,604,500** |

# Quantitative Value Alternative

**Title** **CI-02**

***DEVELOP CONTROL STRATEGY FOR STORES***

## Exhibits - Original Concept



Technology

An increased use of technology in a Stores control strategy could increase the level of convenience for both Stores staff and their customers; increasing the success of this strategy and compliance with operating procedures. This could take the form of RFIDs and automated inventory controls, barcode or QR code scanning and partially automated inventory controls, and/or a scale to capture precise bulk material weights.

RFIDs and barcodes would require a potentially significant IT infrastructure component and ongoing support, but could increase the level of convenience for all users to the point where adherence to the desired workflow is very high. As a backup, technology could provide an engineering control to loss prevention through the use of CCTV. This would allow Stores staff to double check counts and activities if reporting procedures are not strictly followed.

A bulk materials scale is an expensive piece of infrastructure and requires ongoing calibration and maintenance. The volume and value of materials passing over the scale (and their associated loss rates) must be commensurate to its cost and operational demands in order to justify its installation. Scales also dictate vehicle movements, and depending on position can create traffic or sterilize a large area of land.

If a single scale is to be used there may be traffic disruptions as vehicles need to queue and take turns to scale in and scale out. For this reason a single scale is not recommended at the site entrance. A double scale could solve this problem, however it may still restrict movements of vehicles entering the site, resulting in backup onto Labieux Road. As well, a double scale would cost twice as much and thus would need twice as much volume and value of materials in order to justify its installation.

Should the City wish to explore outsourcing some Stores functions while maintaining a minimal on-site supply of common materials required for emergencies it is not anticipated that a scale would be required. If that is not the case, a business case should be created which examines the costs of material losses vs the costs of purchasing and operating a scale (or scales) to ensure that the benefit of the scale(s) is greater than the cost of bulk material losses. If it is determined that the scale(s) are required it is recommended to include a single scale on-site in an area that will not cause disruption to site circulation.

# Quantitative Value Alternative

**Title** **CI-02**

***DEVELOP CONTROL STRATEGY FOR STORES***

## Exhibits - Alternative Concept



Outsourcing Some Stores Functions and Downsizing On-Site Storage

Currently there are a large volume of construction materials stored on site, within Stores' control. It was observed that a significant portion of this material is quite old and/or is not commonly used. If external suppliers for materials which are not being commonly used, or when they are used it is often done with advanced planning, those external suppliers could provide those materials instead of Stores. This would free up significant space within NOC and avoid the potential for materials 'spoiling on shelves'. This could include bulk materials as well pipes, manholes, fire hydrants, etc.

In conjunction with this, a smaller supply of materials which are commonly required in emergency situations where advanced planning is not possible must be maintained to enable the City to be responsive and avoid reputational damage. For example, several lengths of common watermain sizes, couplers, reducers, and granular material to support backfilling should always be available in case of a watermain break. The breadth and volume of these materials should be determined by operational Managers with the goal of ensuring responsiveness during emergencies but eliminating reliance on these stored materials for day-to-day operations.

Return Policy and 'As Is' Materials

It was noted during discussions that individual workgroups are using significant space to store materials which they wish to use on future jobsites but which are not accepted by Stores. Some items being stored by workgroups were checked out from Stores and were not returned in a timely manner or were damaged to some degree and were not accepted back by Stores. Other items are recovered materials salvaged during work which, while they are used or damaged, still have a long useful residual life. A clear policy for returning new items would help ensure Stores' goals are in alignment with their customer's desires and help to reduce the duplication of storage areas within NOC. Establishing an 'As Is' storage area available to all workgroups would help reduce waste generated by City Operations and reduce further duplication of storage areas within NOC. These items could be available for any workgroup which wishes to use them for their projects and would contribute to a culture of sharing resources across workgroups.

# Quantitative Value Alternative

**Title** **CI-02**

***DEVELOP CONTROL STRATEGY FOR STORES***

## Exhibits - Alternative Concept



Timing

As these workflows are dictating a lot of spatial programming within the NOC plan it is highly recommended that if value is seen in refining them that process should start immediately. It will take time to settle on a final strategy and implementing will involve a lot of change management, so the sooner that process can begin the more money the City will be able to save on allocating resources within NOC.

Cost Savings

If an estimated third of the storage space currently programmed within the NOC master plan could be used for other purposes by implementing a control and stocking strategy for Stores a significant amount of land and cost could be saved.

# Quantitative Value Alternative

**Title** **CI-02**

***DEVELOP CONTROL STRATEGY FOR STORES***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Value of Storage Space Presently | LS | 1 | $6,616,300.00 | $6,616,300 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **6,616,300** |
| 25.0% | Project Markup: | $ | 1,654,075 |
| | **Total Cost (Rounded):** | **$** | **8,270,400** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Value of Storage Space Req. After Workflow Changes | LS | 1.00 | $4,851,955.76 | $4,851,956 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **4,851,956** |
| 25.0% | Project Markup: | $ | 1,212,989 |
| | **Total Cost (Rounded):** | **$** | **6,064,900** |
| | **Cost Difference:** | **$** | **2,205,500** |

# Quantitative Value Alternative

**Title** **CI-02**

***DEVELOP CONTROL STRATEGY FOR STORES***

## Life Cycle Cost Estimate



**Discount Rate** 5.00% Net
**Life Cycle Period** 50 Years

| | | | | Original Concept | | Alternative Concept | |
|---|---|---|---|---|---|---|---|
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 8,270,400 | 8,270,400 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 6,064,900 | 6,064,900 |
| | | | **Total Initial Costs** | | **$ 8,270,400** | | **$ 6,064,900** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 2,205,500** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Concept | | | 18.256 | 65,555 | 1,196,767 | 43,703 | 797,845 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 1,196,800** | | **$ 797,800** |

| **Life Cycle Cost Summary** | Present Worth (PW) | Present Worth (PW) |
|---|---|---|
| Subtotal Replacement / Salvage + Annual Costs | $ 1,196,800 | $ 797,800 |
| **Difference (Compared to Original)** | | **399,000** |
| Total Life Cycle Costs (Present Worth) | $ 9,467,200 | $ 6,862,700 |
| **Life Cycle Difference (Compared to Original)** | | **$ 2,604,500** |
| **Total Life Cycle Costs (Annualized)** | **Per Year: $ 518,582** | **Per Year: $ 375,916** |

# FUNCTION:
## DEFINE SUSTAINABILITY TARGETS (DT)

# Quantitative Value Alternative

**Title** **DT-02**

***DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.)***

## Original Concept



Current City of Nanaimo Green Building Policy (effective 2006-MAY-29; latest amendment 2011-MAR-28) requires all new municipal buildings, 900 square meters or greater, to be built to the Gold standard for LEED, including full registration and certification under the CaGBC. Priority is given to the following categories: Energy and Atmosphere; Sustainable Sites; Water Efficiency. Council may exempt the building from the LEED certification process where it can be demonstrated that the proposed building contains LEED equivalent green features.

## Alternative Concept

Develop a sustainability strategy that is tailored specifically to the development of the NOC based on up-to-date sustainability technologies and standards. Strategy should support the City of Nanaimo Strategic Framework and the City Plan: Nanaimo Reimagined which identifies 'resilient and regenerative eco systems including GHG reductions, climate change and mitigation' amongst it's five goals.

## Advantages

- Creates specific targets that are compatible with the operations of the facility.
- Communicates to Council clear sustainability goals that are aligned with City policies and future planning.
- Focuses resources and funding on most effective solutions.

## Disadvantages

- If not formalized, allows sustainability efforts to be removed in lieu of costs during further design stages.
- Added capital costs.

## Discussion / Justification

Pursue sustainability strategies in the following areas, discussed below:
Alternatives DT-05 and DT-09 are grouped with this write up.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 2,198,600 | $ -232,000 | $ 1,966,600 |
| **Difference** | **$ -2,198,600** | **$ 232,000** | **$ -1,966,600** |

# Quantitative Value Alternative

**Title** **DT-02**

***DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.)***

## Discussion / Justification (Continued)



**Energy Efficiency**
**- At minimum, meet the following:**
City of Nanaimo Building Bylaw Amendment Bylaw 2023 No. 7224.05
- As of 2024-JUL-01, requires Part 3 buildings to meet performance requirements specified in EL-4 (Zero Carbon Performance) of the Zero Carbon Step Code (requires that the operations of the building is as close to zero emissions as possible)
- As of 2026-JAN-01, requires Part 3 buildings to meet Step 3 of the BC Energy Step Code (50% better energy efficiency than BC Building Code)
**- Additional Energy Efficiency Options:**
- Passive House Certification (Admin building) - (further energy efficiency beyond Step 3 of BC Energy Step Code; defines indoor air quality standards)
- Combining above with on site energy generation to meet net zero energy (potential for photovoltaics on building roof, staff parking). Is there potential for the site to contribute to the Reginal Strategy for Net Zero Buildings being developed by the RDN, City of Nanaimo and Town of Qualicum Beach?
- Is there potential for district energy in combination with Beban Park redevelopment?

**Indoor Environmental Quality:**
- Review IAQ standards and determine targets for indoor air quality
- Design to ensure adequate daylighting for all interior spaces, incorporate glazing in all occupied spaces, provide necessary sun shading to prevent direct sunlight and glare
- Design to consider sound management within buildings and across the site; location of noise generating functions away from noise sensitive areas; zoning both sites and buildings with consideration for sounds management
- Ensuring adequate lighting levels within buildings and across the site for both comfort and safety (exterior lighting to be Dark Sky compliant)
- Ensuring building design serves all persons equitably

**Water Efficiency**
**- At minimum:**
- Capture, manage and treat all rainwater on site
**- Additional Water Efficiency Options:**
- Collecting stormwater for non-potable uses (truck wash; irrigation; etc.)
- Is there opportunity for using stormwater for indoor non-potable uses?
- Landscaping design to favor native species to reduce irrigation demand

# Quantitative Value Alternative

**Title** **DT-02**

***DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.)***

## Discussion / Justification (Continued)



**Site Resiliency**
- Consider design of all required emergency site services
- Post disaster operations of Admin and Fleet Maintenance facilities
- Fuelling and energy in post-disaster scenarios
- Design facilities for changing climate (hotter summers, colder winters)
- Ventilation requirements to consider wildfire smoke

**Site Design**
- Maximize landscaping to reduce heat island effect
- Consider landscaped areas at the administration building specifically
- Maximize landscaping in parking areas
- Consider green roofs on administration and fleet maintenance buildings

**Building Design**
- Consider local materials
- Consider embodied carbon - mass timber vs. steel/concrete
- Consider life cycle costing analysis for building systems

# Quantitative Value Alternative

**Title** **DT-02**

***DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.)***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Base provision of intent to meet sustainable goals | | | | |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Premium to do better than intent | sum | 1 | $1,758,900.00 | $1,758,900 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 1,758,900** |
| 25.0% | Project Markup: | $ | 439,725 |
| | **Total Cost (Rounded):** | **$** | **2,198,600** |
| | **Cost Difference:** | **$** | **-2,198,600** |

# Quantitative Value Alternative

**Title** **DT-02**

***DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.)***

## Life Cycle Cost Estimate



| | | | | Original Concept | | Alternative Concept | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | | | | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 2,198,600 | 2,198,600 |
| | | | **Total Initial Costs** | | $ - | | $ 2,198,600 |
| | | | **Difference (Compared to Original Concept)** | | | | -$ 2,198,600 |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | $ - | | $ - |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Potential energy cost saving | | | 18.256 | | | -12,710 | -232,029 |
| | | | **Total Annual Costs (Present Worth)** | | $ - | | -$ 232,000 |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | -$ 232,000 |
| **Difference (Compared to Original)** | | | | | | | **232,000** |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 1,966,600 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **-$ 1,966,600** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ -** | **Per Year:** | **$ 107,724** |

# Quantitative Value Alternative

**Title** **DT-03**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO***

## Original Concept



It was felt that the Truck Barn and the Stores buildings were the newest buildings and in an effort to save money, we would keep them and upgrade the Truck Barn to house some storage and also the Parks Trail maintenance group and the carpenters staff and shop. Stores would remain as is except Purchasing staff would move to the new admin building.

## Alternative Concept

1. Move carpenters workshop and trail builders space 360m2 to Fleet building and dedicate Truck Barn building to storage only. Then, reduce the purpose built storage building by 360m2.
2. Demo truck barn and rebuild new for carpenters workshop, trail builders and truck equipment storage.
3. Demo Stores and rebuild new.

## Advantages

- OP 1 - Minimum upgrades due to storage only
- OP 1 -Shared use needs with Fleet - welding bay, exhaust systems, noisy groups
- OP 1- Size and layout (drive through ability) good for storage of equipment
- OP 2 & 3 - Invest in new building as opposed to 50 year old building
- OP 3 - Replace 50 year old building with new, with ability to expand

## Disadvantages

- OP 1 - Moving carpenters and trail builders to Fleet building will add cost to Phase 1
- OP 2 - Lack of sufficient power supply and no plumbing in truck barn
- OP 2 & 3 - investing in a 50 year old building to bring up to code as opposed to new
- OP 2 & 3 - Cost of of demo and rebuild

## Discussion / Justification

Existing truck barn buildings in place with power but no plumbing. At master plan development time it was thought that it would save money to keep the Truck Barn and Stores buildings. With a view to do some upgrades and rebuild in the future if and as required. After more consideration the following should be considered: 1. Keep as a storage only building and move parks trail building and carpenters into fleet or possibly admin building. Option 2. Demo existing Truck Barn building and rebuild new for carpenters workshop and workspace for trail builders. Current plan is for 320m2 for office/workshop space and remainder of building for vehicle/equipment storage. 3. Demo stores building and rebuild new.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 3,393,100 | $ 925,600 | $ 4,318,700 |
| **Alternative Concept** | $ 2,589,900 | $ 690,100 | $ 3,280,000 |
| **Difference** | **$ 803,200** | **$ 235,500** | **$ 1,038,700** |

# Quantitative Value Alternative

**Title** **DT-03**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Renovate Lines Park shop and storage | sum | 1 | $1,706,500.00 | $1,706,500 |
| Purpose build area | m2 | 360 | $2,800.00 | $1,008,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **2,714,500** |
| 25.0% | Project Markup: | $ | 678,625 |
| **Total Cost (Rounded):** | | **$** | **3,393,100** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Repurpose lines park shop to storage and trailer - min code requirement | m2 | 780 | $500.00 | $390,000 |
| Add carpentry shop and truck storage | m2 | 360 | $4,672.00 | $1,681,920 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **2,071,920** |
| 25.0% | Project Markup: | $ | 517,980 |
| **Total Cost (Rounded):** | | **$** | **2,589,900** |
| **Cost Difference:** | | **$** | **803,200** |

# Quantitative Value Alternative

**Title** **DT-03**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO***

## Life Cycle Cost Estimate

Page 3 of 3

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 3,393,100 | 3,393,100 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 2,589,900 | 2,589,900 |
| | | | **Total Initial Costs** | | **$ 3,393,100** | | **$ 2,589,900** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 803,200** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| O+M | | | 18.256 | 50,700 | 925,575 | 37,800 | 690,074 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 925,600** | | **$ 690,100** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 925,600 | | $ 690,100 |
| | | | **Difference (Compared to Original)** | | | | **235,500** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 4,318,700 | | $ 3,280,000 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 1,038,700** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 236,564** | **Per Year:** | **$ 179,668** |

# Quantitative Value Alternative

**Title** **DT-14**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0***

## Original Concept



It was felt that the Truck Barn and the Stores buildings were the newest buildings and in an effort to save money, we would keep them and upgrade the Truck Barn to house some storage and also the Parks Trail maintenance group and the carpenters staff and shop. Stores would remain as is except Purchasing staff would move to the new admin building.

## Alternative Concept

. Move carpenters workshop and trail builders space 320m2 to Fleet building and dedicate Truck Barn building to storage only. Then, reduce the purpose built storage building by 320m2.
2.Demo truck barn and rebuild new for carpenters workshop, trail builders and truck equipment storage.
3. Demo Stores and rebuild new

## Advantages

- OP 1 - minimum upgrades due to storage only
- OP 1 -Shared use needs with Fleet - welding bay, exhaust systems, noisy groups
- OP 1- Size and layout (drive through ability) good for storage of equipment
- OP 2 & 3 - Invest in new building as opposed to 50 year old building
- OP 3 - replace 50 year old building with new, with ability to expand

## Disadvantages

- OP 1 - Moving carpenters and trail builders to Fleet building will add cost to Phase 1
- OP 2 - Lack of sufficient power supply and no plumbing in truck barn
- OP 2 & 3 - investing in a 50 year old building t o bring up to code as opposed to new
- OP 2 & 3 - Cost of demo and rebuild

## Discussion / Justification

Existing truck barn buildings in place with power but no plumbing. At master plan development time it was thought that it would save money to keep the Truck Barn and Stores buildings. With a view to do some upgrades and rebuild in the future if and as required. After more consideration the following should be considered: 1. Keep as a storage only building and move parks trail building and carpenters into fleet or possibly admin building. Option 2. Demo existing Truck Barn building and rebuild new for carpenters workshop and workspace for trail builders. Current plan is for 320m2 for office/workshop space and remainder of building for vehicle/equipment storage. 3. Demo stores building and rebuild new.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 2,133,300 | $ 925,600 | $ 3,058,900 |
| **Alternative Concept** | $ 3,510,000 | $ 640,800 | $ 4,150,800 |
| **Difference** | **$ -1,376,700** | **$ 284,800** | **$ -1,091,900** |

# Quantitative Value Alternative

**Title** **DT-14**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Renovated Lines and Parks Shop and storage | m2 | 780 | $2,188.00 | $1,706,640 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **1,706,640** |
| 25.0% | Project Markup: | $ | 426,660 |
| **Total Cost (Rounded):** | | **$** | **2,133,300** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| New build | m2 | 780 | $3,500.00 | $2,730,000 |
| Demolition to existing | m2 | 780 | $100.00 | $78,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **2,808,000** |
| 25.0% | Project Markup: | $ | 702,000 |
| **Total Cost (Rounded):** | | **$** | **3,510,000** |
| **Cost Difference:** | | **$** | **-1,376,700** |

# Quantitative Value Alternative

**Title** **DT-14**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 2,133,300 | 2,133,300 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 3,510,000 | 3,510,000 |
| | | | **Total Initial Costs** | | **$ 2,133,300** | | **$ 3,510,000** |
| | | | **Difference (Compared to Original Concept)** | | | | **-$ 1,376,700** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| O+M | | | 18.256 | 50,700 | 925,575 | 35,100 | 640,783 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 925,600** | | **$ 640,800** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 925,600 | | $ 640,800 |
| | | | **Difference (Compared to Original)** | | | | **284,800** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 3,058,900 | | $ 4,150,800 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **-$ 1,091,900** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 167,557** | **Per Year:** | **$ 227,367** |

# Quantitative Value Alternative

**Title** **DT-15**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0***

## Original Concept



It was felt that the Truck Barn and the Stores buildings were the newest buildings and in an effort to save money, we would keep them and upgrade the Truck Barn to house some storage and also the Parks Trail maintenance group and the carpenters staff and shop. Stores would remain as is except Purchasing staff would move to the new admin building.

## Alternative Concept

1. Move carpenters workshop and trail builders space 320m2 to Fleet building and dedicate Truck Barn building to storage only. Then, reduce the purpose built storage building by 320m2.
2.Demo truck barn and rebuild new for carpenters workshop, trail builders and truck equipment storage.
3. Demo Stores and rebuild new

## Advantages

- OP 1 - minimum upgrades due to storage only
- OP 1 -Shared use needs with Fleet - welding bay, exhaust systems, noisy groups
- OP 1- Size and layout (drive through ability) good for storage of equipment
- OP 2 & 3 - Invest in new building as opposed to 50 year old building
- OP 3 - replace 50 year old building with new, with ability to expand

## Disadvantages

- OP 1 - Moving carpenters and trail builders to Fleet building will add cost to Phase 1
- OP 2 - Lack of sufficient power supply and no plumbing in truck barn
- OP 2 & 3 - investing in a 50 year old building t o bring up to code as opposed to new
- OP 2 & 3 - Cost of demo and rebuild

## Discussion / Justification

Existing truck barn buildings in place with power but no plumbing. At master plan development time it was thought that it would save money to keep the Truck Barn and Stores buildings. With a view to do some upgrades and rebuild in the future if and as required. After more consideration the following should be considered: 1. Keep as a storage only building and move parks trail building and carpenters into fleet or possibly admin building. Option 2. Demo existing Truck Barn building and rebuild new for carpenters workshop and workspace for trail builders. Current plan is for 320m2 for office/workshop space and remainder of building for vehicle/equipment storage. 3. Demo stores building and rebuild new.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 1,293,800 | $ 712,000 | $ 2,005,800 |
| **Alternative Concept** | $ 2,700,000 | $ 492,900 | $ 3,192,900 |
| **Difference** | **$ -1,406,200** | **$ 219,100** | **$ -1,187,100** |

# Quantitative Value Alternative

**Title** **DT-15**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Stores building | m2 | 600 | $1,725.00 | $1,035,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | **$** | **1,035,000** |
| 25.0% Project Markup: | $ | 258,750 |
| **Total Cost (Rounded):** | **$** | **1,293,800** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| New build | m2 | 600 | $3,500.00 | $2,100,000 |
| Demolition | m2 | 600 | $100.00 | $60,000 |

| | | |
|---|---|---|
| **Subtotal:** | **$** | **2,160,000** |
| 25.0% Project Markup: | $ | 540,000 |
| **Total Cost (Rounded):** | **$** | **2,700,000** |
| **Cost Difference:** | **$** | **-1,406,200** |

# Quantitative Value Alternative

**Title** **DT-15**

***ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 1,293,800 | 1,293,800 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 2,700,000 | 2,700,000 |
| | | | **Total Initial Costs** | | **$ 1,293,800** | | **$ 2,700,000** |
| | | | **Difference (Compared to Original Concept)** | | | | **-$ 1,406,200** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| O+M | | | 18.256 | 39,000 | 711,981 | 27,000 | 492,910 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 712,000** | | **$ 492,900** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 712,000 | | $ 492,900 |
| | | | **Difference (Compared to Original)** | | | | **219,100** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 2,005,800 | | $ 3,192,900 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **-$ 1,187,100** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 109,871** | **Per Year:** | **$ 174,897** |

# FUNCTION:
# ENHANCE WORK ENVIRONMENT (EE)

# Quantitative Value Alternative

**Title** **EE-06**

***ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT***

## Original Concept



A metal siding rain screen wall is proposed as the primary building cladding. The cladding extends from the parapet to a concrete skirt at the base of the building. Currently the concrete skirt is less than a metre height.

## Alternative Concept

Alternatively the base of the building could be clad in a precast concrete insulated sandwich panel to a height of 2.4 m approximately.

## Advantages

- Creates a more robust surface at grade to provide for storage and protect against impact.
- Provides a robust surface on the inside suitable for the heavy uses envisioned.

## Disadvantages

- Will add cost
- May not be as aesthetically pleasing as the current design.

## Pre

This proposal could be applied to all buildings, however the administration building may not require a more robust surface at grade and can be protected by other means. The operation building will likely be subject to heavy truck traffic, forklifts and temporary storage uses over its lifespan. Precast insulated sandwich panels provide a finished interior and exterior surface in one system and are highly durable.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 4,940,100 | $ | $ 4,940,100 |
| **Alternative Concept** | $ 6,043,300 | $ | $ 6,043,300 |
| **Difference** | **$ -1,103,200** | **$** | **$ -1,103,200** |

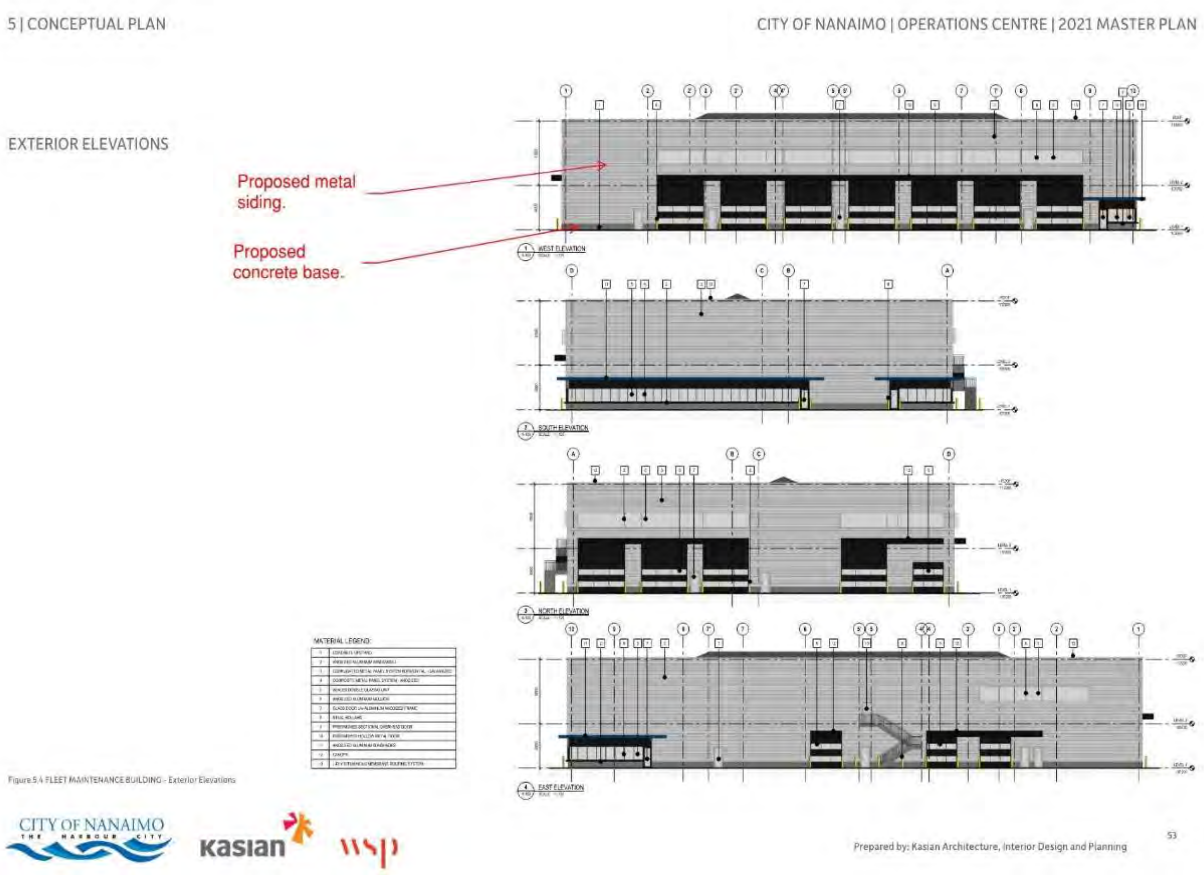
# Quantitative Value Alternative

**Title** **EE-06**

***ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT***

## Exhibits - Original Concept





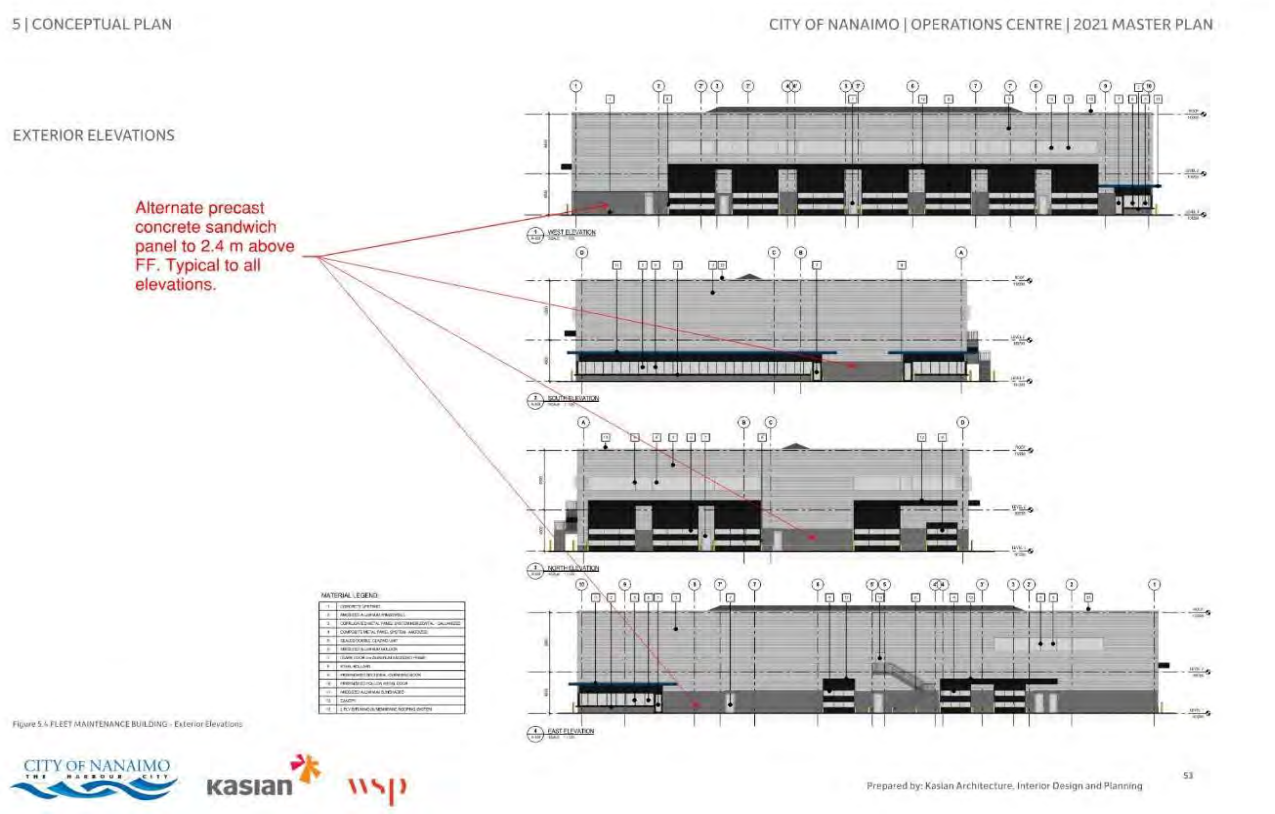
# Quantitative Value Alternative

**Title** **EE-06**

***ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **EE-06**

***ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Perimeter envelope cost -concrete wall | m2 | 1918.5 | $800.00 | $1,534,800 |
| Metal panel | m2 | 2685.9 | $900.00 | $2,417,310 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **3,952,110** |
| 25.0% | Project Markup: | $ | 988,028 |
| **Total Cost (Rounded):** | | **$** | **4,940,100** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Precast insulated sandwich panel | m2 | 4604.4 | $1,050.00 | $4,834,620 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **4,834,620** |
| 25.0% | Project Markup: | $ | 1,208,655 |
| **Total Cost (Rounded):** | | **$** | **6,043,300** |
| **Cost Difference:** | | **$** | **-1,103,200** |

# Quantitative Value Alternative

**Title** **EE-06**

***ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 4,940,100 | 4,940,100 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 6,043,300 | 6,043,300 |
| | | | **Total Initial Costs** | | **$ 4,940,100** | | **$ 6,043,300** |
| | | | **Difference (Compared to Original Concept)** | | | | **-$ 1,103,200** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| **Difference (Compared to Original)** | | | | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ 4,940,100 | | $ 6,043,300 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **-$ 1,103,200** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 270,603** | **Per Year:** | **$ 331,032** |

# Design Suggestion

**Title** **EE-08**

***ADD STAFF TRAINING AND CHANGE MANAGEMENT AS PART OF THE PROGRAM***

## Original Concept



Status quo

## Alternative Concept

Train key staff in change management and begin implementing change management practices for the NOC redevelopment project as well as other municipal projects.

## Advantages

- Improved staff engagement
- Improved operational metrics (costs, schedules, etc.)
- Reduced labour relation issues
- More informed staff are empowered to make better decisions

## Disadvantages

- Costs and time associated with change management training
- Staff time associated with implementing change management practices

## Discussion / Justification

Change management is a proven method of driving organizational change, engaging staff, improving employee morale and improving bottom-line metrics. Numerous organizations provide training and certifications such as PROSCI, UBC Sauder School of Business, etc.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **EE-08**

***ADD STAFF TRAINING AND CHANGE MANAGEMENT AS PART OF THE PROGRAM***

## Discussion / Justification



The City of Nanaimo has a unique opportunity with the NOC redevelopment to capitalize on improvements in how staff are engaged, informed and their general productivity. The current process for keeping staff informed on the NOC redevelopment includes the following:
-updates on the intranet
-monthly newsletters posted on bulletin boards
-crew talks and management meetings
-occasional special meetings with staff

These types of communication are push notifications with no way to know if staff have actively absorbed the info. Specifically for operational staff, their use of computers for intranet updates is limited, they may or may not read newsletters, and crew talks are generally brief with limited information. Select staff have provided input on the preliminary design and needs analysis, but there has not been any feedback to them on whether their ideas were incorporated or valued.

A robust change management approach would ensure that there is a significant level of communication via methods that engage staff in active discussion. This level of communication is often viewed as excessive by many organizations as heavy workloads, project backlogs, etc. are core business and are prioritized over staff engagement. However, excessive engagement is typically what is needed to truly implement effective change management. Effective change management is often difficult to quantify as there are limited data points to measure against and the change in staff engagement is relatively slow. That said, staff engagement surveys, trends in project budgets/schedules, HR/management efforts for labour relation issues and staff retention are a few indicators that can reveal the benefits of change management.

# Design Suggestion

**Title** **EE-08**

***ADD STAFF TRAINING AND CHANGE MANAGEMENT AS PART OF THE PROGRAM***

## Discussion / Justification (Continued)



As an example of change management, the PROSCI change management model (ADKAR) follows a five-step methodology including:

1. **Awareness** - informing staff of the change. For the NOC redevelopment, staff are generally aware of the change.

2. **Desire** - ensuring staff have the desire to be involved in the change and are engaged in the process. It's unclear on whether staff have a desire to be part of the change or if they are engaged in the project.

3. **Knowledge** - providing staff with information on why the change is happening, details about the change and the project process. It is believed some staff have been provided with details on the project, but meetings were generally large group meetings where it's unknown how many staff attended. Other information was provided by bulletin boards, crew talks and other brief push methods.

4. **Ability** - providing staff with training to implement and use the change. As the NOC redevelopment is not yet underway, staff training on how to use the new facility in an efficient way is not relevant. However, staff training on new work methods and business process improvement could be opportunities for preparing staff for the use of a new facility and aligning new business process with changes in facility design.

5. **Reinforcement** - this is the process to ensure changes are continued and integrated into business process. This usually occurs after a project is complete.

# Design Suggestion

**Title** **EE-08**

***ADD STAFF TRAINING AND CHANGE MANAGEMENT AS PART OF THE PROGRAM***

## Discussion / Justification



In discussion with several management, there are opportunities for planning for change management as part of this project. Several suggestions include:
-more regular engagement of operations staff
-feedback to operations staff on revised designs and how their input has been used to improve the design. If their input was not used, briefly explain some of the reasons why.
-engagement with union executives to keep them informed on the project developments and plans. Engagement with union executives is typically limited to labour relation issues, and a proactive approach is expected to have positive impacts on relations.
-develop an operations committee for this project. These are typically formed from change champions and, similar to an OHS committee, would require regular meetings, assignment of tasks to committee members, expectation that committee members are discussing project progress with co-workers, discussion of identified or perceived issues, development of new safe work practices, research on best practices from operations staff at other municipalities, etc.
-training key staff on change management practices and empowering them to use the new skills. Committee members, project staff and NOC management are suggested as the staff to begin training with.
-begin employee engagement surveys

Comparing change management and training to IT projects, a software update or new IT process generally has numerous communications, test groups for rollout, cheat sheets/training manuals and small group or individual training. Compare this to the typical implementation of a new piece of equipment or facility for operations staff which may or may not include a brief overview or tour. In many cases, operational staff are not provided with quality training despite the substantial costs associated with equipment and facilities.

Change management is an initiative that takes several years to begin realizing substantial business improvements. Considering timelines for the NOC project as well as the potential it has to transform public works, aligning it with a good change management approach has the potential to supercharge the benefits of this project by combining modern state of the art facilities with modern, collaborative and engaged people.

# FUNCTION:

## ENHANCE OPERATIONS FLEXIBILITY (EF)

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

## Original Concept



The Purpose-Built Storage Building is a pre-engineered structure providing semi-conditioned storage constructed to structural post-disaster standards. The Purpose-Built Storage Building is located in close proximity to the Administration Building to provide ready access to materials and equipment for operations crews. The Administration Building is a separate structure for offices and meeting spaces for Operations staff constructed to post disaster standards. See Exhibit - Original Concept.

## Alternative Concept

Reducing the footprints of both the Administrative Building and the Purpose Built Storage Building by combining both buildings into one and taking advantage of the vertical space for both storage and offices will reduce capital costs and make room for additional area within the property. This will allow for staff parking to be fully developed and improved connectivity for operations.

## Advantages

- Additional space gained on Public Works Yard and allow for the additional staff parking displaced by the social housing project and / or make room for Stores / Purchasing.
- Reduced Capital Costs - utilizing pre-engineered building.
- Functional building and more efficient access to materials and storage areas.

## Disadvantages

- Uncertainties with post-disaster of pre-engineered building housing offices
- Loss of public facing architectural features fronting Labieux Road
- Deeper window sills / wood frame building within steel shell building.

## Discussion / Justification

Combining two or possibly three building and utilizing the vertical space with multiple stories for storage, offices and meeting areas reduces the overall foundation footprint, allows for better use and functions and lowers the capital costs. Designing the Administration building and Purpose Built Storage Building as one pre-engineered building has efficiencies and ultimate overall capital cost savings.

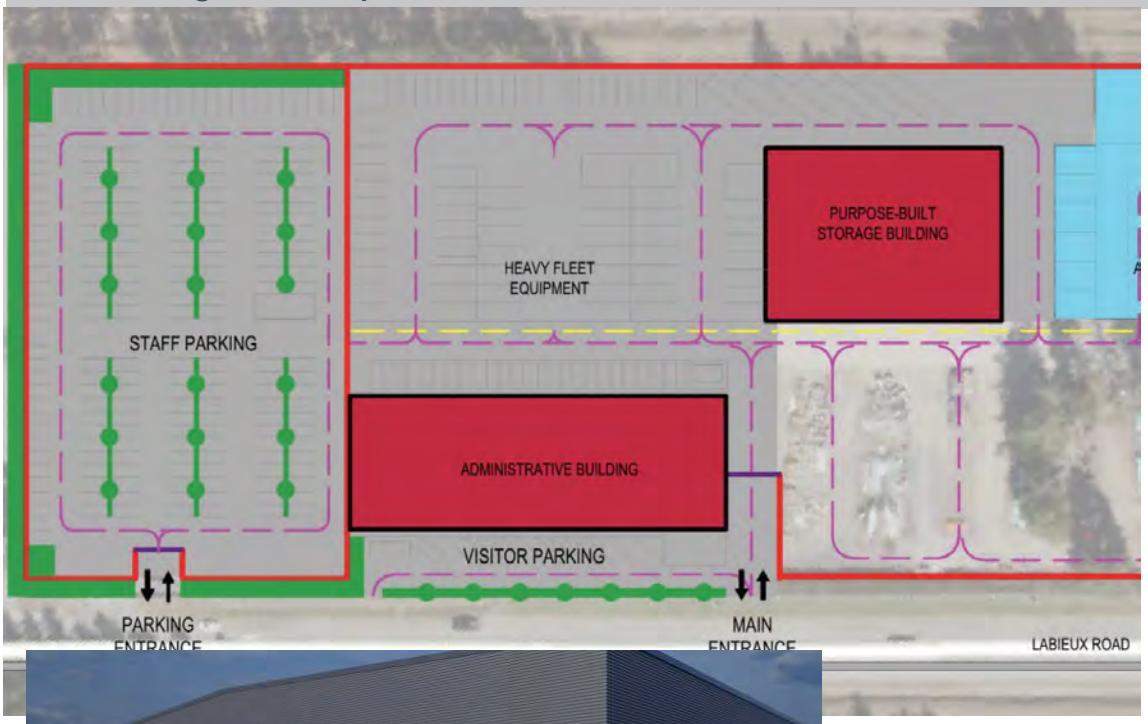
| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 33,450,300 | $ | $ 33,450,300 |
| **Alternative Concept** | $ 28,900,500 | $ -420,100 | $ 28,480,400 |
| **Difference** | **$ 4,549,800** | **$ 420,100** | **$ 4,969,900** |

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Exhibits - Original Concept** **Page 2 of 12**



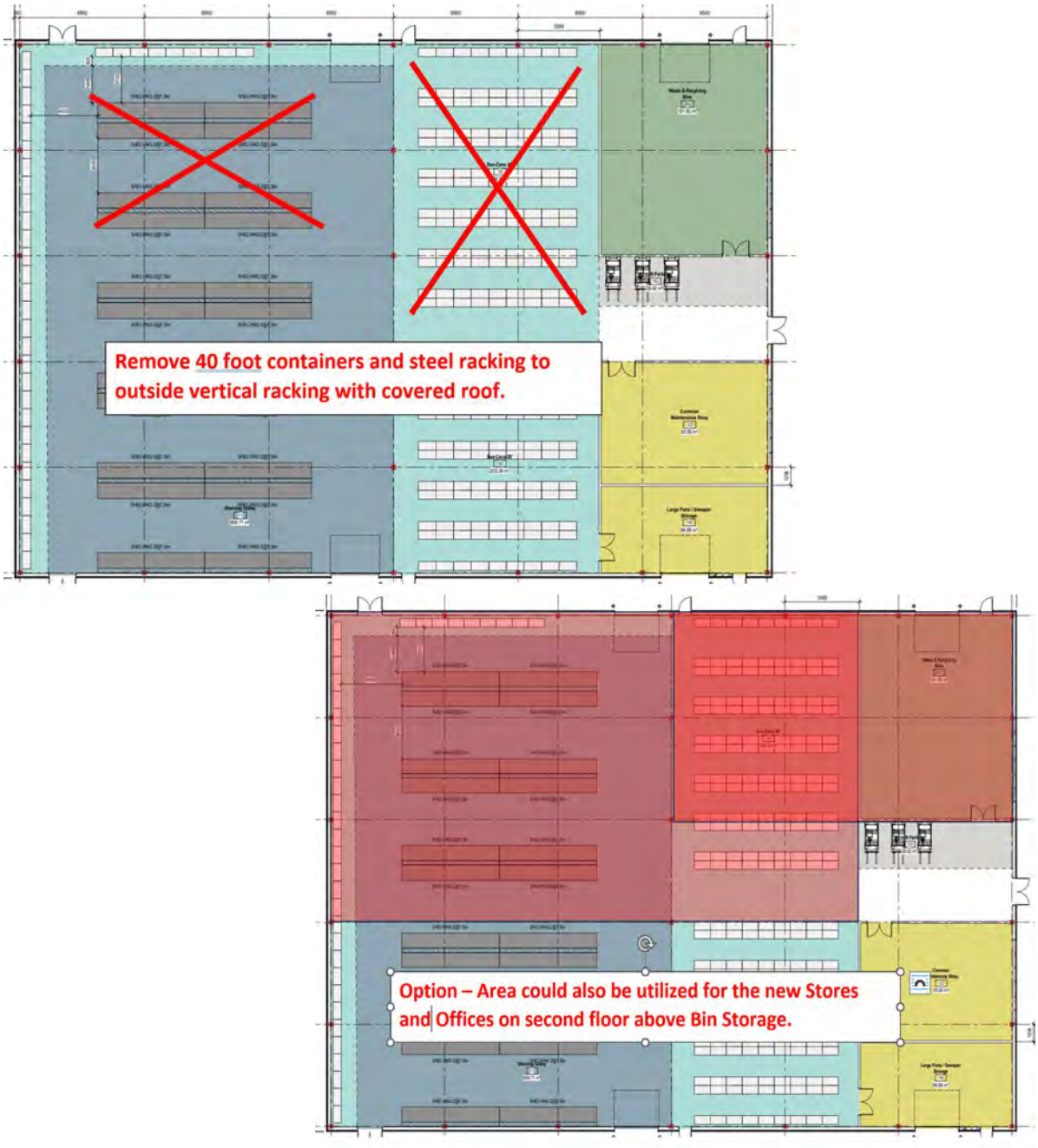

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Exhibits - Alternative Concept** **Page 4 of 12**


**Example of Building in Area: Pre-engineered building with architectural storefront on street**

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

## Exhibits - Alternative Concept



Some of the internal storage proposed in the Purpose Built Storage Building has the opportunity to be stored outside on vertical storage racks with a small covered roof. By combining both buildings into one and removing some of the proposed inside storage area to outside racking and adding more offices on the second floor (mezzanine) of the Purpose Built Storage Building, it is estimated that the combined building footprints will be reduced by approximately 20 - 30 %. With this option there also exists the opportunity to combine the Stores / Purchasing Department into this building (Option EF-12 - Demolish Existing Stores and Replace with new Facility into this building). Further capital cost savings could also be considered designing the Administration Building as a pre-engineered building with architectural detail on the front public entrance facing the street.

**Example of Building in Area: Pre-engineered building with architectural storefront on street**

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Exhibits - Alternative Concept** **Page 6 of 12**

**Warehouse building with weight-scale at entrance.**

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Exhibits - Alternative Concept** **Page 7 of 12**

**Department of Fisheries and Oceans – Pre-engineered building with offices above / warehouse / storage in the back**

**Example: Outdoor Vertical Storage Racks with Roofs**

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Exhibits - Alternative Concept** **Page 8 of 12**


**Example of Building in Area: Pre-engineered building with architectural storefront on street**

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Exhibits - Alternative Concept** **Page 9 of 12**

**Example of Building in Area: Pre-engineered building with architectural storefront on street**

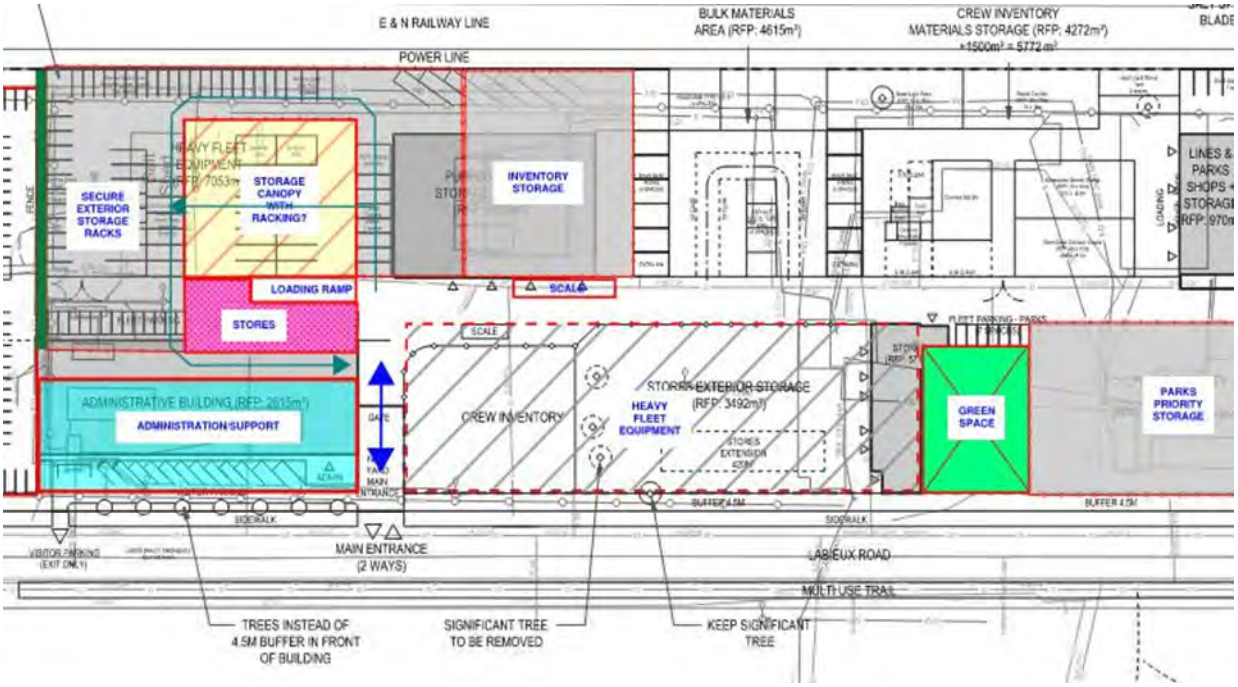
# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

## Exhibits - Alternative Concept

**Page 10 of 12**



# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| New Administration Building | ea. | 1 | $20,143,900.00 | $20,143,900 |
| New Purpose-Built Storage Building | ea. | 1 | $6,616,300.00 | $6,616,300 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **26,760,200** |
| 25.0% | Project Markup: | $ | 6,690,050 |
| **Total Cost (Rounded):** | | **$** | **33,450,300** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Pre-Engineered Administration Building | ea. | 1 | $18,129,510.00 | $18,129,510 |
| Efficiency with combined storage with Administration Building - reduce size to outdoor racking | sum | 1 | $4,990,873.60 | $4,990,874 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **23,120,384** |
| 25.0% | Project Markup: | $ | 5,780,096 |
| **Total Cost (Rounded):** | | **$** | **28,900,500** |
| **Cost Difference:** | | **$** | **4,549,800** |

# Quantitative Value Alternative

**Title** **EF-02**

***COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 33,450,300 | 33,450,300 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 28,900,500 | 28,900,500 |
| | | | **Total Initial Costs** | | **$ 33,450,300** | | **$ 28,900,500** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 4,549,800** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Reduced enclosed space O+M | | | 18.256 | | | -23,010 | -420,069 |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **-$ 420,100** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | -$ 420,100 |
| **Difference (Compared to Original)** | | | | | | | **420,100** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 33,450,300 | | $ 28,480,400 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **$ 4,969,900** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 1,832,298** | **Per Year:** | **$ 1,560,063** |

# Quantitative Value Alternative

**Title** **EF-04**

***LONG SPAN BEAMS IN ADMIN BLDG FOR FUTURE FLEXIBILITY***

## Original Concept



The spacing of columns within a structure has a significant impact on the ability to program the space. The existing Admin building structural system assumes a column spacing of 7m x 9m, which is the most efficient. The concept is to provide a flexible space to allow for future adjustments to workspaces. It is impossible to predict the necessary programming over the expected lifespan of the building (50 years). A good example is the balance of offices vs open space or the need for certain types of service bays in the shop. This will allow adaptations to new or differing work styles, functions, densities or priorities. Avoiding structural or other physical constraints on changes will make future changes easier

## Alternative Concept

Instead of structurally optimized columns and beams, the idea is to use longer span beams and avoid columns as much as reasonable (given extra costs). Potential to implement the more costly structural option presented by WSP in the structural system memo. The admin floor would require 36% more steel and the admin roof would require about 5% more steel. admin building floor area = 2615 m2. The span would increase from 7x9m to potentially 9x9m (with a bit more steel needed).

## Advantages

- Provides flexibility on future adjustments and adaptations

## Disadvantages

- Higher cost
- Additional steel and heavier structure

## Discussion / Justification

The additional costs are considerable given the extra span from 7m to 9m. For an office it doesn't appear to warrant the significant additional costs.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 1,259,000 | $ | $ 1,259,000 |
| **Difference** | **$ -1,259,000** | **$** | **$ -1,259,000** |

# Quantitative Value Alternative

**Title** **EF-04**

***LONG SPAN BEAMS IN ADMIN BLDG FOR FUTURE FLEXIBILITY***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | | $ |
| | | **Total Cost (Rounded):** | **$** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Premium for structural steel additional structural steel and infrastructure ready for flexibility to future proof | sum | 1 | $1,007,195 | $1,007,195 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 1,007,195** |
| 25.0% | Project Markup: | | $ 251,799 |
| | | **Total Cost (Rounded):** | **$ 1,259,000** |
| | | **Cost Difference:** | **$ -1,259,000** |

# Quantitative Value Alternative

**Title** **EF-04**

***LONG SPAN BEAMS IN ADMIN BLDG FOR FUTURE FLEXIBILITY***

## Life Cycle Cost Estimate

Page 3 of 3

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 1,259,000 | 1,259,000 |
| | | | **Total Initial Costs** | | $ - | | $ 1,259,000 |
| | | | **Difference (Compared to Original Concept)** | | | | -$ 1,259,000 |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | $ - | | $ - |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | $ - | | $ - |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| **Difference (Compared to Original)** | | | | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 1,259,000 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | -$ 1,259,000 |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | $ - | **Per Year:** | $ 68,964 |

# Quantitative Value Alternative

**Title** **EF-05**

***CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), PUBLIC WORKS AND CONSTRUCTION***

## Original Concept



Current administrative staff and functions for work groups going into NOC are Purchasing, Fleet, Construction, Parks and Public Works. They provide support for incoming calls, clerical and administrative support for staff and managers. At Master Plan development stage a lobby and waiting room was developed to greet visitors. Since the pandemic and development of more on-line tools and services, there has been a large reduction in the need for the public to come into Public Works. The need still exists for meetings with consultants, contractors and suppliers which need a greeting and an info/direction area of telecom system. This area could be reduced.

## Alternative Concept

Reduce size of lobby area and consider a telecom/video system for visitors at main door.
1. Look to combine PW and Parks dispatch services to NOC Operations Dispatch and Support.
2. Combine PW and Parks financial support staff.
3. Consider cross training admin. staff in each area to cover for vacation, sick time and emergency weather events.

## Advantages

- Reduce lobby foot print
- Streamline information and communication coming into and out of NOC
- Streamline financial support and consistent accuracy of information
- Streamline admin staff coverage

## Disadvantages

- Non personal greeting of people to facility
- Change management for staff
- Collective agreement issues

## Discussion / Justification

Business model changes since pandemic. Between PW and Parks we provide a number of services. Cross training helps for transfer of knowledge and coverage for staffing when away. Finance work should be done by finance trained staff. Reduce lobby area +- 70%

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 350,300 | $ 718,300 | $ 1,068,600 |
| **Alternative Concept** | $ 130,100 | $ 22,000 | $ 152,100 |
| **Difference** | **$ 220,200** | **$ 696,300** | **$ 916,500** |

# Quantitative Value Alternative

**Title** **EF-05**

***CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), PUBLIC WORKS AND CONSTRUCTION***

**Pick the Correct Title** **Page 2 of 4**

# Quantitative Value Alternative

**Title** **EF-05**

***CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), PUBLIC WORKS AND CONSTRUCTION***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Lobby Area | m2 | 66.83 | $4,193.60 | $280,258 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **280,258** |
| 25.0% | Project Markup: | $ | 70,065 |
| **Total Cost (Rounded):** | | **$** | **350,300** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Reduced lobby area | m2 | 20.049 | $4,193.60 | $84,077 |
| Add interphone and access control | sum | 1 | $20,000.00 | $20,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **104,077** |
| 25.0% | Project Markup: | $ | 26,019 |
| **Total Cost (Rounded):** | | **$** | **130,100** |
| **Cost Difference:** | | **$** | **220,200** |

# Quantitative Value Alternative

**Title** **EF-05**

***CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), PUBLIC WORKS AND CONSTRUCTION***

## Life Cycle Cost Estimate

Page 4 of z4

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 350,300 | 350,300 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 130,100 | 130,100 |
| | | | **Total Initial Costs** | | **$ 350,300** | | **$ 130,100** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 220,200** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Reduced overall building O+M | | | 18.256 | 4,344 | 79,303 | 1,203 | 21,961 |
| 0.5 FTE of receptionist | | | 18.256 | 35,000 | 638,957 | | |
| | | | **Total Annual Costs (Present Worth)** | | **$ 718,300** | | **$ 22,000** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 718,300 | | $ 22,000 |
| | | | **Difference (Compared to Original)** | | | | **696,300** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 1,068,600 | | $ 152,100 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 916,500** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 58,534** | **Per Year:** | **$ 8,332** |

# Quantitative Value Alternative

**Title** **EF-09**

***INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE***

## Original Concept



The concept of this value alternative is to ensure the NOC is prepared for electrification to support emission reductions, provide resiliency, provide peak shaving of BC Hydro demand charges and provide initial design considerations for future adaptability. Infrastructure to support future Battery Energy Storage (BESS) combined with the alternative concepts below ensures an electrification eco-system can be easily introduced during the design life of the NOC.

## Alternative Concept

Alternative concepts include:
DT-04 - INTRODUCE INFRASTRUCTURE TO SUPPORT PV CELLS (solar panels)
IE-24 - INTRODUCE SEMI-PERMANENT REFUELING STATION

## Advantages

- Providing infrastructure during contruction will reduce future installation costs.
- Provisions for PV and BESS will allow for future emission reductions from NOC.
- Semi-permanent refueling will allow for easy removal of gasoline/diesel fueling infrastructure as EVs are introduced.
- Future install of BESS will allow for BC Hydro demand charge savings as the heavy fleet is transitioned to EV.

## Disadvantages

- Infrastructure installed as part of initial construction may not be in the optimal location for future PV/BESS.
- PV/BESS may not be installed in the future.

## Discussion / Justification

The City has an emission reduction target of 94-107% below 2010 levels by 2050 as well as EL-4 of zero carbon step code for buildings. By providing the infrastructure to support future installation of PV, BESS and removal of gasoline/diesel fueling infrastructure, the NOC will be adaptable for future emission reduction initiatives as well as supporting energy requirements as vehicles are transitioned to electric.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 312,500 | $ | $ 312,500 |
| **Difference** | **$ (312,500)** | **$** | **$ (312,500)** |

# Quantitative Value Alternative

**Title** **EF-09**

***INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE***

## Discussion / Justification



For the purposes of this value exercise, each component has been broken down as detailed below. Each of these components represents a part of the future adaptability and estimated cost benefit.

**PV (Solar panels)**
Solar panels have been estimated to cover 70% of the roof of the administration, fleet maintenance and purpose built storage. The remaining 30% is for mechanical and HVAC infrastructure. Total roof space for each building is as follows:
1)Fleet Maintenance : 2,558m2 (70% = 1,790m2)
2)Admin : 2,186m2 (70% = 1,530m2)
3)Purpose build Storage: 1,763m2 (70% = 1,234m2)
Add overall construction cost of $2,000000

**BESS**
Battery Energy Storage has several advantages including reducing the demand charges from BC Hydro, providing backup power in case of grid outage and supporting fleet charging power requirements when the fleet is transitioned to electric. BESS technology is relatively new, but is expected to play a significant part in the renewable energy transition throughout Canada and BC. Current capital costs are approximately $350/kwh with future projections of 50% of that cost by 2035. The NOC is assumed to be a large service customer with BC Hydro which results in a demand charge of $12.50/kW. Assuming a 250kW continuous discharge rate from the BESS, annual demand charge savings are estimated at up to $3,125/month. A detailed energy analysis would be required at the NOC to determine appropriate sizing of the BESS system.

There is potential that the EV fleet may be able to be the BESS system, but substantial modelling and fleet usage patterns would need to be identified. For the purposes of this business case, it is assumed that a dedicated BESS system would be installed.

# Quantitative Value Alternative

**Title** **EF-09**

***INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE***

## Discussion / Justification (Continued)



**Semi-permanent refuelling**

Semi-permanent refuelling will allow for a modular design for scaling fueling infrastructure as demand for gasoline/diesel is reduced and vehicles are shifted to EV. As the reliance on gasoline/diesel is reduced some of the infrastructure can be removed freeing up space for other NOC activities or needs. Above ground fueling tanks are already in the design for the NOC and there is not expected to be an additional capital cost during construction. There will be costs associated with removing the infrastructure when appropriate. It is assumed that gasoline fueling infrastructure can be removed in 2040 as most gasoline vehicles are expected to be replaced with EV by that time. Diesel fueling infrastructure would likely need to remain until 2050 or beyond.

**Infrastructure**

Installation of the infrastructure to support the above components and concepts is proposed as part of this value alternative. Infrastructure would include electrical conduit, structural provisions on the roof of the fleet maintenance facility, administration building and purpose-built storage building. This would allow for ease of future installation of any or all of the PV, BESS or refueling components.

Allowance for infrastructure ready for future installation: $320,000

# Quantitative Value Alternative

| Title | EF-09 |
|---|---|

***INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | | $ |
| | | **Total Cost (Rounded):** | **$** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Add infrastructure ready for future | sum | 1 | $250,000.00 | $250,000 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 250,000** |
| 25.0% | Project Markup: | | $ 62,500 |
| | | **Total Cost (Rounded):** | **$ 312,500** |
| | | **Cost Difference:** | **$ -312,500** |

# Quantitative Value Alternative

**Title** **EF-09**

***INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 312,500 | 312,500 |
| | | | **Total Initial Costs** | | $ - | | $ 312,500 |
| | | | **Difference (Compared to Original Concept)** | | | | -$ 312,500 |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | $ - | | $ - |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | $ - | | $ - |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| | | | **Difference (Compared to Original)** | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 312,500 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | -$ 312,500 |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | $ - | **Per Year:** | $ 17,118 |

# Design Suggestion

**Title** **EF-11**

***RE-EVALUATE PROJECT DELIVERY METHOD***

## Original Concept



Design-Bid-Build

## Alternative Concept

Construction Manager As Agent with optional Stipulated Sum
Construction Manager At Risk

## Advantages

- Constructability input/feedback on the design through design development
- A second cost estimate to compare to QS values
- Market intel - supply chain, labour availability (what other major projects in construction that could limit competitive pool)
- Contractor selection based on qualifications/experience not just on lowest price
- Since design is more collaborative, it reduces the risk of major change orders and claims
- With the first alternative, you have a period to gauge value as a CM before entering a fixed price contract (optionality).
- Ideally suited to complex, phased projects with high probability of scope change
- Ability to sequentially tender which can have phasing/schedule benefits

## Disadvantages

- More complicated procurement (contract); Owner must have developed Supplementary Conditions to CCDC-5A/5B
- There is an initial cost premium to having CM expertise/skills through design
- Potentially more resource-intensive as Owners' project manager becomes key liaison between design consultant and construction manager

## Discussion / Justification

Success of this phase is defined by building public trust by demonstrating rigour to the PM framework and delivering what is expected and promised. The ability to obtain future funding for subsequent phases depends on this.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **EF-11**

***RE-EVALUATE PROJECT DELIVERY METHOD***

## Discussion / Justification (Continued)



The decision to go with a traditional Design-Bid-Build delivery model may have been made under different economic conditions. With unprecedented levels of escalation in recent times, Contractors are unwilling to take on the risk of a fixed price contract or if they are, may transfer the risk back to the Owner through a risk premium. Furthermore, the assumptions may have changed since this decision was made (e.g. changes to operations may necessitate a re-evaluation of the design; project risks may have changed or evolved; market conditions may be different - materials and labour availability or other major projects commencing at the same time (major mid-island hospitals); changes to planned phasing of the project).

An alternative contract delivery method, such as a CCDC-5A or 5B (with optional step sum), may result in:

- Achieving a greater level of cost certainty (comparative cost estimates with local market intel and trades pricing) along with GMP (guaranteed maximum price)
- Increased schedule certainty (ability to deploy sequential permitting/tendering)
- Navigating complexity of maintaining operations and potential move/relocation activities and staging
- Navigating possible changes to project phasing

The lowest-priced bid may not translate to the maximum benefit to the project.

# Quantitative Value Alternative

**Title** **EF-14**

***ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM***

## Original Concept



The original concept for Fleet Maintenance Facility is contained in pages 52 to 56 of the Master Plan.

## Alternative Concept

The alternative concept is to add offices to the facility beyond the initial plan.

## Advantages

- Providing additional room for unexpected office requirements in the future
- Provide additional flexibility during the construction phasing
- Be space that could be offered commercially if surplus to City requirements
- Potentially reduce office requirements elsewhere in the complex

## Disadvantages

- Much has been made of the need to separate fleet from other facilities due to noise. It is therefore counterintuitive to add offices to this environment
- Additional upfront cost
- Alternative access protocols will be required if leased out to a third party.

## Discussion / Justification

This could take many forms but, for simplicity, we will consider the addition of 10 offices at an average of 11m2 plus corridor etc. say an addition of 158m2 of floor area stacked above the current facility. Additional off road parking will be required at the south end of the facility. It is possible this would need additional washroom facilities. Note that adding a floor above the existing offices will be +/- 160m2.

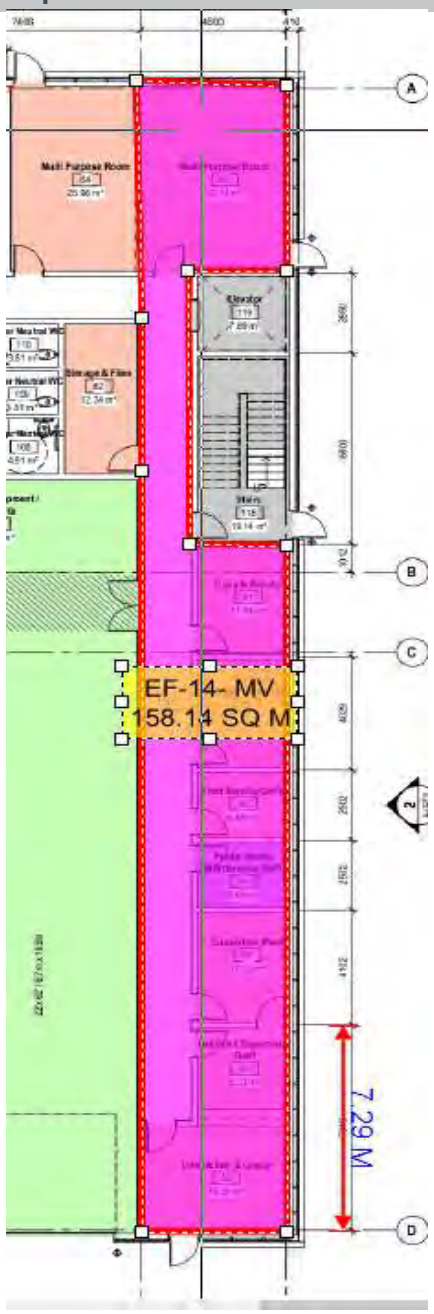
| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 830,400 | $ -374,600 | $ 455,800 |
| **Difference** | **$ -830,400** | **$ 374,600** | **$ -455,800** |

# Quantitative Value Alternative

**Title** **EF-14**

***ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM***

**Exhibits - Alternative Concept** **Page 2 of 6**



# Quantitative Value Alternative

**Title** **EF-14**

***ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM***

## Exhibits - Alternative Concept



"Adding Offices" to the Fleet Maintenance Facility could take many forms including changing the floor plan, adding external offices etc. For the purposes of the Value Alternative the assumption is that the space requirements for Fleet have been dealt with and are not being questioned, therefore the most expedient route to adding offices within the original concept footprint has been chosen. That is to stack them within the existing building.

The previous page takes the Floor Level Plan of the Fleet Maintenance building and highlights the area of the proposed additional office space above the offices already contemplated.

The result of this is to add 10 offices with supporting space. This could also be open plan and provide even more work stations.

The current master plan does not show off road parking but it will be a necessity if employees (or visitors) need to park close to this building. The assumption is that this will be accommodated and also controlled pedestrian access provided.

# Quantitative Value Alternative

**Title** **EF-14**

***ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM***

## Discussion / Justification



The Master Plan has staged the Fleet Maintenance building as Phase 1.

By adding office space to phase 1 the positive impact to Public Works could be accelerated. Additional offices will be available to all departments. Currently, purchasing is renting a trailer to house purchasers. Additional offices could provide a temporary relief pending the permanent solution.

In the current phasing the new administrative building is in phase 3. There is every possibility that phase 3 will delay beyond the current plan. By adding offices to phase 1 there will be space available for some growth pending completion of the later phases. If, for any reason the later phasing is delayed (or cancelled) this will be valuable office space.

If these additional offices are constructed and, in the unlikely event that they are found to be surplus to requirements at a later date they could be leased out commercially.

One potential advantage that was not analysed but should be mentioned is that by adding office space to fleet it may reduce some office space requirement elsewhere.

The biggest disadvantage to this option is the fact that these offices are now with-in the Fleet Maintenance building which is industrial in nature. A primary motivation to have the fleet building separate from the other offices was to move the noise and disruption away from offices. It is therefore counter intuitive to add offices to the building. These offices may not provide a conducive work environment and may not be attractive to lease at a later date.

# Quantitative Value Alternative

**Title** **EF-14**

***ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Add offices to the fleet maintenance facility | m2 | 158 | $4,204.80 | $664,358 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 664,358** |
| 25.0% | Project Markup: | $ | 166,090 |
| | **Total Cost (Rounded):** | **$** | **830,400** |
| | **Cost Difference:** | **$** | **-830,400** |

# Quantitative Value Alternative

**Title** **EF-14**

***ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 830,400 | 830,400 |
| | | | **Total Initial Costs** | | $ - | | $ 830,400 |
| | | | **Difference (Compared to Original Concept)** | | | | -$ 830,400 |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | $ - | | $ - |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Revenue generation | | | 18.256 | | | -30,000 | -547,678 |
| O+M | | | 18.256 | | | 9,480 | 173,066 |
| | | | **Total Annual Costs (Present Worth)** | | $ - | | -$ 374,600 |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | -$ 374,600 |
| **Difference (Compared to Original)** | | | | | | | **374,600** |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 455,800 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **-$ 455,800** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | $ - | **Per Year:** | $ 24,967 |

# Design Suggestion

**Title** **EF-17**

***REEVALUATE STRATEGIC GROWTH TO REFLECT WITHIN THE MASTER PLAN OF NOC***

## Original Concept



The current concept does not consider City staff growth beyond year 25. This is most readily able to be analyzed with respect to city population growth through the Administration building, and in particular, to the inside staff.

## Alternative Concept

Referring to the Surrey Operations Centre as a model, an entire extra full building floor footprint was constructed creating a 3 story building. The business model considers this to be inexpensive space for when Surrey requires it in the future but allows the City to collect rent from external parties who would lease the floor in the interim. The alternative then is to add a third floor and construct when the Admin building is built.

## Advantages

- Allows the city to move in and occupy the space when the need arises. It is assumed that city occupancy need not be confined to Parks and Public Works, but could be any city department that might find the location and purpose built space suitable.
- For the city to spend the capital now for future accommodation is to anticipate that future construction costs greatly exceed present values due to escalation. The business model suggests that in order to accommodate growth to a 50 year horizon, the least costliest capital to be committed is now.
- The constructed third floor space can be leased, generating revenue for the city.
- City use of the space allows the operations to easily grow and to have all staff co-located within the same facility using the same staff supports of parking and amenities.

## Disadvantages

- Having a third party / external non-City staff tenant will required heightened security and access control for the public into the building.
- Doing the fifty year build-out requirement suggests that the city will still only need to occupy one third of the current floorplate. Occupancy at that time will require floor demarcation to securely separate city accommodation from private sector lease space.
- Dedicated parking for a potential private sector lessee is required, potentially constraining City availability for parking.
- Leasing requires a marketplace that would absorb the space. Office space need has greatly fallen since Covid and in a worst case, may see the space unleased for a period of time.

## Discussion / Justification

Please see discussion below:

# Design Suggestion

**Title** **EF-17**

***REEVALUATE STRATEGIC GROWTH TO REFLECT WITHIN THE MASTER PLAN OF NOC***

## Discussion / Justification



While a 25 to even 50 year horizon for much of the various departments is either very low or difficult to quantify, those staff in the admin building as currently indicated on the second floor provide a good comparative basis to undertake analysis of growth beyond the current 25 year horizon to 50 years. Currently the concept suggests that in 25 years, the second floor will be full with 50 staff and will occupy 2,227 m2 on one level. For a 50 year horizon how much more area would be required to accommodate staff growth based on City growth?

RPG Program of July 2019 stated that the program was based on an additional 30,000 people within a 25 year time frame for a total city population of 135,000. The City of Nanaimo stats in current 2023 "State of the Nanaimo Economy' document a population of 140,000 people by 2046. The 50 year estimate at a conservative 1 - 1.5% growth annually would consider in 2071 an estimated population of approximately 175,000. The current plan for the administrative building accommodates approximately 50 FTEs per floor occupying 2,225 m2 gross. Based on gathered best practice an additional 5 FTEs are required per 10,0000 population. At the fifty year mark with 30,000 more people in the city, a minimum of 15 FTEs would require accommodation. A rough estimate is that approximately 1/3 of the current floorplate will be occupied by new staff.

# Quantitative Value Alternative

**Title** **EF-18**

***REGULARIZE STRUCTURAL BAYS IN THE FLEET BLDG.***

## Original Concept



The proposed structural system for the fleet maintenance building has an irregular grid resulting in large variations in spans and column locations.

## Alternative Concept

Develop a standardized structural bay, likely based on the larger service bays. Consider reducing spans in some areas by adding columns as noted in the attached drawings.

## Advantages

- Reduced structural costs in steel weight and fabrication.
- Long term flexibility in improved by having a more regular grid.

## Disadvantages

- May not precisely fit all conditions. May require some planning compromises.

## Discussion / Justification

The current structural grid is very sensitive to the planning as presently developed. Plan changes to many of the more granular spaces will occur through design, construction and the life of the building. While the location of columns and there spacing may be appropriate to the current design, they may not make sense in the future. A standardized column grid easily subdivided into 600 mm modules for example will allow for change.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 263,100 | $ | $ 263,100 |
| **Difference** | **$ -263,100** | **$** | **$ -263,100** |

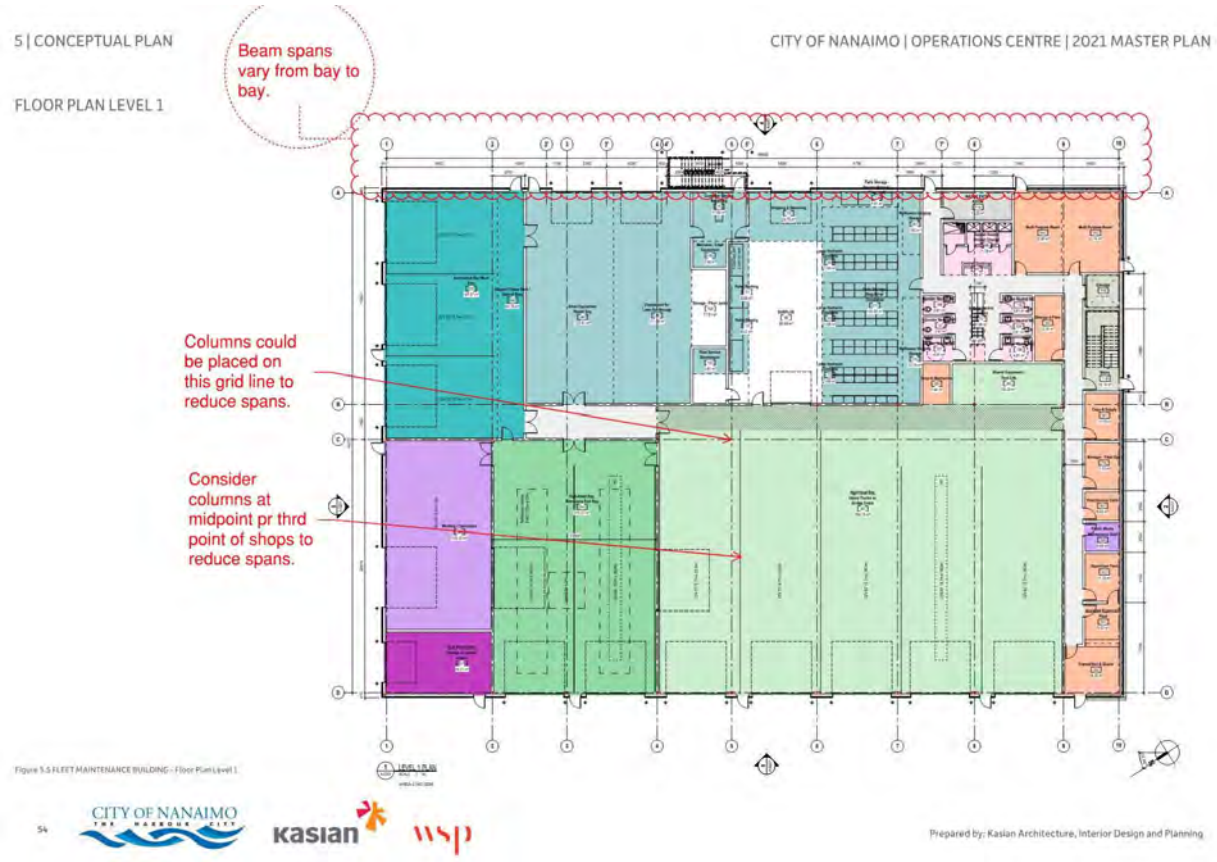
# Quantitative Value Alternative

**Title** **EF-18**

***REGULARIZE STRUCTURAL BAYS IN THE FLEET BLDG.***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

| Title | EF-18 |
|---|---|

***REGULARIZE STRUCTURAL BAYS IN THE FLEET BLDG.***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | | $ |
| | | **Total Cost (Rounded):** | **$** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Structural cost impact | sum | 1 | $210,480.20 | $210,480 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 210,480** |
| 25.0% | Project Markup: | | $ 52,620 |
| | | **Total Cost (Rounded):** | **$ 263,100** |
| | | **Cost Difference:** | **$ -263,100** |

# Quantitative Value Alternative

**Title** **EF-18**

***REGULARIZE STRUCTURAL BAYS IN THE FLEET BLDG.***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 263,100 | 263,100 |
| | | | **Total Initial Costs** | | $ - | | $ 263,100 |
| | | | **Difference (Compared to Original Concept)** | | | | -$ 263,100 |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | $ - | | $ - |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | $ - | | $ - |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| | | | **Difference (Compared to Original)** | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 263,100 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | -$ 263,100 |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | $ - | **Per Year:** | $ 14,412 |

# FUNCTION:
## IMPROVE CIRCULATION (IC)

# Quantitative Value Alternative

**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Original Concept



The Purpose Built Storage Building is a heated building containing a Common Maintenance Shop for all departments, sweeper storage, green bin storage, contents of existing sea can storage, racking dedicated to department.

## Alternative Concept

1. Change the purpose of the green bin storage area to storage of Vac Truck.
2. Change the building from Grid Line 1 to Grid Line 4 in either of the two following ways:

a. **Option 1**: Grid Line 1 - 4 change from enclosed to covered space by way of canopy attached to building.
b. **Option 2:** Grid Line 1 - 4 eliminate the building, and install sheet metal roofs over each row of racking.

## Advantages

- Reduced Capital, Operational, and Maintenance Costs
- Reduced GHG emissions
- Better and more efficient use of space
- Better air quality

## Disadvantages

- Exterior storage of green bins would need to be identified either on site or off site.
- Option 2 would not allow additional covered equipment parking.

## Discussion / Justification

See sheets below for details:

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 2,828,300 | $ 660,000 | $ 3,488,300 |
| **Alternative Concept** | $ 2,147,600 | $ 198,900 | $ 2,346,500 |
| **Difference** | **$ 680,700** | **$ 461,100** | **$ 1,141,800** |

# Quantitative Value Alternative

**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Exhibits - Original Concept



**Building Description:** The Purpose Built Storage Building is an industrial building, steel frame pre-engineering structure with energy efficient envelope design (double storey, pre finished industrial metal panelling, metal sloped roof, minimum windows, maintenance shop, clerestory glazing, glazed overhead doors, shelving, sea-can, waste and recycling bins) and standard interior finishes.

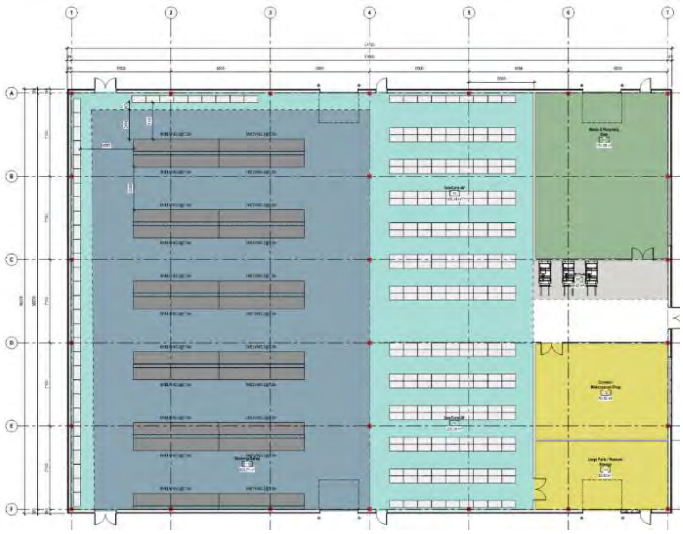
**Purpose:** Common Maintenance Shop for all departments, sweeper storage, green bin storage, contents of existing sea can storage, racking dedicated to departments.

**Structurally**, The foundations will consist of reinforced concrete pads at each column and larger seismic reinforced concrete pads under the seismic cross bracing. The slab on grade will be a minimum 250 mm thick reinforced concrete slab due to high racking loads, with the thickness and reinforcing to be finalized once the project specific loads are confirmed. This slab will also carry
forklift loads and will require integral hardener. The slab will be minimally sloped to drains.

**Mechanically**, Space ventilation for the storage will be provided by roof mounted 100% outdoor heat recovery air handling units (Capacity: 5000 l/s) c/w supply fan, return fan, heat recovery section, MERV 13 filters, gas fired burner, roof curb and variable speed drive. Heating for the storage will consist of ten (10) gas fired unit heaters (Reznor: UDAS 120).

**Electrically**, The new storage building will be fed with 600V from the main electrical room in the Admin building. Currently all the of electrical equipment is proposed to be mounted on the wall in the storage area.

**Fire Protection,** Wet sprinkler systems will be provided throughout all heated areas to suit the hazard rating for each area. A Siamese connection will be provided on the outside of each building, adjacent to the main entrance.



# Quantitative Value Alternative

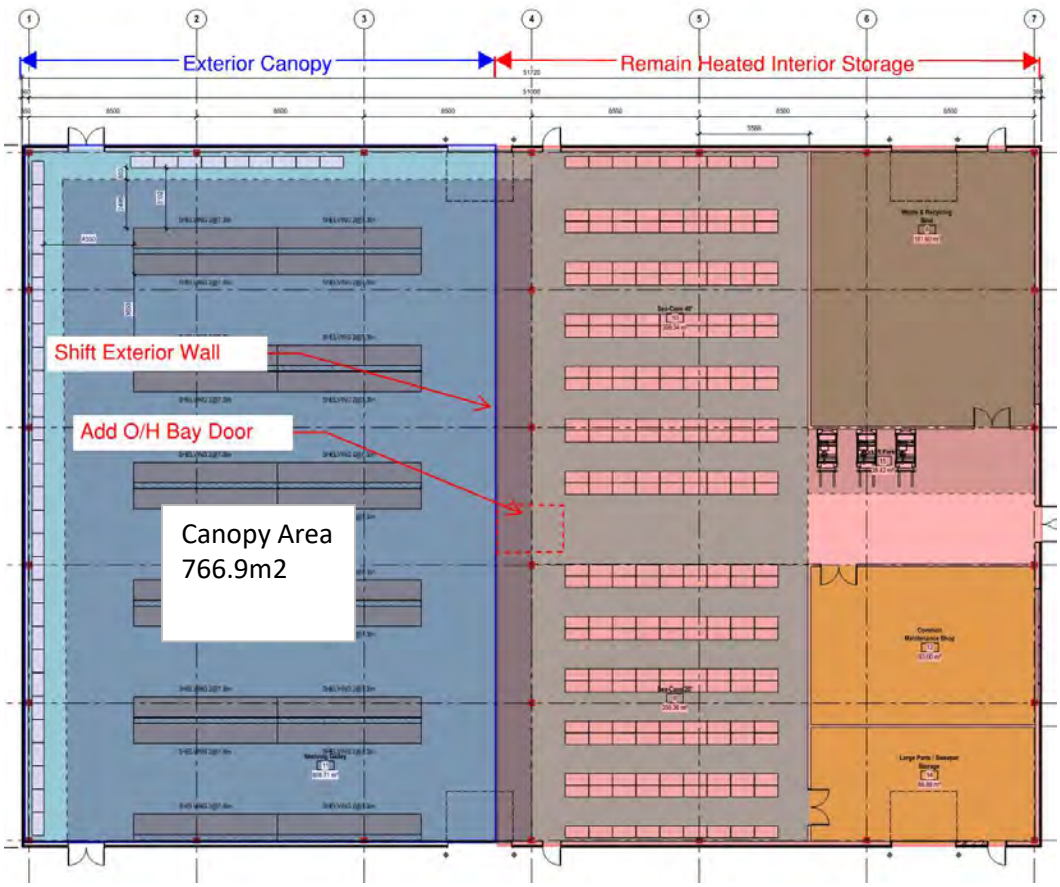
**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Exhibits - Alternative Concept



**Option 1**: Grid Line 1 - 4 change from enclosed to covered space by way of canopy attached to building.
Opt 1 Architectural Changes, elimination of 50m of exterior walls, elimination of 1 overhead door (retain one overhead door in the middle for forklift to access in and out). Move the medium duty shelving in grid lines 1 - 4 into the interior.
Opt 1 Structurally, changes would be minor reduction in loading for grid line 1 - 4.
Mechanically, changes include reduced heated space by 45% (10 natural gas heaters down to 5)
Opt 1 Electrically, changes would be minimal, but reduced load by reducing overhead door, lighting change from interior to exterior.
Opt 1 Fire Protection, changes from wet system to dry system.



# Quantitative Value Alternative

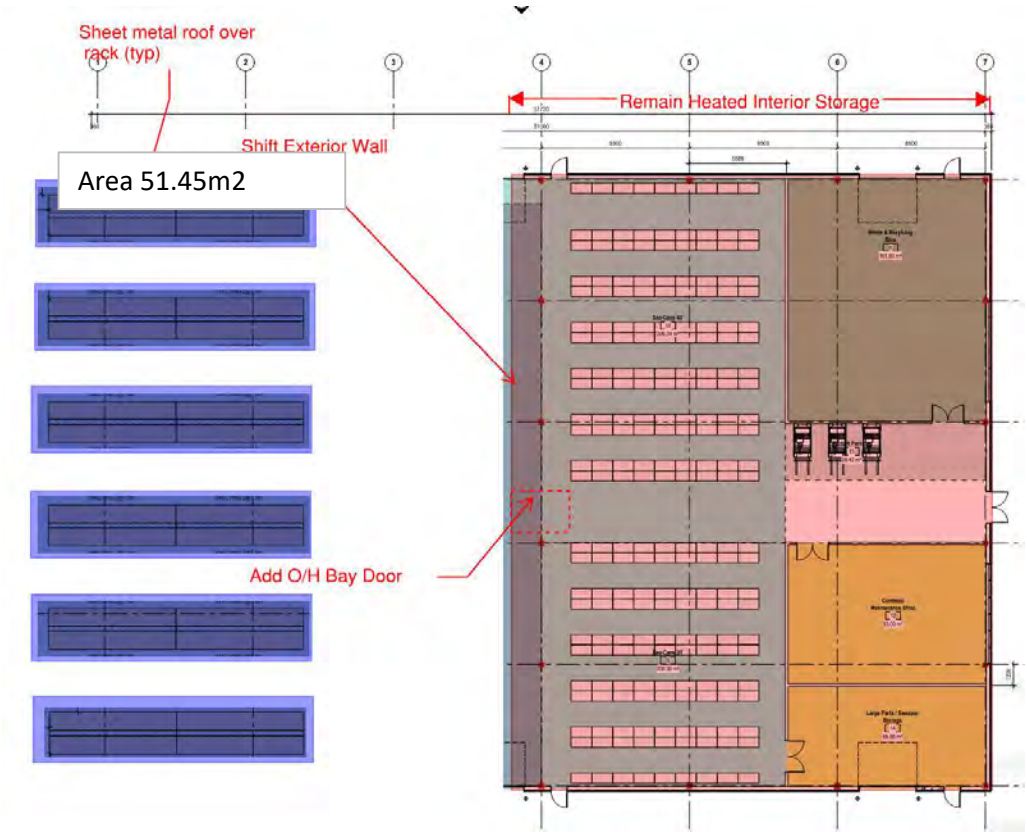
**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Exhibits - Alternative Concept



**Option 2**: Grid Line 1 - 4 eliminate the building, install sheet metal roofs over each road of industrial racking.
Opt 2 Architectural Changes, elimination of 45% of GFA (842m2 reduction), 50m of exterior walls, elimination of 1 overhead door (retain one overhead door in the middle for forklift to access in and out), addition of sheet metal roof over each rack. Move the medium duty shelving in grid lines 1 - 4 into the interior
Opt 2 Structurally, elimination of foundation and structure of approximately 45% of building GFA.
Mechanically, changes include reduced heated space by 45% (10 natural gas heaters down to 5)
Opt 2 Electrically, changes would be minimal, but reduced load by reducing overhead door, lighting change from interior to exterior.
Opt 2 Fire Protection, changes from wet system to dry system.



# Quantitative Value Alternative

**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Discussion / Justification



Currently the existing sea can storage is not heated space, so it is likely there is some rationale to being able to reduce the heated storage. A reduction of heated storage space should be coupled with a review by departments to identify those items that they require to store in heated space and items required to be stored in covered, unconditioned space.

Option 1 provides better shelter over the racking area than option 2. A benefit of option 1 over option 2 is that you could store the milling machine or paving machine under cover.

Option 2 would be less expensive than option 1. although would be more expensive than Option 2. It may be possible to incorporate milling machine and paving machine parking between racks under cover.

Green bin storage could be located outdoors, or off site.

Cost Avoidance:
OPTION 1 - CANOPY COVER - $600,000
OPTION 2 - RACK COVERS - $2,200,000

# Quantitative Value Alternative

**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Exhibits



CAN, AB, Edmonton

**Model:**

Warehouse, Temperature Controlle

Choose Levels of Service

**Custodial:** Medium

**Energy:** Medium

**Grounds:** Medium

**Management:** Medium

**Pest Control:** Medium

**Refuse:** Medium

**Road Clearance:** Medium

**Security:** Medium

**Telecom:** Medium

| Model | Size | PRV |
|---|---|---|
| Warehouse, Temperature Controlled | 8,200 Sq Ft | $1,334,625 |

| Forecast Type | Cost Type | 30-year Average Annual Cost | Cost / Size | Cost / PRV |
|---|---|---|---|---|
| M&R | PM | $10,231 | $1.25 | 0.77 % |
| | Unscheduled | $11,375 | $1.39 | 0.85 % |
| | Repair & Replace | $15,586 | $1.90 | 1.17 % |
| | **Sub-Total** | **$37,192** | **$4.54** | **2.79 %** |
| Operations | Custodial | $1,129 | $0.14 | 0.08 % |
| | Energy | $6,779 | $0.83 | 0.51 % |
| | Grounds | $416 | $0.05 | 0.03 % |
| | Management | $15,482 | $1.89 | 1.16 % |
| | Pest Control | $1,962 | $0.24 | 0.15 % |
| | Refuse | $43 | $0.01 | 0.00 % |
| | Road Clearance | $1,482 | $0.18 | 0.11 % |
| | Security | $5,324 | $0.65 | 0.40 % |
| | Telecommunications | $986 | $0.12 | 0.07 % |
| | Water/Sewer | $514 | $0.06 | 0.04 % |
| | **Sub-Total** | **$34,117** | **$4.16** | **2.56 %** |
| Recapitalization | Recapitalization | $19,578 | $2.39 | 1.47 % |
| | **Sub-Total** | **$19,578** | **$2.39** | **1.47 %** |
| **Total Cost** | | **$90,887** | **$11.08** | **6.81 %** |

# Quantitative Value Alternative

**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

**Estimated Cost of Original Concept** **Page 7 of 8**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Purpose -Built Storage building | m2 | 767 | $2,950.00 | $2,262,650 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **2,262,650** |
| 25.0% | Project Markup: | $ | 565,663 |
| | **Total Cost (Rounded):** | **$** | **2,828,300** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Steel framed canopy c/w gutters, finished soffit | m2 | 767 | $2,200.00 | $1,687,400 |
| add dry sprinkler system | m2 | 767 | $40.00 | $30,680 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **1,718,080** |
| 25.0% | Project Markup: | $ | 429,520 |
| | **Total Cost (Rounded):** | **$** | **2,147,600** |
| | **Cost Difference:** | **$** | **680,700** |

# Quantitative Value Alternative

**Title** **IC-04**

***COVERED STORAGE IN LIEU OF ENCLOSED PURPOSE STORAGE BLDG***

## Life Cycle Cost Estimate



**Discount Rate** 5.00% Net
**Life Cycle Period** 50 Years

| | | | | Original Concept | | Alternative Concept | |
|---|---|---|---|---|---|---|---|
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 2,828,300 | 2,828,300 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 2,147,600 | 2,147,600 |
| | | | **Total Initial Costs** | | **$ 2,828,300** | | **$ 2,147,600** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 680,700** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| Replacement | 15 | | 0.481 | 37,152 | 17,871 | 13,003 | 6,255 |
| | | | **Total Replacement/Salvage Costs** | | **$ 17,900** | | **$ 6,300** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Operation cost | | | 18.256 | 35,170 | 642,065 | 10,551 | 192,619 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 642,100** | | **$ 192,600** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 660,000 | | $ 198,900 |
| | | | **Difference (Compared to Original)** | | | | **461,100** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 3,488,300 | | $ 2,346,500 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 1,141,800** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 191,078** | **Per Year:** | **$ 128,534** |

# Quantitative Value Alternative

**Title** **IC-07**

***MOVE HV TRUCK DUMP FACILITY OFF SITE***

## Original Concept



Public Works currently owns one Hydro Vac/Flush Truck which is mainly used for cleaning sewers. It has a excavation package which provides the ability to excavate (vacuum) around utility line to improve and accelerate ease of access a around utility pipes. The City 's Hydrovac truck is the primary tool for emergency after hours water breaks and sewer plugs. For all other construction digs the City utilize a number of contract hydro vac trucks. The City also contracts out our catch basin cleaning program of over 13,000 CB's. Currently all of the waste from these hydro vac activities are dumped at the PW yard and sorted to dry and then hauled off site.

## Alternative Concept

We have worked with GRT in Duke Point to receive CB materials which 2021 and 2022 worked well and offset double handling costs and cleaned material to a high level. In 2023 GRT stopped accepting the material due to the number of needles in the CB cleaning materials (and also sweeper materials). We now are taking the material to the landfill which the RDN operates and are paying contaminated rates. 1. Tender/RFP CB Clearing contract to include disposal. 2. Work with RDN/GRT to accept material at a more reasonable rate.3. Partner with a private contractor to build a receiving and handling facility which the City and contractors could use.

## Advantages

- Remove or reduce the need to receive and handle hydro vac and sweeper materials at PW Yard
- Build relations, long term contract with RDN and or GRT for materials handling
- Recycle contaminated materials through working with GRT
- Find a solution to deal with needles

## Disadvantages

- Negotiations with RTDN and GRT have not been successful so far
- Contracting out CB cleaning including disposal means we do not know where the material ends up
- Lack of flexibility for afterhours emergency needs to dump hydro vac trucks

## Discussion / Justification

Hydro vac material takes up substantial real estate and not enough space is allocated in current plan. Material requires drying before moving to dump site . The material from construction sites is generally clean but due to water content it is hard to handle. Materials from CB cleaning have needles and can have low to high levels of contamination and comes with a foul odor.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 62,500 | $ 1,853,000 | $ 1,915,500 |
| **Alternative Concept** | $ | $ 1,853,000 | $ 1,853,000 |
| **Difference** | **$ 62,500** | **$** | **$ 62,500** |

# Quantitative Value Alternative

**Title** **IC-07**

***MOVE HV TRUCK DUMP FACILITY OFF SITE***

## Exhibits - Original Concept



Current on site

# Quantitative Value Alternative

**Title** **IC-07**

***MOVE HV TRUCK DUMP FACILITY OFF SITE***

## Exhibits - Alternative Concept



Remove the dump facility; keep wash pit and truck wash.

# Quantitative Value Alternative

**Title** **IC-07**

***MOVE HV TRUCK DUMP FACILITY OFF SITE***

## Exhibits - Alternative Concept



Hi John,

The operating cost for the dump site at the top of the yard:

Catchbasin Waste: Disposal Costs:$24, 750 annually; Labour + Truck + Loader:$6450 Total annually: $31, 200

HydroVac Waste: $47, 675 (based on 20wks at 8hrs per week, 32wks at 4hrs per week, note no disposal charge as material goes to City Fill sites);

Bottom of Yard:

Washpit (bottom of yard): Labour + Flush Truck and RDN Disposal: $22 625 annually.

Hope that helps, Michael is gathering the other costs for the yard operations.

Thx
Dave

# Quantitative Value Alternative

| Title | IC-07 |
|---|---|

***MOVE HV TRUCK DUMP FACILITY OFF SITE***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Construction of dump facility | sum | 1 | $50,000.00 | $50,000 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **50,000** |
| 25.0% | Project Markup: | $ | 12,500 |
| | **Total Cost (Rounded):** | **$** | **62,500** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |
| | **Cost Difference:** | **$** | **62,500** |

# Quantitative Value Alternative

**Title** **IC-07**

***MOVE HV TRUCK DUMP FACILITY OFF SITE***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 62,500 | 62,500 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | | |
| | | | **Total Initial Costs** | | **$ 62,500** | | **$ -** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 62,500** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Current operating Cost | | | 18.256 | 101,500 | 1,852,976 | | |
| Offsite cheaper | | | 18.256 | | | 101,500 | 1,852,976 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 1,853,000** | | **$ 1,853,000** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 1,853,000 | | $ 1,853,000 |
| | | | **Difference (Compared to Original)** | | | | **-** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 1,915,500 | | $ 1,853,000 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 62,500** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 104,925** | **Per Year:** | **$ 101,501** |

# Quantitative Value Alternative

## Title IC-13

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

### Original Concept



Three (3) combined ingress/egress accesses are presently provided for the following Users:
Staff Parking - Entry and Exit
Main Entrance - Entry and Exit for Visitors, Operations Vehicles, Material Delivery etc.
Fleet Entrance - Entry and Exit for Fleet Vehicles
A separate 'exit only' is provided for Visitors leaving the site

### Alternative Concept

The alternative concept revises the ingress/egress arrangement in the following ways:
Staff Parking - Removed and Relocated to Main Entrance noting proposed alternative use (housing)
Main Entrance - Accommodates Staff Parking, Material Delivery, Fleet. Visitor Parking/Access and Operations Access are removed
Operations Entrance - A dedicated Operations Entrance has been added
Fleet Entrance - Removed and Relocated to Main Entrance
Exit Only Access - Fleet entrance/exit modified to 'All Exit Only'

### Advantages

- Reduces free flow access and conflict points throughout the site
- Provides an opportunity to better control material logistics (manoeuvres are more controlled and predictable)
- Improves site Health & Safety through 'predictable' traffic movements
- Supports various grouped items related to site circulation

### Disadvantages

- Single point of ingress may be busy at times and congestion/queuing may need to be mitigated
- Can increase source-destination travel time/distance
- Additional signage and painting may need to be implemented to reinforce logic (over signage)
- Requires reliance on (modular) barriers to maintain circulatory intent

### Discussion / Justification

IC-13 - Separate Ingress and Egress Points to the Site, involves (and will realize) various other considerations/opportunities identified below:

### Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 956,300 | $ | $ 956,300 |
| **Difference** | **$ -956,300** | **$** | **$ -956,300** |

# Quantitative Value Alternative

**Title** **IC-13**

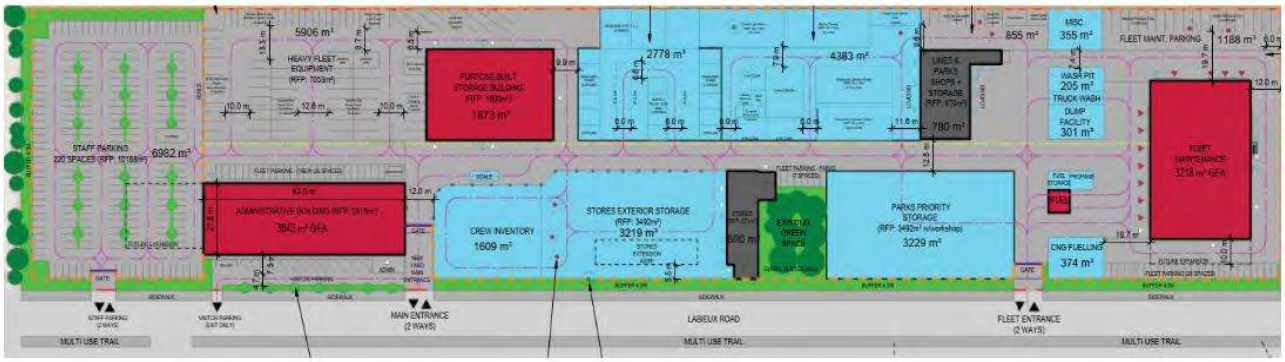
***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Exhibits - Original Concept



IC-13 - Separate Ingress and Egress Points to the Site, involves (and will realize) various other considerations/opportunities as follows:

IC-01 CONSIDER SAWTOOTH PARKING - Optimizes storage space and logistical loading/unloading activities
IC-03 CONSIDER SAWTOOTH FOR AGGREAGTE STORAGE - Optimizes logistical loading/unloading activities
IC-05 INCLUDE LABIEAUX ROAD AS PART OF THE SITE CIRCULATION - Return option to Operations/Stores to support unit-directional site circulation
IC-06 CONSIDER A SINGLE POINT OF ENTRY TO THE SITE - Main entrance converted in 'All-in' (except Ops) to support unit-directional site circulation
IC-08 MOVE SITE CIRCULATION ADJACENT TO LABIEAUX RD - Return trip provided to support unit-directional site circulation
IC-10 RELOCATE SHIPPING AND RECEIVING OFF SITE ON LABIEAUX RD. - Relocation of Stores to front Labieux and expand to include Shipping and Receiving. Reduces congestion on site for S&R operation
IC-12 INTRODUCE UNI-DIRECTIONAL FLOW IN SOME PARTS OF THE SITE - Reduces free flow manoeuvres and conflict points. Improves health and safety on-site through 'predicable' movements
IE-33 INCORPORATE LABIEAUX RD WITHIN THE SITE FUNCTIONS - Supports unit-directional site circulation
OC-14 REVIEW AND REPURPOSE VISITOR PARKING AREA - Removing visitor parking allows Administration to front Labieux and provides additional useable area on site.



# Quantitative Value Alternative

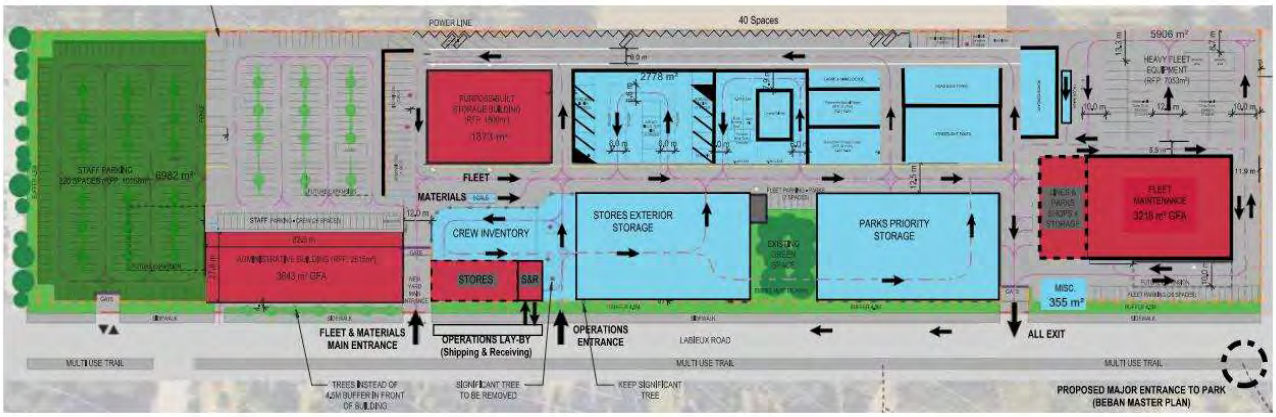
**Title** **IC-13**

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Exhibits - Alternative Concept



Separate Ingress and Egress Points, Single Point of Access, Uni-Directional Flow



# Quantitative Value Alternative

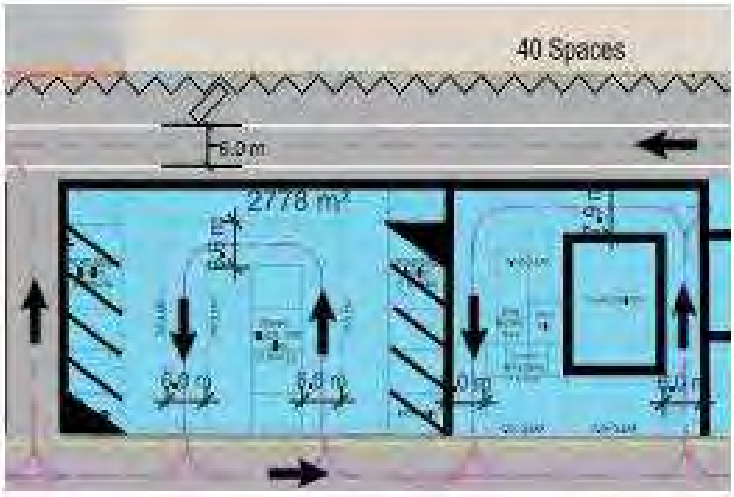
**Title** **IC-13**

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Exhibits - Alternative Concept



Sawtooth for Parking and Aggregates



# Quantitative Value Alternative

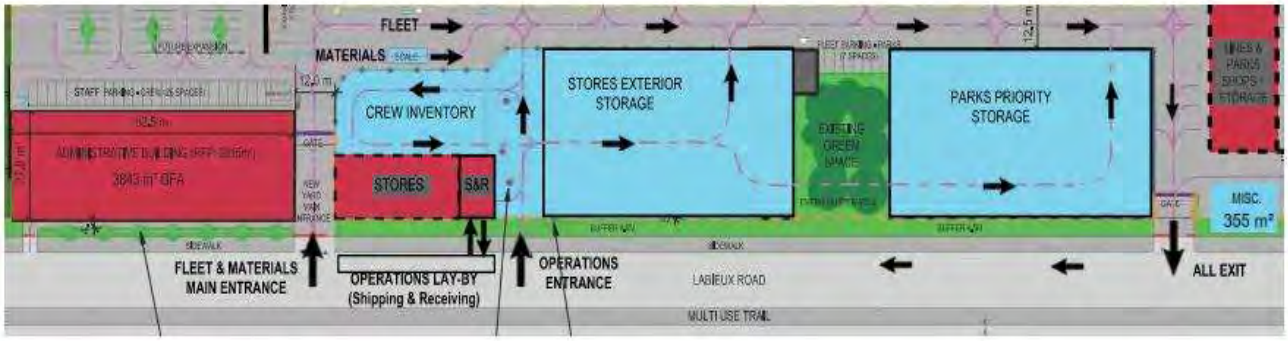
**Title** **IC-13**

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Exhibits - Alternative Concept

**Page 5 of 9**

Labieux Road - Site Circulation (on and adjacent), Shipping and Receiving, Site Functions



# Quantitative Value Alternative

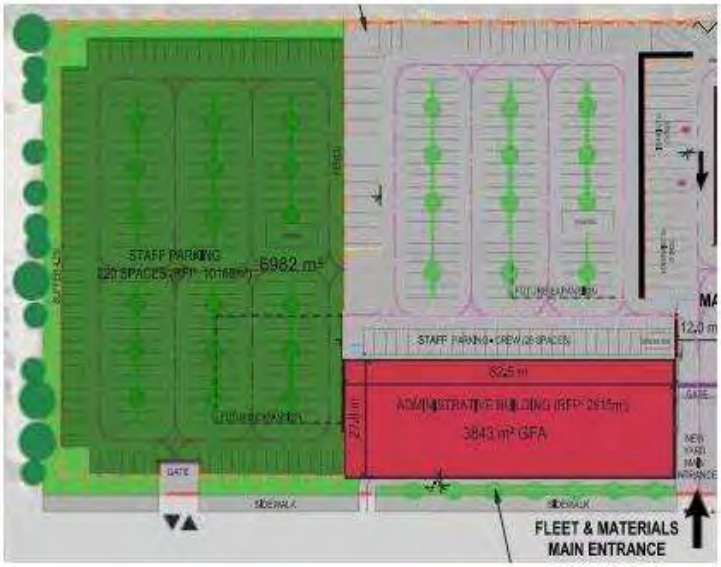
**Title** **IC-13**

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Exhibits - Alternative Concept



Re-Purpose Visitor Parking Area



# Quantitative Value Alternative

**Title** **IC-13**

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Discussion / Justification



Sawtooth (Herring bone) for Fleet Parking - Example illustrates opportunity for 'pull-through' arrangements (where space permits)

# Quantitative Value Alternative

| Title | IC-13 |
|---|---|

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | | $ |
| | **Total Cost (Rounded):** | | **$** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Improvements to Labieux Road | LS | 1 | $50,000.00 | $50,000 |
| Additional Signage and Traffic Controls | LS | 1 | $15,000.00 | $15,000 |
| Security (Gate) | LS | 1 | $20,000.00 | $20,000 |
| Shipping and Receiving Area | m2 | 170 | $4,000.00 | $680,000 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 765,000** |
| 25.0% | Project Markup: | | $ 191,250 |
| | **Total Cost (Rounded):** | | **$ 956,300** |
| | **Cost Difference:** | | **$ -956,300** |

# Quantitative Value Alternative

**Title** **IC-13**

***SEPARATE INGRESS AND EGRESS POINTS TO THE SITE***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 956,300 | 956,300 |
| | | | **Total Initial Costs** | | $ - | | $ 956,300 |
| | | | **Difference (Compared to Original Concept)** | | | | -$ 956,300 |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | $ - | | $ - |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | $ - | | $ - |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| **Difference (Compared to Original)** | | | | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 956,300 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **-$ 956,300** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ -** | **Per Year:** | **$ 52,383** |

# FUNCTION:
## IMPROVE SPATIAL EFFICIENCY (IE)

# Quantitative Value Alternative

**Title** **IE-01**

***DEVELOP OFF SITE STORAGE***

## Original Concept

**Page 1 of 4**

The original/existing concept is to construct NOC to provide storage for all workgroups mustering out of this space on site. Their equipment, tools, and vehicles would all be stored on site as would much of the materials they use to complete their work.

## Alternative Concept

The alternative concept is introduce an off-site storage facility which crews could use for some equipment, tools, and materials. This is recommended to start by using the City's existing disused gravel pit as a trial.

## Advantages

- Decentralizing storage allows for more flexible use of the NOC site.
- Storage could be established in an area with lower land value and less programming pressures.
- If commercial storage were utilized it could nimbly scale to meet the City's evolving needs and likely would include on-site security.
- Having storage off-site can serve as a backup in case of on-site emergencies.

## Disadvantages

- This could result in crews needing to make multiple stops as the deploy and return from their duties, negatively impacting workflows and efficiencies.
- If the City wishes to operate the storage facility (as opposed to using a commercial storage facility) it may need to acquire land.
- Ongoing fees to use a use a commercial storage facility may become cost prohibitive.
- In emergencies City operations crews may need immediate access to tools, equipment, or materials that are stored off-site, which may be challenging to achieve.

## Discussion / Justification

Developing off-site storage can benefit the City by reducing the amount of high value real-estate within NOC being used to store materials for potentially long periods of time. This could be done by utilizing a commercial storage facility, allowing the City to right size its off-site storage requirements as they evolve, or by developing a new storage facility in a proximal location. Alternatively, the City could use the existing gravel pit for storage of large and seldom used materials as a trial, alleviating immediate storage space pressures.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 4,315,000 | $ 1,150,100 | $ 5,465,100 |
| **Alternative Concept** | $ 500,000 | $ | $ 500,000 |
| **Difference** | **$ 3,815,000** | **$ 1,150,100** | **$ 4,965,100** |

# Quantitative Value Alternative

**Title** **IE-01**

***DEVELOP OFF SITE STORAGE***

## Discussion / Justification



While establishing a new storage facility, or utilizing an existing commercial storage facility, may present some opportunities for improving NOC space programming and operational workflows a smaller interim step taken as a 'proof of concept' may yield immediate positive results without exposing the City to too many risks.

There are several seldom-used materials which take up a great deal of space in the current public works yard. These items include davit poles, large diameter water pipe and fittings, unused paving stone, old garbage carts, new garbage carts intended for swaps/replacements with residents, and concrete road barriers.

Generally, these items are fairly secure due to either their weight or lack of resale value and could be stored in an offsite location with a lower level of security than NOC. A potential location for this, which does not require land acquisition and is already accessible to the City, is the City's gravel pit. With some minimal security retrofitting additional security (lighting, cctv, additional fencing) could be installed if desired.

The land is already owned by the City and not currently is not currently utilized (or planned to be utilized) so costs of this land are not being considered.

# Quantitative Value Alternative

**Title** **IE-01**

***DEVELOP OFF SITE STORAGE***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Existing storage space req. | m^2 | 1,500 | $2,301.31 | $3,451,964 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **3,451,964** |
| 25.0% | Project Markup: | $ | 862,991 |
| **Total Cost (Rounded):** | | **$** | **4,315,000** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Security upgrade costs if req. at gravel pit | ls. | 1 | $100,000.00 | $100,000 |
| Make good of existing asphalt area | ls. | 1 | $300,000.00 | $300,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **400,000** |
| 25.0% | Project Markup: | $ | 100,000 |
| **Total Cost (Rounded):** | | **$** | **500,000** |
| **Cost Difference:** | | **$** | **3,815,000** |

# Quantitative Value Alternative

**Title** **IE-01**

***DEVELOP OFF SITE STORAGE***

## Life Cycle Cost Estimate



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | | |
| **First Costs** | | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | 4,315,000 | 4,315,000 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | | 500,000 | 500,000 |
| | | | | **Total Initial Costs** | | **$ 4,315,000** | | **$ 500,000** |
| | | | | **Difference (Compared to Original Concept)** | | | | **$ 3,815,000** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| O+M | | | 18.256 | | 63,000 | 1,150,123 | | |
| | | | | **Total Annual Costs (Present Worth)** | | **$ 1,150,100** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | | $ 1,150,100 | | $ - |
| | | | | **Difference (Compared to Original)** | | | | **1,150,100** |
| Total Life Cycle Costs (Present Worth) | | | | | | $ 5,465,100 | | $ 500,000 |
| | | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 4,965,100** |
| | | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 299,360** | **Per Year:** | **$ 27,388** |

# Design Suggestion

**Title** **IE-03**

***DEVELOP A STRATEGY FOR CONTROLLED GROWTH***

## Original Concept

**Page 1 of 2**

Master Plan assumes development of full program in a phased approach.

## Alternative Concept

Reconsider portions of the Master Plan to introduce controlled growth by right sizing in place over time.

## Advantages

- Lower initial capital cost and spread spending over time.
- Provides additional space on an as needed basis.
- No unused surplus space.

## Disadvantages

- May require additional phases.
- Phasing for growth may incur additional costs over time.
- Risk of future phases not being approved / being delayed for long periods.
- Requires flexibility of funding - availability of funding on an as needed basis.

## Discussion / Justification

Phase 1 (Fleet Maintenance Building)
- Potential to forgo mezzanine area (2nd floor) in the short term. Utilize higher industrial racking or rolling industrial racking storage in the short term to maximize storage in Small Equipment and Parts Storage areas.
- Construction of mezzanine level could be undertaken at a later time when a second floor is required to provide additional industrial storage/ office space.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **IE-03**

***DEVELOP A STRATEGY FOR CONTROLLED GROWTH***

## Discussion / Justification (Continued)



**Phase 2**
- Build out aggregates and heavy fleet equipment parking to meet present needs and add bins/parking on an as needed basis over time. Hold paving of east extent of site until space is needed.
- If a review of the Purpose Built Storage Building program identifies areas of the building that are more suitable as covered storage, covered storage could be phased to be constructed on an as needed basis.

**Phase 3**
- Build out staff parking as needed (as staff contingent grows over time).
- Consider building Administration Building in two phases depending on spatial need/demand at time of initial construction.

**Phase 4**
- Introduce racking in exterior storage areas as needed over time.
- Renovate existing buildings on an as needed basis to support operations over time.

# Quantitative Value Alternative

**Title** **IE-04**

***ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA***

## Original Concept



The fleet maintenance building conceptual design incorporates two "Alternative Fuel Bays" that are intended for the repairs and maintenance of CNG refuse trucks. These two bays are completely enclosed and isolated from the adjacent areas in the facility.

The NOC Master Plan conceptual design incorporates a CNG fueling station onsite. This fueling station is intended to be used for the 12 CNG refuse trucks that the City owns and operates.

## Alternative Concept

Eliminate the need for two "Alternative Fuel Bays" in the fleet maintenance building. These two bays would become standard high-head bays.
Eliminate the CNG fueling station onsite. Continue to fuel CNG vehicles at the Co-op on Northfield Road.

## Advantages

- Reduction in construction and operating costs
- More space flexibility in maintenance building
- More adaptability for future technologies
- Increased space on the property without fueling station

## Disadvantages

- Current CNG trucks still need repair and maintenance until 2031. Will need to find alternative ways to work on these vehicles and meet safety regulations.
- Continue to use Co-op cardlock for CNG fueling until trucks are phased out which is less convenient than fueling onsite.

## Discussion / Justification

Constructing two "Alternative Fuel" bays in the fleet maintenance building would have a significant impact on the total cost of the project. These bays would require additional concrete and other building materials. They would require additional safety features such as alarms, vents, and other advanced technologies.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 720,500 | $ 27,400 | $ 747,900 |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$ 720,500** | **$ 27,400** | **$ 747,900** |

# Quantitative Value Alternative

**Title** **IE-04**

***ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA***

## Discussion / Justification (Continued)



The refuse truck fleet consists of 12 CNG trucks. These trucks are on a 8-year replacement schedule and the planned replacement schedule is:
2025 - 2 Trucks
2026 - 6 Trucks
2030 - 1 Truck
2031 - 3 Trucks

Starting in 2025, the two trucks that need replacing will likely be replaced with battery electric trucks and the CNG vehicles will be getting phased out. It is expected by 2031, dedicated CNG bays in the fleet maintenance building will not be necessary.

A CNG fueling station with an estimated size of 374 Sq. Meters will also not be necessary on the property. CNG fueling can continue at the Co-op cardlock until the CNG refuse trucks have been completely phased out and replaced.

As the City transitions away from CNG vehicles, it is not worth investing in CNG technology either in the shop or on the property.
Current Alternative Fuel bays

# Quantitative Value Alternative

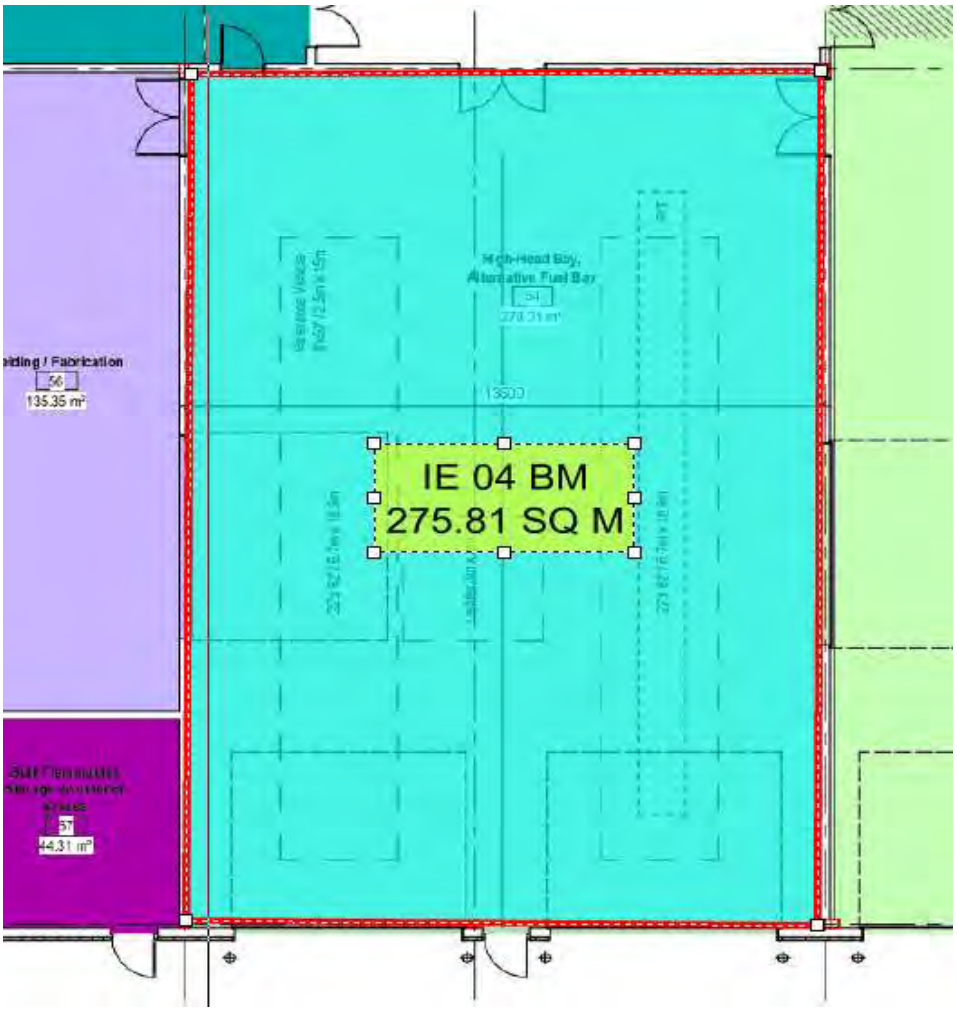
**Title** **IE-04**

***ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA***

## Exhibits - Original Concept



Current Alternative Fuel bays



# Quantitative Value Alternative

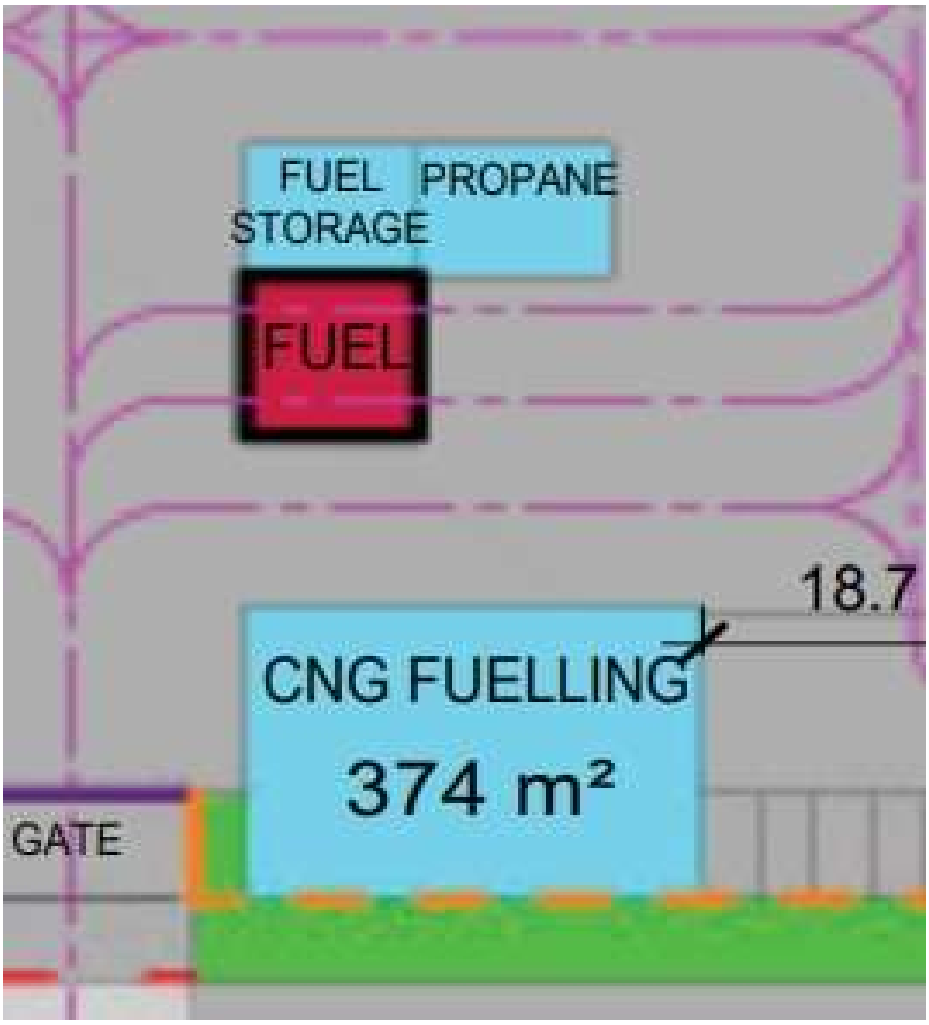
**Title** **IE-04**

***ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA***

## Exhibits - Alternative Concept



Current CNG Fueling Station



# Quantitative Value Alternative

**Title** **IE-04**

***ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Cost of anti blast concrete, gas detection systems, safety features | sum | 1 | $220,000.00 | $220,000 |
| Alternative CNG Fuelling Stations | sum | 1 | $356,400.00 | $356,400 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **576,400** |
| 25.0% | Project Markup: | $ | 144,100 |
| | **Total Cost (Rounded):** | **$** | **720,500** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |
| | **Cost Difference:** | **$** | **720,500** |

# Quantitative Value Alternative

**Title** **IE-04**

***ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 720,500 | 720,500 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | | |
| | | | **Total Initial Costs** | | **$ 720,500** | | **$ -** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 720,500** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Annual cost for safety check and | | | 18.256 | 1,500 | 27,384 | | |
| | | | **Total Annual Costs (Present Worth)** | | **$ 27,400** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 27,400 | | $ - |
| **Difference (Compared to Original)** | | | | | | | **27,400** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 747,900 | | $ - |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **$ 747,900** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 40,968** | **Per Year:** | **$ -** |

# Quantitative Value Alternative

**Title** **IE-05**

***DEVELOP OFF SITE STAFF PARKING***

## Original Concept



The program has identified a need (based on bylaw) for 226 parking stalls. The current plan is to provide about 220 parking stalls mostly at the north end of the yard. The base plan or expectation is that the supportive housing will vacate the north end of the yard and that would become staff parking. If the supportive housing site doesn't leave how would staff be provided with appropriate parking?. The idea is that some of the parking need could be provided with on street parking; however, it would require the development of the parking spaces along the street.

## Alternative Concept

To develop formal on street parking either parallel or angled parking (less preferred but provides more capacity). To develop the parking spaces it would be necessary to infill and pipe a large ditch and associated civil works. The stretch of road that would be upgraded is expected to be about 330 m long and both sides of the road could generate about 100 parking spaces, more if angled stalls were implemented,

## Advantages

- It would provide additional parking for Beban Park users that would be quite valuable during after normal work hours and weekends.

## Disadvantages

- Additional costs
- Loss of open ditch that provides infiltration and ground water recharge benefit (minor infiltration given the geology)
- Additional physical assets (the pipe) that require maintenance and eventual renewal
- Parking on the street may be less safe for both parking users and road users such as vehicles and cycles.
- Farther away from the operations center

## Discussion / Justification

On street parking compared to on site parking is less safe for staff transitioning from their vehicles to work since they would need to walk across a road with a 50 kmh speed limit. Overall this option is less desirable due to the cost of the storm pipe installation, loss of the ditch environmental value.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ 1,077,100 | $ 2,700 | $ 1,079,800 |
| **Difference** | **$ -1,077,100** | **$ -2,700** | **$ -1,079,800** |

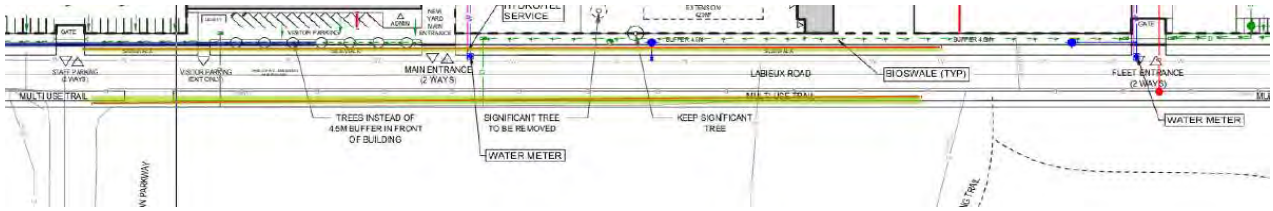
# Quantitative Value Alternative

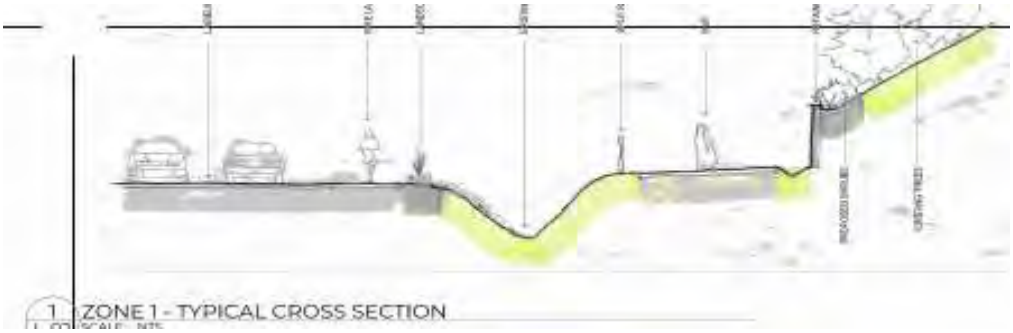
**Title** **IE-05**

***DEVELOP OFF SITE STAFF PARKING***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-05**

***DEVELOP OFF SITE STAFF PARKING***

## Exhibits - Alternative Concept



# Quantitative Value Alternative

**Title** **IE-05**

***DEVELOP OFF SITE STAFF PARKING***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$** |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Asphalt including base and stall painting | m2 | 1200 | $250.00 | $300,000 |
| Asphalt reinstatement +stall painting | m2 | 750 | $150.00 | $112,500 |
| Storm drainage 900mm | lm | 300 | $1,200.00 | $360,000 |
| Precast Manhole 1350 for tie-in | ea | 2 | $15,000.00 | $30,000 |
| Back fill of ditch | m3 | 531 | $55.00 | $29,205 |
| Catch basins | ea | 4 | $7,500.00 | $30,000 |

| | | | |
|---|---|---|---|
| | | **Subtotal:** | **$ 861,705** |
| 25.0% | Project Markup: | $ | 215,426 |
| | **Total Cost (Rounded):** | **$** | **1,077,100** |
| | **Cost Difference:** | **$** | **-1,077,100** |

# Quantitative Value Alternative

**Title** **IE-05**

***DEVELOP OFF SITE STAFF PARKING***

## Life Cycle Cost Estimate



| | | | | Original Concept | | Alternative Concept | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | | | | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | | | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 1,077,100 | 1,077,100 |
| | | | **Total Initial Costs** | | **$ -** | | **$ 1,077,100** |
| | | | **Difference (Compared to Original Concept)** | | | | **-$ 1,077,100** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| Every 5 year | 5 | | 0.784 | | | 3,500 | 2,742 |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ 2,700** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ 2,700 |
| **Difference (Compared to Original)** | | | | | | | **(2,700)** |
| Total Life Cycle Costs (Present Worth) | | | | | $ - | | $ 1,079,800 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **-$ 1,079,800** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ -** | **Per Year:** | **$ 59,148** |

# Quantitative Value Alternative

## Title IE-06

***ELIMINATE ON SITE FUELING***

### Original Concept



The NOC Master Plan design incorporates a fuel island with above-ground fuel tanks which would be utilized to fuel the City's fleet of 200 vehicles.

### Alternative Concept

Eliminate fuel island and tanks. Vehicles could be fueled off-site at 3rd party fuel stations or card-locks.

### Advantages

- Increased yard space at NOC.
- Reduced maintenance, management, and capital cost.
- Eliminate need for fuel deliveries.
- Reduced vehicle traffic in the yard.

### Disadvantages

- Increased management of fuel cards and accounts. 200 vehicles would require access to 3rd party fuel stations.
- Increased challenges when creating fuel usage reports.
- Increased challenges creating and managing fuel usage for fleet vehicles.
- Additional cost of fuel at 3rd party fueling stations. The City pays a reduced price for fuel.

### Discussion / Justification

The Public Works yard utilizes a fuel island with unleaded gasoline and diesel in-ground fuel tanks. This fuel island is used on a daily basis to dispense fuel to the City's fleet of 200 vehicles. Every vehicle utilizes a small fuel fob which grants access to the fuel pumps. Fuel management software is used to control access to the fuel pumps and to generate monthly reports, which then get distributed to various departments.

### Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 352,500 | $ 29,465,100 | $ 29,817,600 |
| **Alternative Concept** | $ 43,800 | $ 31,217,600 | $ 31,261,400 |
| **Difference** | **$ 308,700** | **$ -1,752,500** | **$ -1,443,800** |

# Quantitative Value Alternative

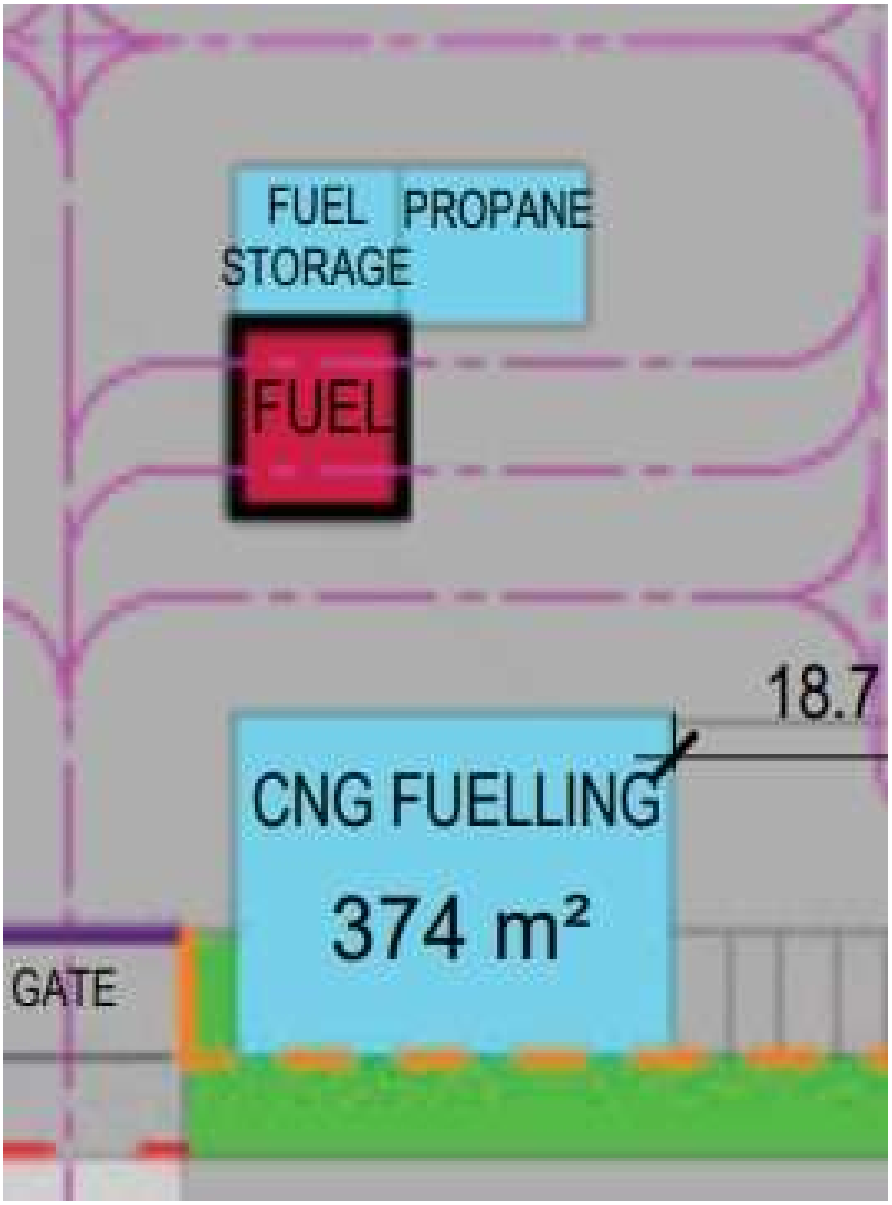
**Title** **IE-06**

***ELIMINATE ON SITE FUELING***

## Exhibits - Original Concept



NOC Conceptual Master Plan - Fuel Station



# Quantitative Value Alternative

**Title** **IE-06**

***ELIMINATE ON SITE FUELING***

## Exhibits - Alternative Concept



Skid-Mounted Fuel Station

# Quantitative Value Alternative

**Title** **IE-06**

***ELIMINATE ON SITE FUELING***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Allowance for relocation of fueling station | sum | 1 | $60,000.00 | $60,000 |
| Cost gap for new fuelling tank | sum | 1 | $222,000.00 | $222,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | **$** | **282,000** |
| 25.0% Project Markup: | $ | 70,500 |
| **Total Cost (Rounded):** | **$** | **352,500** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Decommission fuel oil tank and remove from site | sum | 1 | $35,000.00 | $35,000 |

| | | |
|---|---|---|
| **Subtotal:** | **$** | **35,000** |
| 25.0% Project Markup: | $ | 8,750 |
| **Total Cost (Rounded):** | **$** | **43,800** |
| **Cost Difference:** | **$** | **308,700** |

# Quantitative Value Alternative

**Title** **IE-06**

***ELIMINATE ON SITE FUELING***

## Life Cycle Cost Estimate

Page 5 of 5

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 352,500 | 352,500 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 43,800 | 43,800 |
| | | | **Total Initial Costs** | | **$ 352,500** | | **$ 43,800** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 308,700** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Fuelling cost onsite vs off site | | | 18.256 | 1,614,000 | 29,465,064 | 1,710,000 | 31,217,633 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 29,465,100** | | **$ 31,217,600** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 29,465,100 | | $ 31,217,600 |
| | | | **Difference (Compared to Original)** | | | | **(1,752,500)** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 29,817,600 | | $ 31,261,400 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **-$ 1,443,800** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 1,633,311** | **Per Year:** | **$ 1,712,397** |

# Quantitative Value Alternative

**Title** **IE-11**

***INCLUDE CARPENTRY INTO FLEET MAINTENANCE***

## Original Concept



Carpentry is housed in the renovated truck barn along with Lines and Parks

## Alternative Concept

Expand length of Fleet Building to accommodate the Carpentry functions (Parks). Locate Carpentry shop on corner to provide access to 2 sides of the shop for work flow and ease of materials storage.

## Advantages

- Removes noisy activities from Parks Building (Truck Barn) which are quieter activities.
- Groups noisy functions together at Fleet Building

## Disadvantages

- Introduces 'dust-producing' activities to the Fleet Maintenance Building
- Requires specialized dust extraction/collection equipment that is best located exterior to building. This may interfere with traffic flow around building.
- Adds 360m2 to Fleet Building footprint which adds area to floor, roof and very tall walls.
- Removes Carpentry from direct adjacency to Parks (supervision)

## Discussion / Justification

The additional cost of expanding the Fleet Building for this single use may not warrant the extra cost.
However, it is worth considering if space could be optimised in the existing footprint to accommodate Carpentry without expanding the current building footprint. A less elegant solution would be to locate the carpentry shop on the corner as a single storey element but this does not save on roof or walls, only reduces volume of space enclosed. If Parks occupies the Truck Barn, the Carpentry shop may be best located on the NW corner to be closest to the truck barn.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 3,393,300 | $ 925,600 | $ 4,318,900 |
| **Alternative Concept** | $ 2,589,900 | $ 690,100 | $ 3,280,000 |
| **Difference** | **$ 803,400** | **$ 235,500** | **$ 1,038,900** |

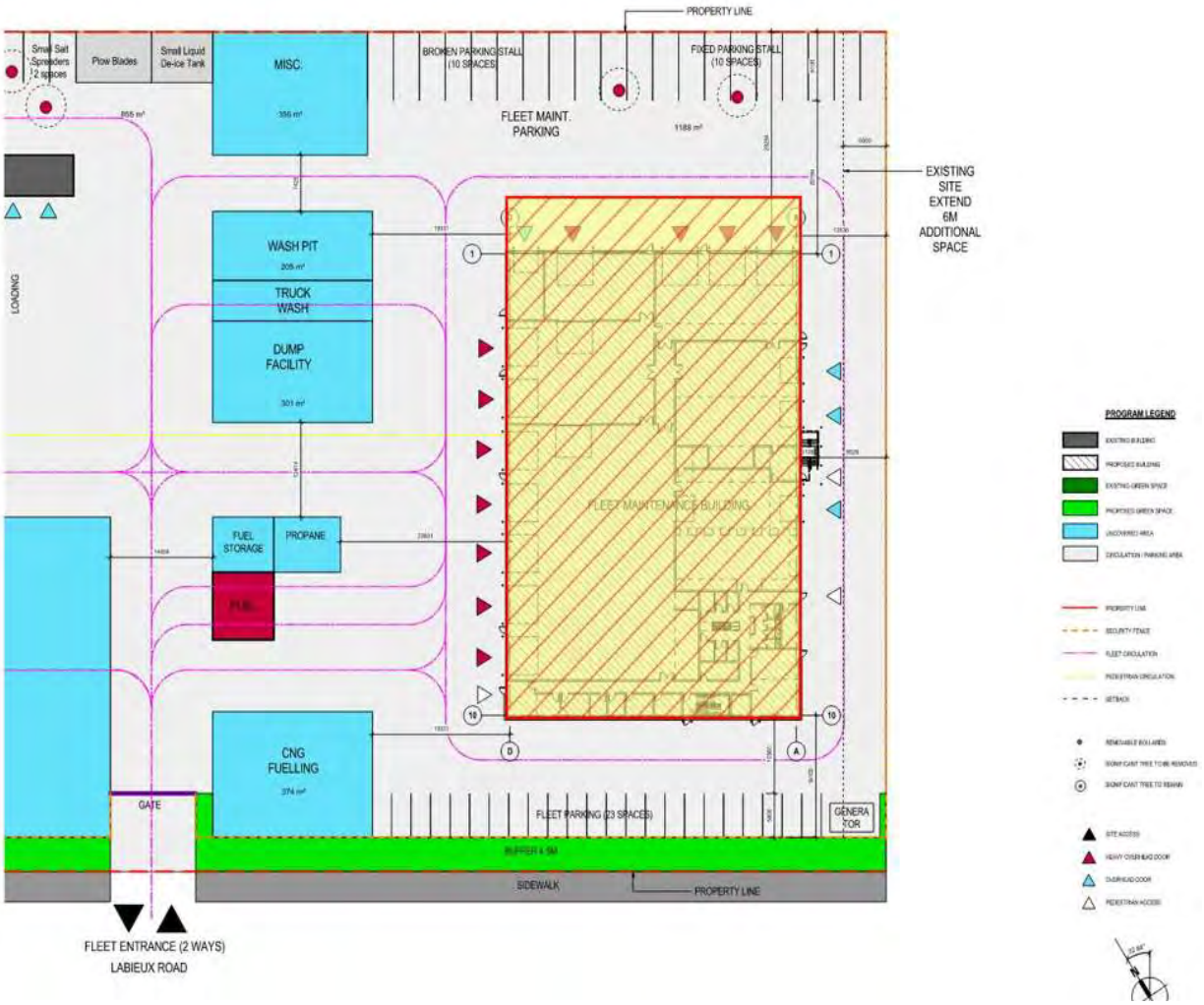
# Quantitative Value Alternative

**Title** **IE-11**

***INCLUDE CARPENTRY INTO FLEET MAINTENANCE***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-11**

***INCLUDE CARPENTRY INTO FLEET MAINTENANCE***

## Exhibits - Alternative Concept



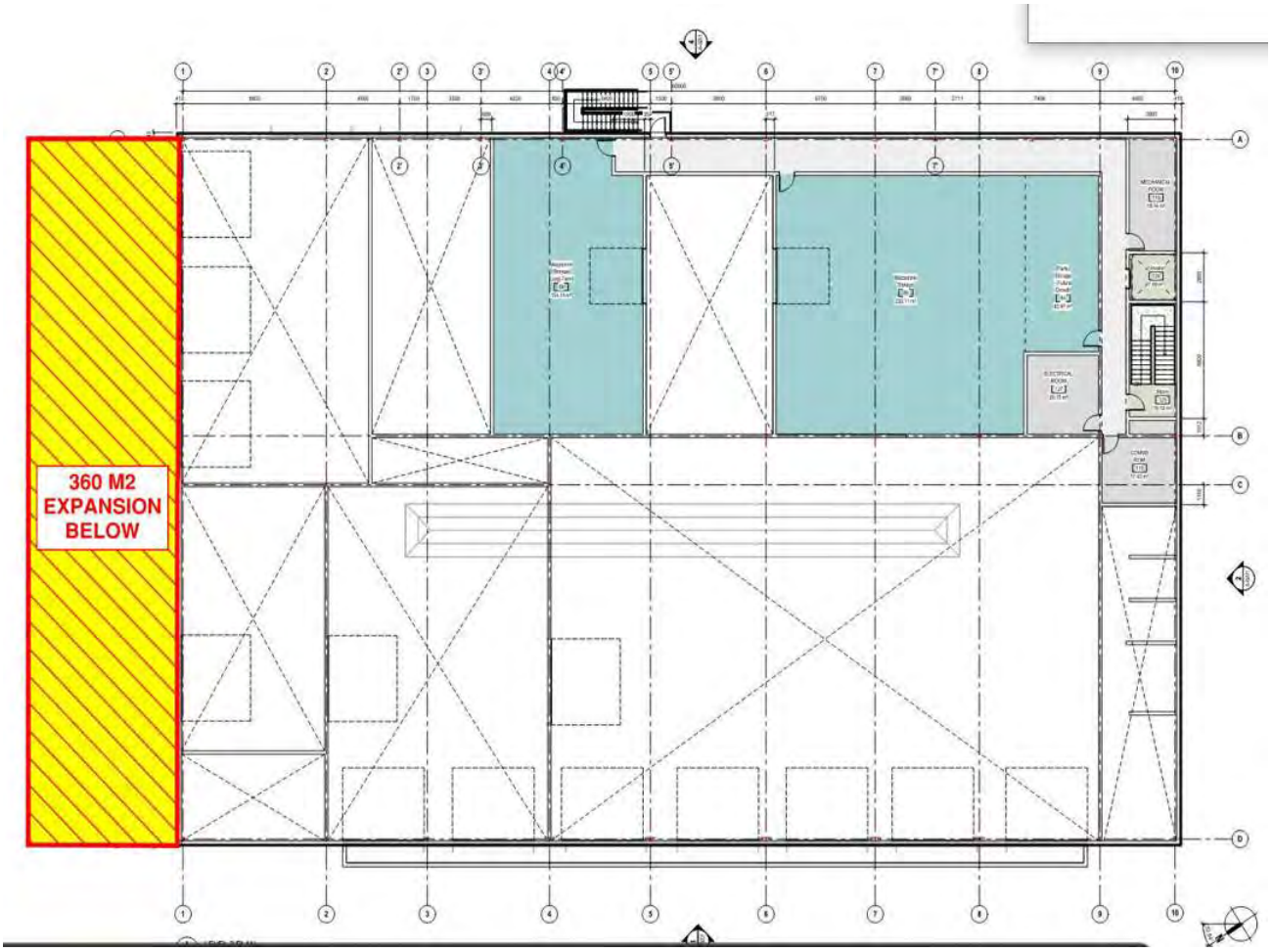
# Quantitative Value Alternative

**Title** **IE-11**

***INCLUDE CARPENTRY INTO FLEET MAINTENANCE***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-11**

***INCLUDE CARPENTRY INTO FLEET MAINTENANCE***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Renovated lines and parks shop and storage | m2 | 780 | $2,188.00 | $1,706,640 |
| Purpose build area | m2 | 360 | $2,800.00 | $1,008,000 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **2,714,640** |
| 25.0% | Project Markup: | $ | 678,660 |
| **Total Cost (Rounded):** | | **$** | **3,393,300** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Repurpose lines park shop to storage and trailer - min code requirement | m2 | 780 | $500.00 | $390,000 |
| Add carpentry shop and truck storage | m2 | 360 | $4,672.00 | $1,681,920 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **2,071,920** |
| 25.0% | Project Markup: | $ | 517,980 |
| **Total Cost (Rounded):** | | **$** | **2,589,900** |
| **Cost Difference:** | | **$** | **803,400** |

# Quantitative Value Alternative

**Title** **IE-11**

***INCLUDE CARPENTRY INTO FLEET MAINTENANCE***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 3,393,300 | 3,393,300 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 2,589,900 | 2,589,900 |
| | | | **Total Initial Costs** | | **$ 3,393,300** | | **$ 2,589,900** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 803,400** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| O+M | | | 18.256 | 50,700 | 925,575 | 37,800 | 690,074 |
| | | | **Total Annual Costs (Present Worth)** | | **$ 925,600** | | **$ 690,100** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 925,600 | | $ 690,100 |
| | | | **Difference (Compared to Original)** | | | | **235,500** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 4,318,900 | | $ 3,280,000 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 1,038,900** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 236,575** | **Per Year:** | **$ 179,668** |

# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Original Concept

**Page 1 of 11**

Admin Building at west of site is 2 storeys (partial second storey).
Maintenance Building at east end of site is high ceiling single storey with some mezzanine area (effectively 3 storeys).

## Alternative Concept

**Administration Building:** Build a third storey above the second storey
- A variation to achieve maximum floor area is to fill out second storey and add additional 3rd floor level the full size of the footprint of the building.

**Fleet Maintenance building:** Stack at least 2 levels of 'office' above the current 'offices' within the current building envelope.

## Advantages

- Economy in expanding scale of buildings without requiring new services etc.
  These buildings already have elevators and multiple staircases which just need to be expanded to serve additional floor(s).
- Providing an additional storey is less expensive than a new stand alone structure. Foundations and roofing costs remain largely unchanged when adding an additional storey.
- Could accommodate other departments e.g. Stores in Admin building, Admin and/or Parks in Fleet Building?
- Future Proofing: could build out as a shell space for future expansion or leasing to a third party.
- Creating partial storeys within the Fleet Maintenance Building volume is easily attainable with most costs for envelope etc. already covered in budget for this building.

## Disadvantages

- More floor area requires more parking
- Some potential combinations (Admin/Fleet Maintenance) may have compatibility challenges. More offices associated with the Fleet Maintenance building will bring more people into potential conflict with vehicles.
- There may be potential security risks if space is leased to outside entities.
- Leasing opportunities (if desired) may not necessarily materialize

## Discussion / Justification

Provided the functions are compatible and appropriately zoned in the building, adding internal floors in the Fleet Maintenance Building is an inexpensive alternative to creating a separate building.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 24,106,900 | $ | $ 24,106,900 |
| **Alternative Concept** | $ 22,901,500 | $ | $ 22,901,500 |
| **Difference** | **$ 1,205,400** | **$** | **$ 1,205,400** |

# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

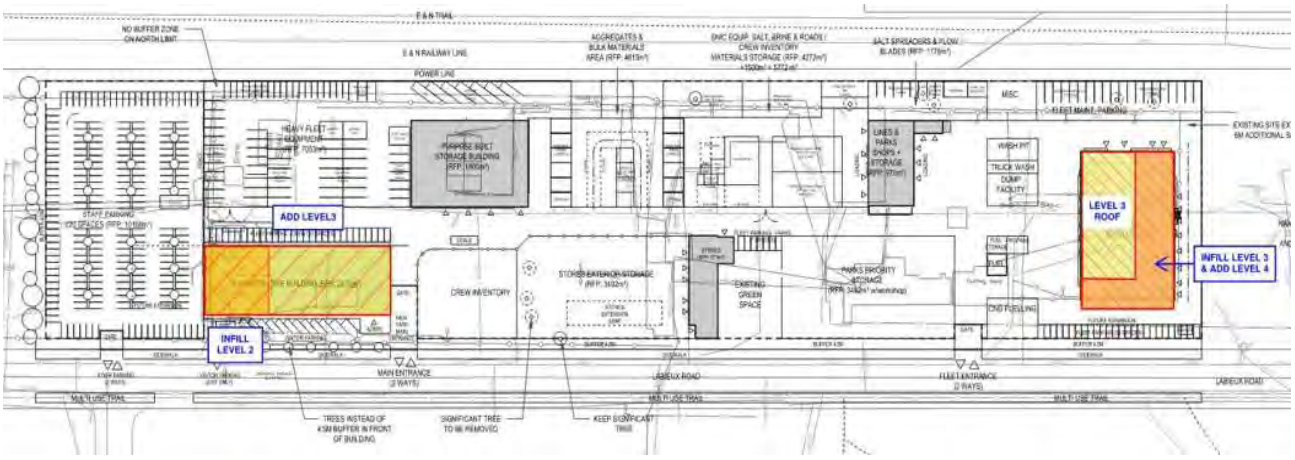
## Discussion / Justification (Continued)



On the 3rd storey of Fleet Maintenance building, the plan could take advantage of excess height in adjacent bays to expand inward to create a double loaded corridor with spaces not requiring views extended over these bays. These interior rooms could incorporate skylights or 'light pipes' for natural lighting.
- It may also be possible to create space above the partial mezzanines along the east side (facing Fire Hall), a double loaded corridor would permit an arrangement of spaces similar those along the south side (facing Labieaux).
- Note: the location of the stairs will need to shift to the west to provide shorter travel distances to exits on the upper floors.

4th Storey: It may be possible to add a 4th storey as well. This storey could have views on all sides. However, this storey would impact the use of skylights into interior spaces on level 3. A hybrid solution could be to not build the interior rooms on level 3.

Provided there is a market for leased office space, adequate parking is provided and adequate security measures are incorporated, adding a third floor to the Admin building may be a good revenue generator. The City will need to do a risk analysis.



# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Exhibits - Alternative Concept



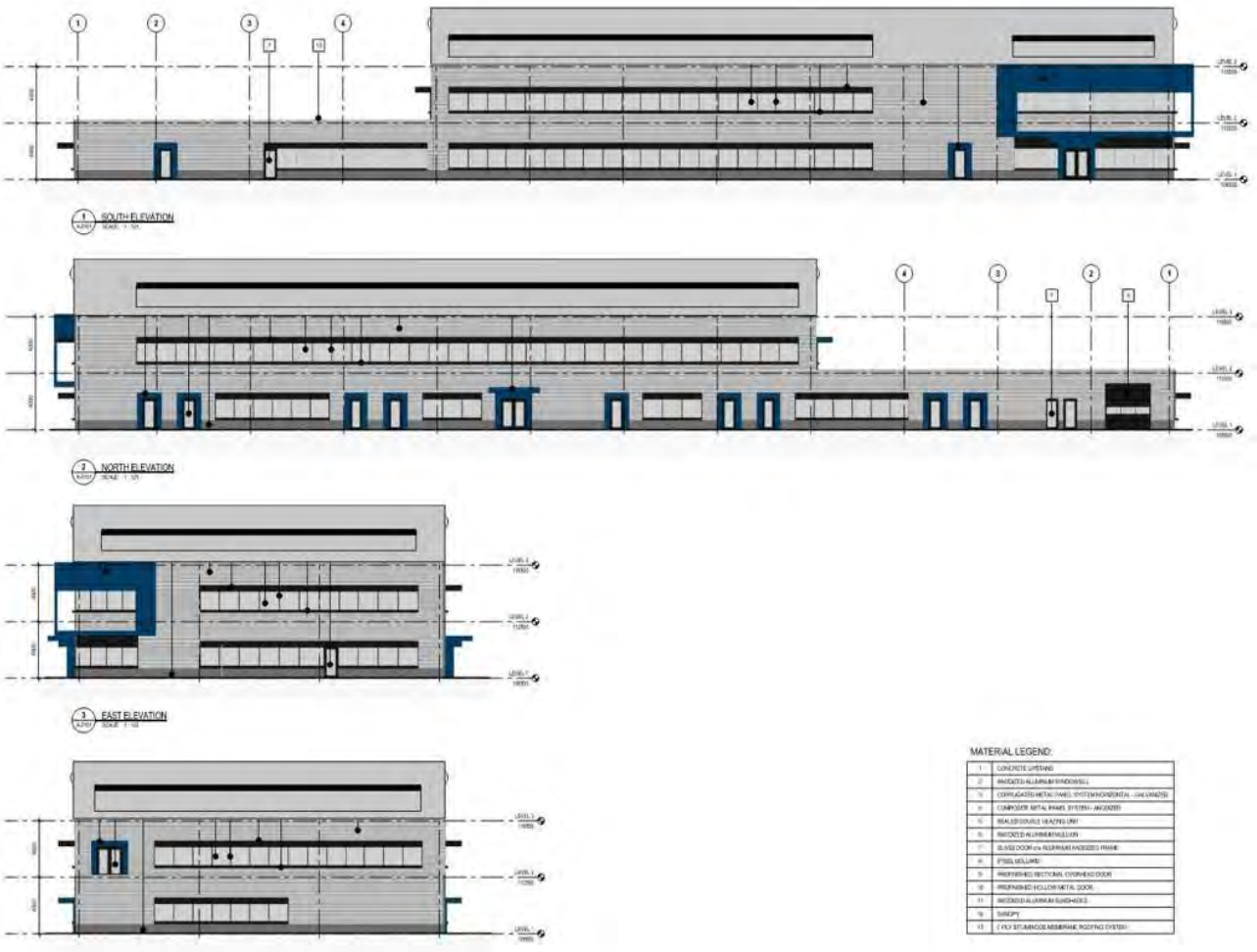
# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

**Exhibits - Alternative Concept** **Page 5 of 11**

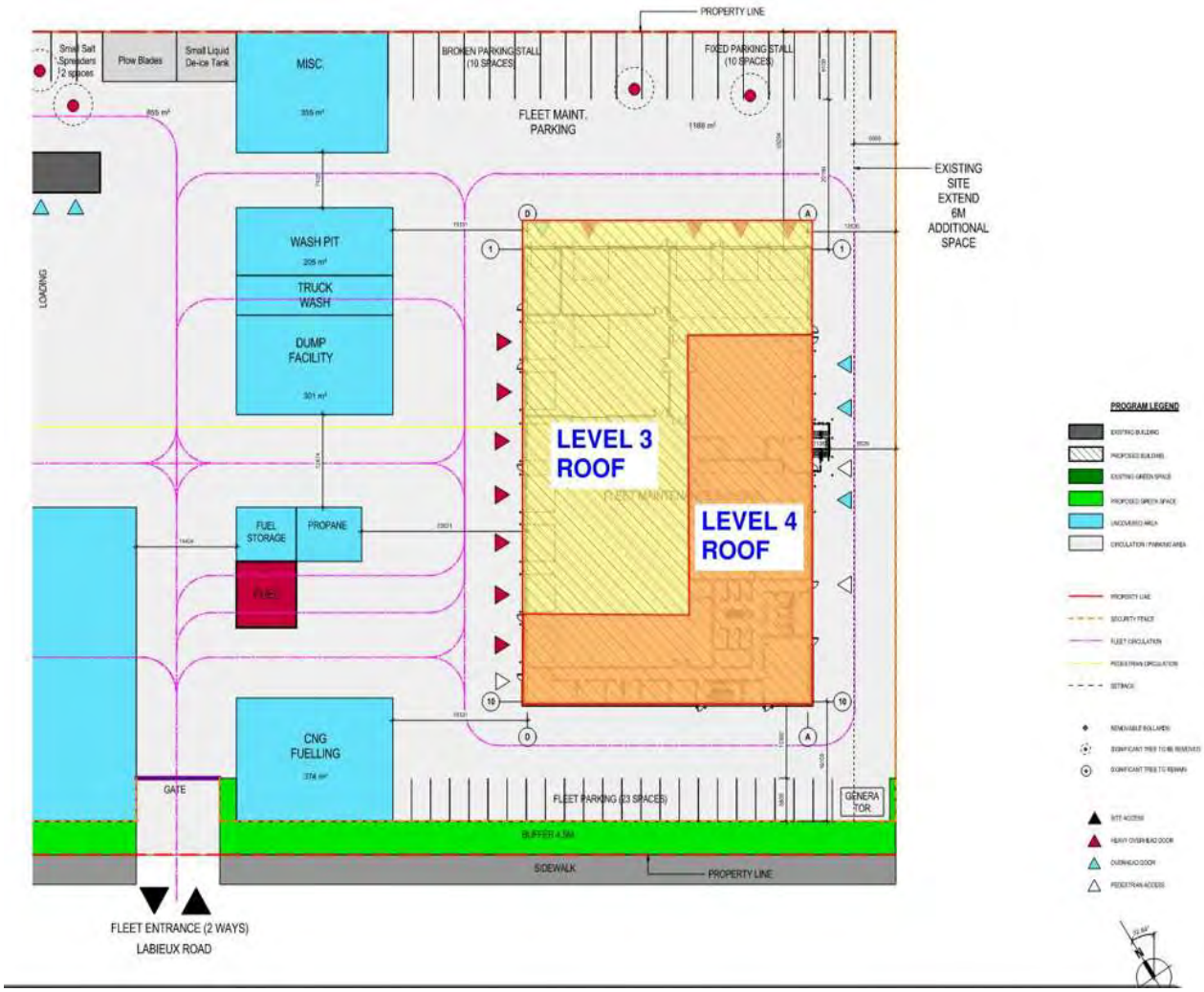
# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Exhibits - Alternative Concept



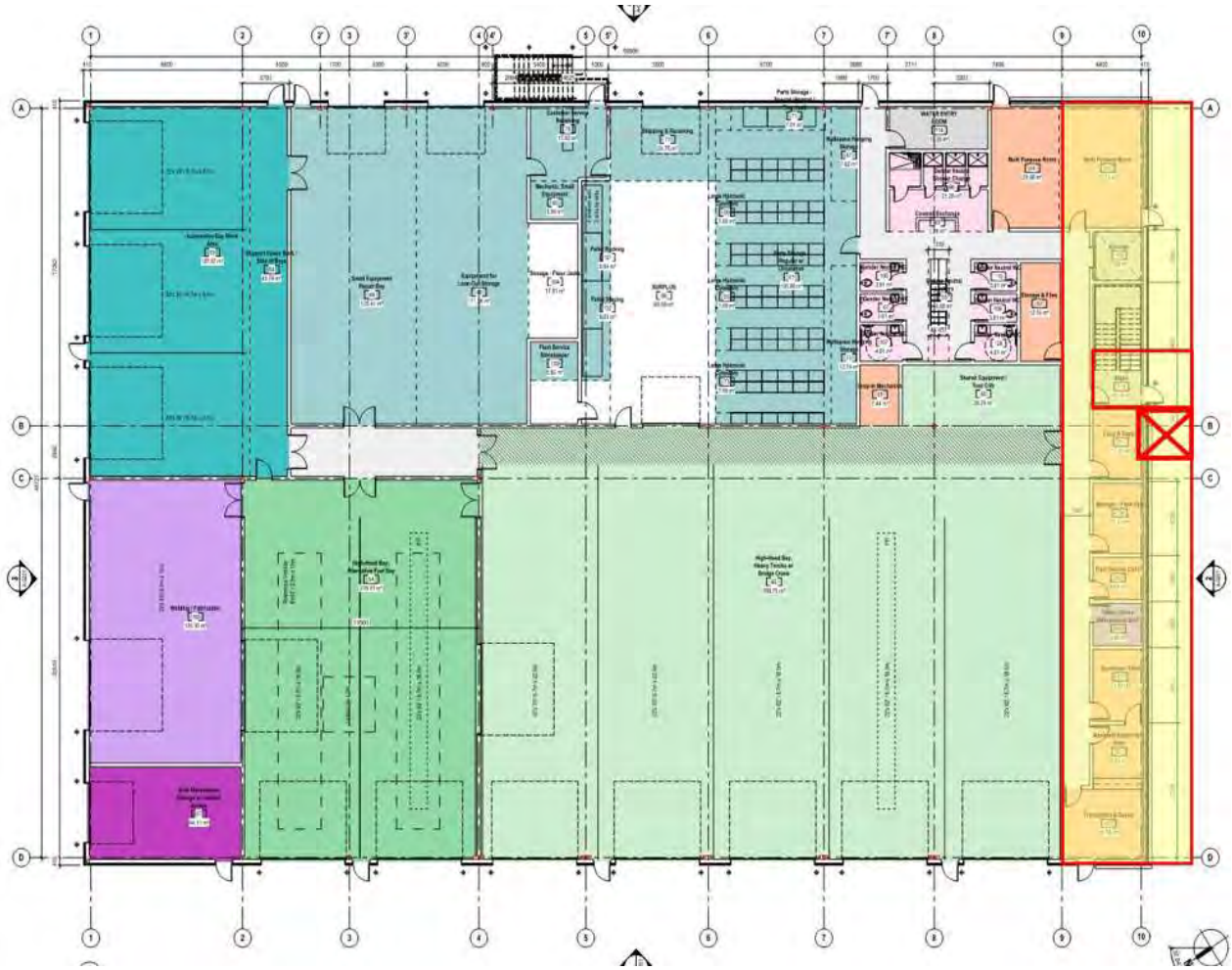
# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Exhibits - Alternative Concept





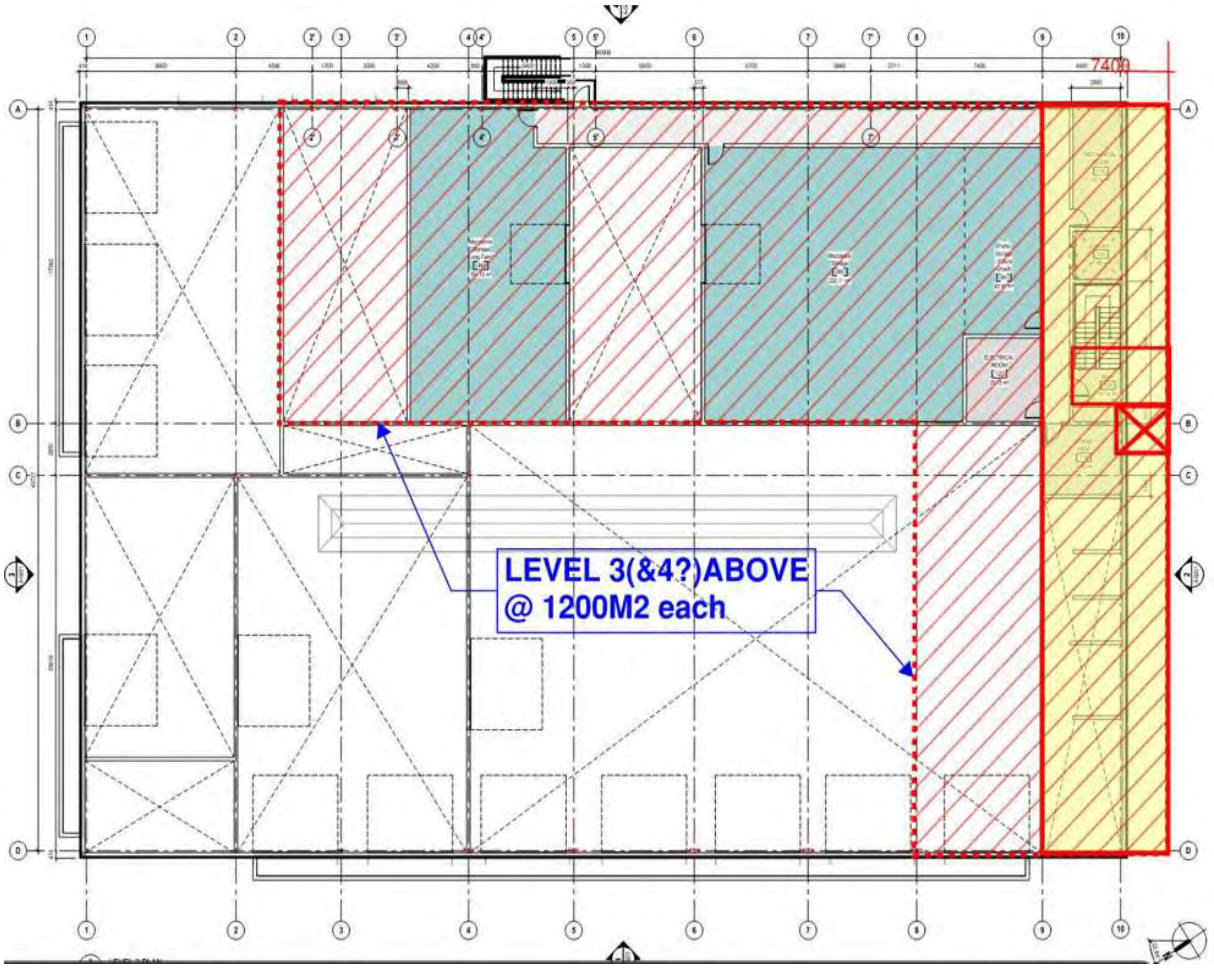
# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

**Estimated Cost of Original Concept** Page 10 of 11

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Fleet | m2 | 2400 | $4,672.00 | $11,212,800 |
| Admin | m2 | 1540 | $5,242.00 | $8,072,680 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **19,285,480** |
| 25.0% | Project Markup: | $ | 4,821,370 |
| **Total Cost (Rounded):** | | **$** | **24,106,900** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Fleet Add level 3 &4 | m2 | 2400 | $4,438.40 | $10,652,160 |
| Admin | m2 | 1540 | $4,979.90 | $7,669,046 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **18,321,206** |
| 25.0% | Project Markup: | $ | 4,580,302 |
| **Total Cost (Rounded):** | | **$** | **22,901,500** |
| **Cost Difference:** | | **$** | **1,205,400** |

# Quantitative Value Alternative

**Title** **IE-12**

***INTRODUCE THREE LEVELS IN THE FACILITIES***

## Life Cycle Cost Estimate

Page 11 of11z

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 24,106,900 | 24,106,900 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 22,901,500 | 22,901,500 |
| | | | **Total Initial Costs** | | **$ 24,106,900** | | **$ 22,901,500** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 1,205,400** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| **Difference (Compared to Original)** | | | | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ 24,106,900 | | $ 22,901,500 |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **$ 1,205,400** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 1,320,497** | **Per Year:** | **$ 1,254,469** |

# Quantitative Value Alternative

**Title** **IE-16**

***OUTSOURCE LIGHT DUTY FLEET***

## Original Concept



Continue status quo with Nanaimo owned and maintained light duty vehicles.

## Alternative Concept

The concept would be to shift from a Nanaimo owned and maintained light duty fleet to a third party provided vehicle as a service. Vehicle as a service is a lease model where a third party leases the vehicle to Nanaimo and provides maintenance.

## Advantages

- Reduces the space required in the fleet maintenance building
- Reduces the staff resources required to maintain the fleet
- Vehicle life is typically reduced resulting in newer vehicles, improved reliability, improved safety features

## Disadvantages

- Agreement would be needed with the union as vehicle maintenance work would be outsourced.
- Vehicles would have to be taken to an offsite location for maintenance
- Ability to modify vehicles would be reduced (or additional costs at the end of the lease)

## Discussion / Justification

The concept is for Nanaimo to adopt a vehicle-as-a-service model for light-duty fleet. This model would include a lease where the lease provides the vehicle and maintenance. Light duty vehicles include passenger cars, 1/2 tonne pickup trucks, 3/4 tonne pickup trucks and vans. These vehicles were selected as they are generally not customized or modified extensively and are typically readily available from leasing companies.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 700,800 | $ 173,100 | $ 873,900 |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$ 700,800** | **$ 173,100** | **$ 873,900** |

# Quantitative Value Alternative

**Title** **IE-16**

***OUTSOURCE LIGHT DUTY FLEET***

## Discussion / Justification



Approximately 60 light-duty vehicles operate out of NOC. These vehicles consist of passenger cars, pickup trucks and SUVs. These vehicles are typically used for staff transport, supporting construction crews, parks operations, and other maintenance functions. These vehicles have limited customization, are commonly available through leasing companies and would be the easiest to consider a vehicle as a service lease model vs the current Nanaimo-owned and maintained model.

A vehicle-as-a-service company that would provide these services in the Nanaimo region would need to be sourced. A few known companies were contacted and none currently have this service available in the Nanaimo region, however, would be willing to entertain working with Nanaimo to explore and possibly offer this type of service. Possible companies include Zeemac, Driving Force and 7 Gen. Further discussions we a possible service provider would be required for costing. As no specific costing could be obtained, a qualitative analysis is described below for a traditional vehicle lease vs own; in house vs outsource maintenance costs; staffing impacts and facility impacts.

Leasing a vehicle for a fleet is generally very similar in cost to owning. The benefit in owning a vehicle is that it can be customized, service life can be better managed and specific vehicle makes/models can be selected which is why many municipalities choose to own their own vehicles. This city owned model is questioned by many municipalities yet many continue with the city owned model even after a review and analysis.

Maintenance costs for light duty vehicles is generally cost competitive for outsourcing vs in house work. One of the major challenges with outsourcing maintenance is transport of the vehicle to the maintenance provider. Transport typically requires 2 staff with a shuttle vehicle or a single staff with taxi/uber/etc. When the cost of a basic service for a light duty vehicle is approximately $500, adding the transport costs to a maintenance provider can easily add 20-30%. One of the major challenges in outsourcing maintence on vehicles is the required scheduling and inability to prioritize the repairs. Typically third party maintenance providers schedule work out 1-2 weeks. This is important to note as when simple repairs are required the vehicle may be unavailable for several wees whereas for in house maintenance it could be repaired the same day. There is a possibility that this could be improved during contract negotiations, however, there would likely be a cost impact.

# Quantitative Value Alternative

**Title** **IE-16**

***OUTSOURCE LIGHT DUTY FLEET***

## Discussion / Justification (Continued)



Moving to a vehicle-as-a-service model would require changes to the collective agreement as it would outsource the maintenance functions of the current Nanaimo-owned model. The maintenance staff impact of outsourcing maintenance of these vehicles would be a reduction of approximately one technician.

With moving to a vehicle as a service for the light duty fleet, there is a possibility that the fleet maintenance center could be reduced in size as the requirement for vehicle repair bays is reduced. A more thorough operational review of maintenance planning and staffing requirements is required, but for the purpose of this evaluation, it's assumed that 2 light duty vehicle repair bays could be eliminated.

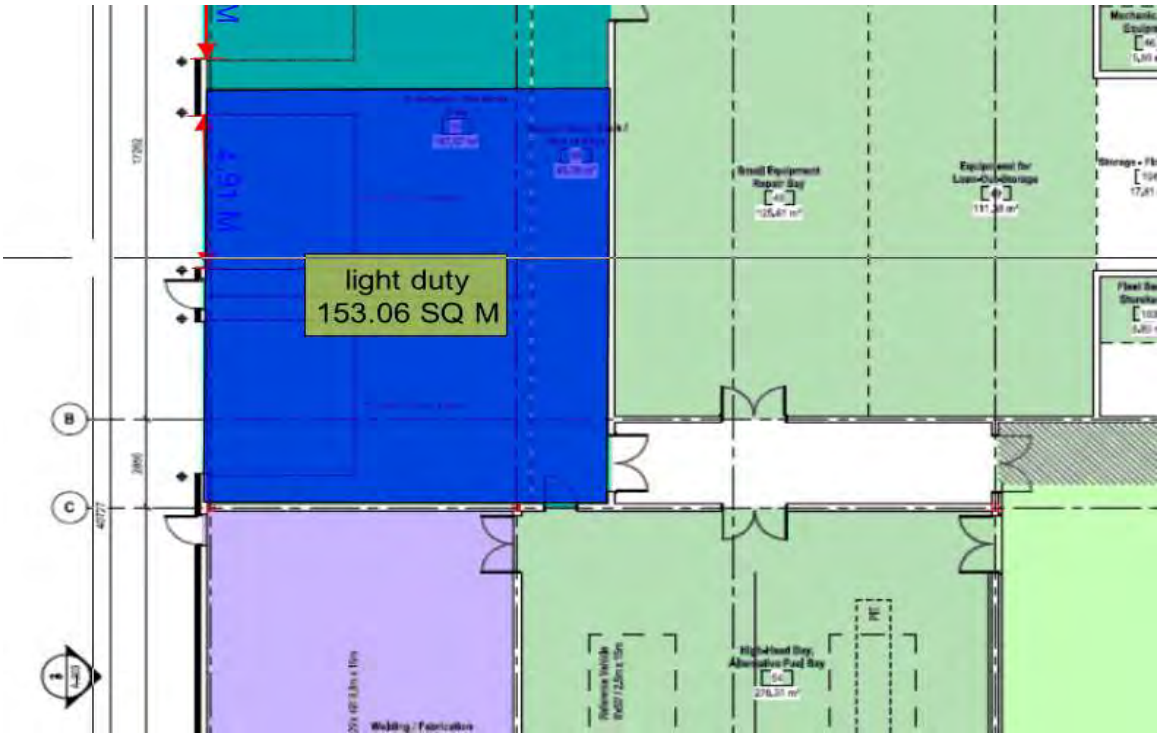
It's anticipated that shifting to the vehicle as a service model, will not reduce the fleet parking needs at NOC as the vehicles would still be parked overnight here. There may be a minimal reduction in parts storage as parts for these vehicles would not be needed. The impact on parts storage is expected to be negligible and not considered in this evaluation.

# Quantitative Value Alternative

**Title** **IE-16**

***OUTSOURCE LIGHT DUTY FLEET***

**Pick the Correct Title** **Page 4 of 6**



# Quantitative Value Alternative

**Title** **IE-16**

***OUTSOURCE LIGHT DUTY FLEET***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Light duty fleet 2 bays | m2 | 150 | $3,737.60 | $560,640 |

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | **560,640** |
| 25.0% | Project Markup: | $ | 140,160 |
| **Total Cost (Rounded):** | | **$** | **700,800** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| **Subtotal:** | | **$** | |
| 25.0% | Project Markup: | $ | |
| **Total Cost (Rounded):** | | **$** | |
| **Cost Difference:** | | **$** | **700,800** |

# Quantitative Value Alternative

**Title** **IE-16**

***OUTSOURCE LIGHT DUTY FLEET***

## Life Cycle Cost Estimate



| | | | | Original Concept | | Alternative Concept | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | | | | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 700,800 | 700,800 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | | |
| | | | **Total Initial Costs** | | **$ 700,800** | | **$ -** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 700,800** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| Reduce space for O+M | | | 18.256 | 9,480 | 173,066 | | |
| | | | **Total Annual Costs (Present Worth)** | | **$ 173,100** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ 173,100 | | $ - |
| **Difference (Compared to Original)** | | | | | | | **173,100** |
| Total Life Cycle Costs (Present Worth) | | | | | $ 873,900 | | $ - |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **$ 873,900** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 47,869** | **Per Year:** | **$ -** |

# Design Suggestion

**Title** **IE-28**

***WHAT IF THE CURRENT HOUSING DEVELOPMENT PARCEL NOT AVAILABLE***

## Original Concept



Currently the master plan envisions the acquisition of the public housing parcel to the west and incorporation into the site. The additional site area is used for staff and public parking and is adjacent the administration building.

## Alternative Concept

Should the site not be available or available in a timely manner, the parking could be relocated underground. A portion of the parking would be located below the administration building and the remainder below the proposed heavy fleet equipment parking.

## Advantages

- Would minimize the site area and make the public housing site available for other uses.

## Disadvantages

- Underground parking costs likely in excess of land value at this time.
- The area over the parking under the parking cannot be redeveloped in the future. Not flexible.

## Discussion / Justification

Parking under the heavy fleet parking will necessitate a very heavy and robust slab above. Loading requirements will be similar to bridge loading standards.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

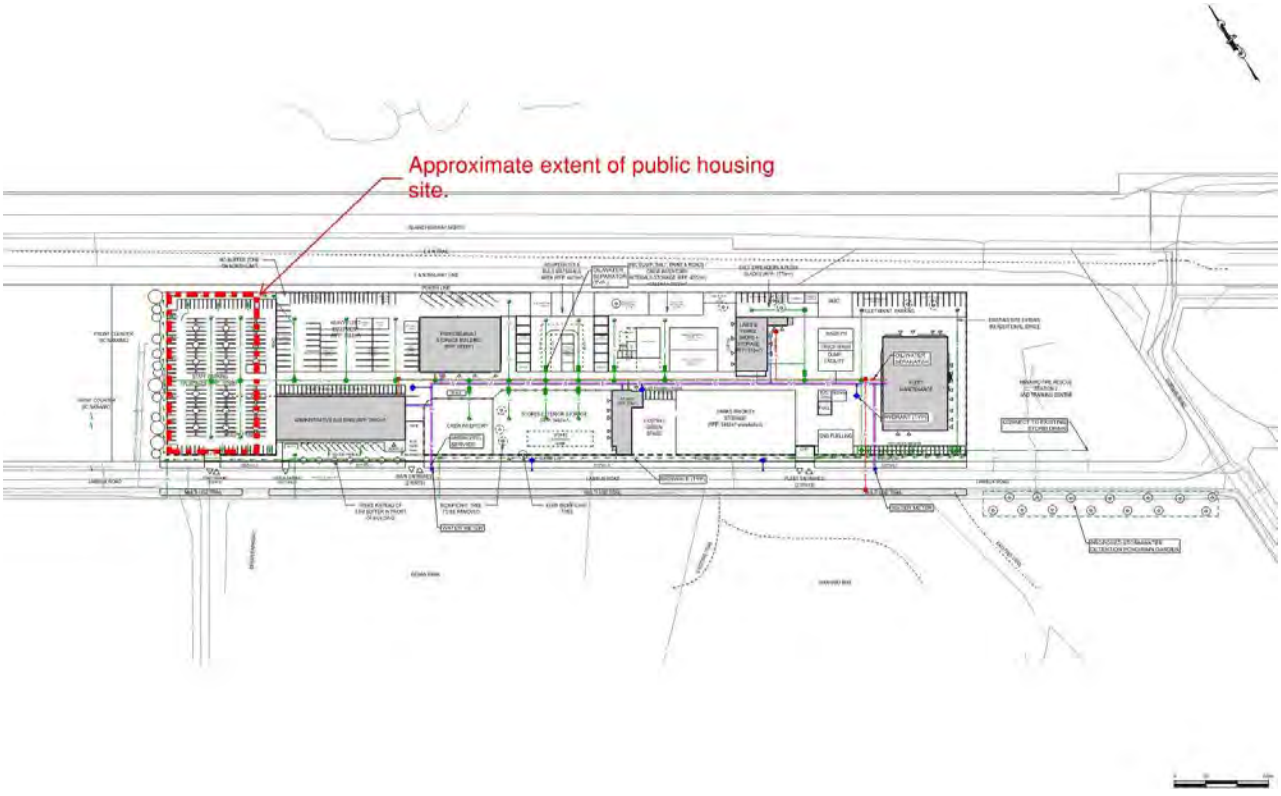
# Design Suggestion

**Title** **IE-28**

***WHAT IF THE CURRENT HOUSING DEVELOPMENT PARCEL NOT AVAILABLE***

## Exhibits - Original Concept





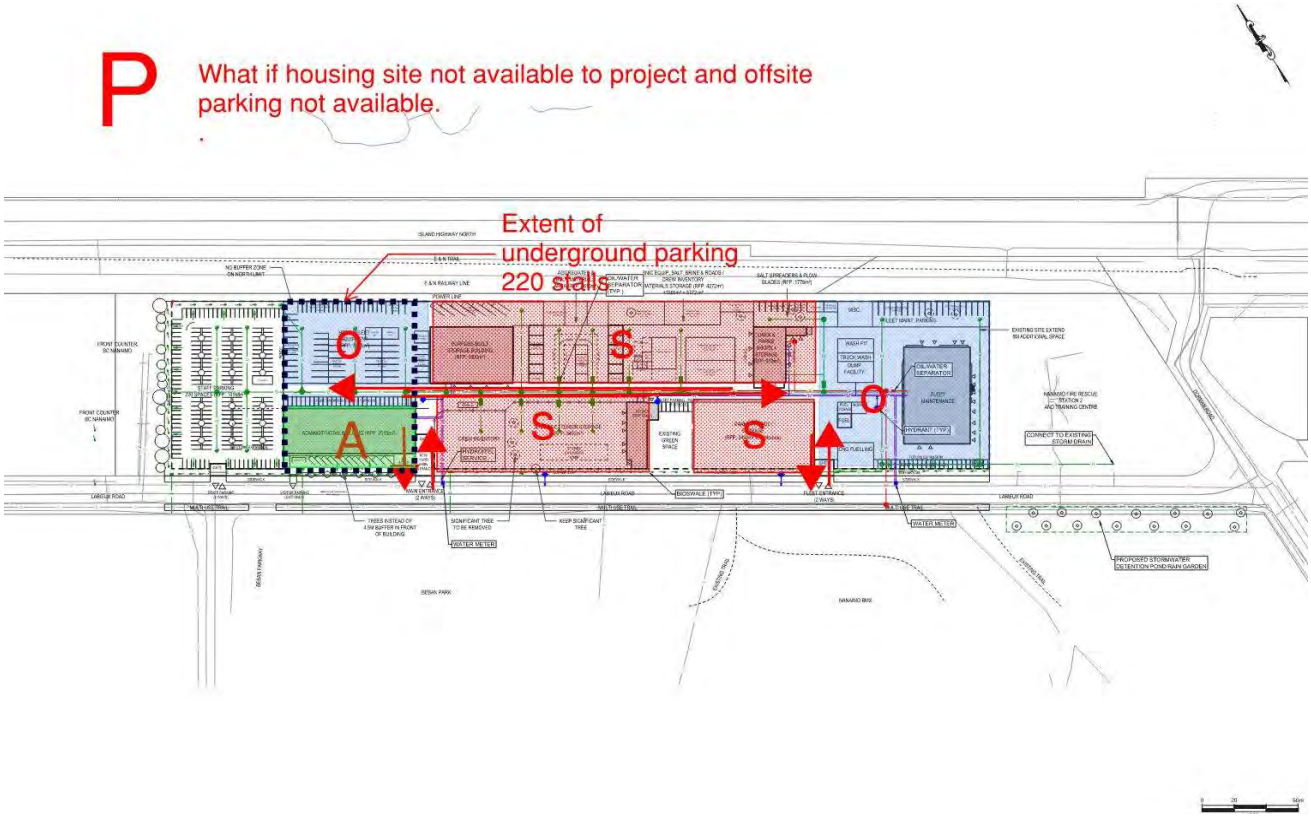
# Design Suggestion

**Title** **IE-28**

***WHAT IF THE CURRENT HOUSING DEVELOPMENT PARCEL NOT AVAILABLE***

## Exhibits - Alternative Concept





# Design Suggestion

## Title IE-40

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

### Original Concept



The current Public Works Yard maintains Labieux Rd as the main access road to the campus while maintaining the connection between Bowen Rd, Kenworth Rd, Beban Parkway, and Dorman Rd. Labieux also creates the separation between the Operations Centre and Beban Park properties as 2 distinct destinations. City staff are currently working with the Nanaimo BMX Club on the complete renewal of the BMX track located in Beban Park with planned access from Labieux Rd.

### Alternative Concept

Concepts around the use of part or all of Labieux Rd as part of the NOC development would have significant impact on Beban Park's current use as well as impacting future uses as per the Beban Park Masterplan.(**https://www.nanaimo.ca/docs/default-document-library/beban-master-plan-2015.pdf**) Prior to any concept development, the 2015 Masterplan needs to be reviewed and referenced. Additionally, the 2022 adopted City Plan (**https://www.nanaimo.ca/docs/city-plan-documents/city-plan---low-resolution-2022-jul-04.pdf**) and associated Integrated Action Plans (**https://www.nanaimo.ca/docs/city-plan-documents/iap---final---2023.06.27-(web).pdf**) would also need to be reviewed to ensure that no conflicting programming is created. The reality of completely shutting Labieux Rd., seems unlikely for the aforementioned reasons, but also due to the fact that Fire Station #2 is also at the Labieux/ Dorman Rd., intersection and NFR uses Labieux as an emergency response route.

### Advantages

- Adds space to use for the new development

### Disadvantages

- Conflicts with Beban Park Masterplan proposed future uses
- Conflicts with current uses in Beban Park
- Conflicts with other current uses of Labieux
- Eliminates important emergency response route, which NFR does not support.

### Discussion / Justification

The original intent of the comment or request to consider the Beban Park Masterplan and City Plan was and is to ensure that all design and programming of 2020 Labieux Rd., use those documents to help guide decisions around changing the currently designed interaction(s) with Labieux Rd. Any decisions to incorporate some or all of Labieux Rd., would require conversations with and decisions from the City of Nanaimo's Senior Leadership Team, Parks Recreation and Culture, Nanaimo Fire and Rescue, Mayor and Council, and the community.

### Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept



# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept



# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept



# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept



# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept



# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept

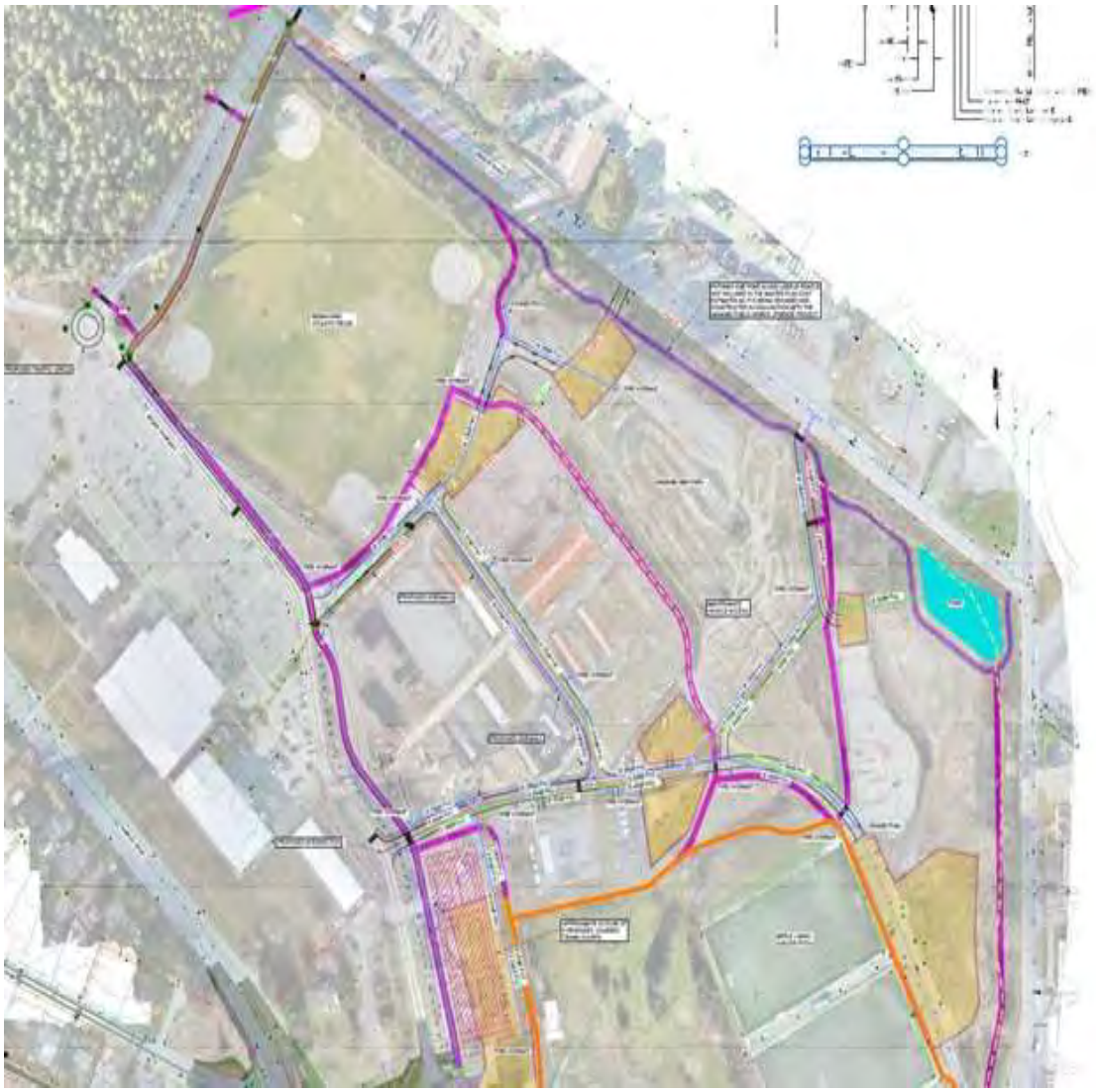


# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

**Exhibits - Alternative Concept** **Page 8 of 9**



# Design Suggestion

**Title** **IE-40**

***COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN***

## Exhibits - Alternative Concept



# Design Suggestion

**Title** **IE-41**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 1***

## Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained throughout the site. See page 2.

## Alternative Concept

A single entrance and exit from Labieux is proposed with a one way loop that separates the storage area in the centre from the operations components to the east and administration to the West. Access to each of the subareas would be from the one way road. Storage would be accessed through a control point allowing for inventory control. See Page 3.

## Advantages

- Allows the storage area to be fenced off and secured point.
- Minimizes on site circulation and allows for a secure site entrance.
- Major circulation is confined to a single loop road minimizing cross overs
- Safer on site circulation and limits traffic on Labieux Road

## Disadvantages

- May force too much centralization of stores.
- Requires areas for the three zones to be sized properly for the future.

## Discussion / Justification

The creation of single access point to the site greatly simplifies site security and minimises on site vehicular movements. We note that a separate public access to the administration building including parking may be desirable in order to keep public traffic out of the yard area.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

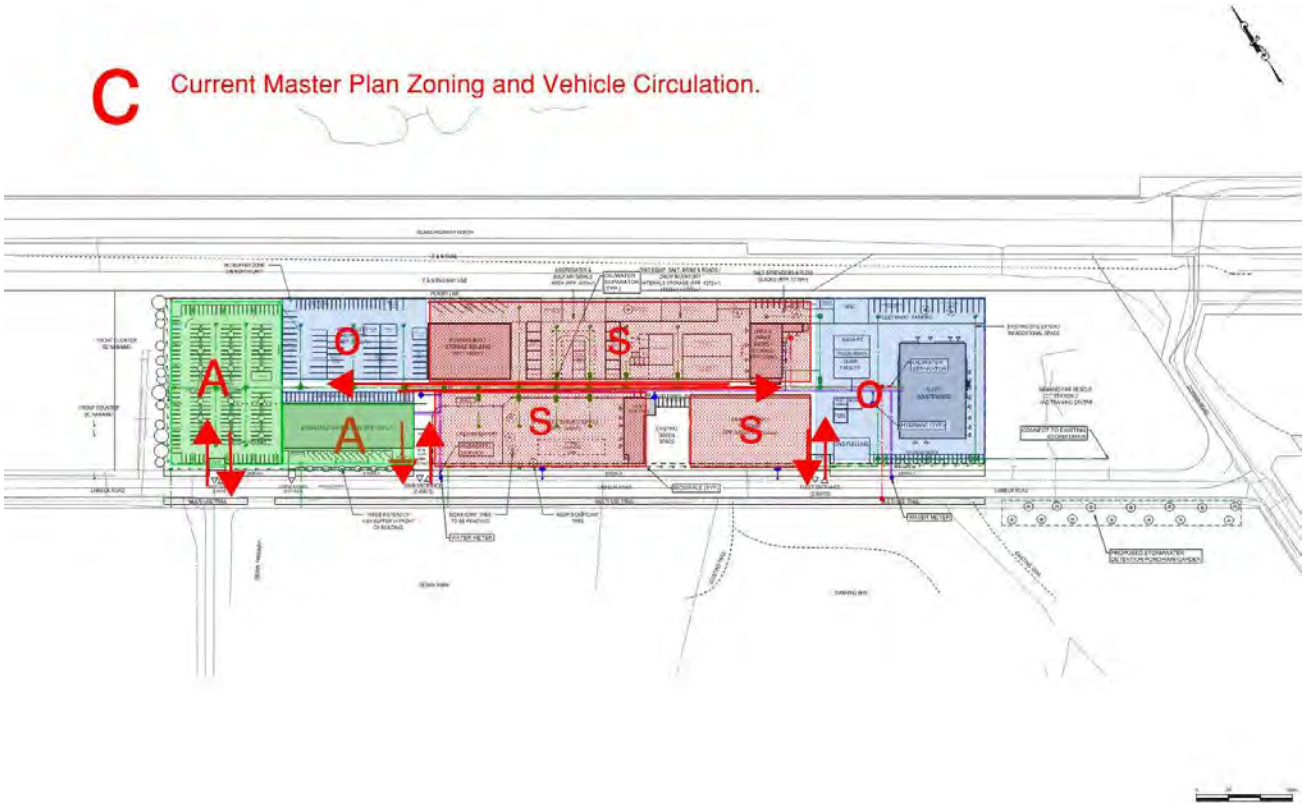
# Design Suggestion

**Title** **IE-41**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 1***

## Exhibits - Original Concept





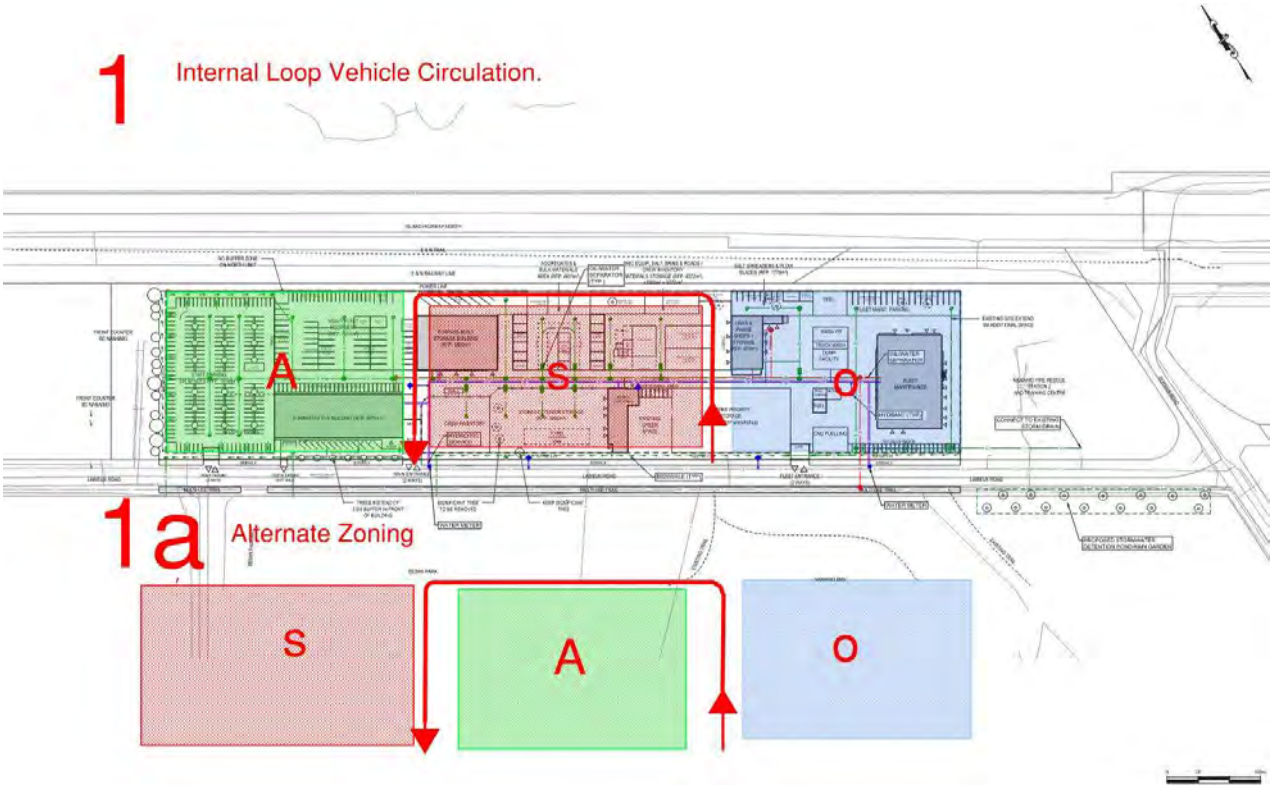
# Design Suggestion

**Title** **IE-41**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 1***

## Exhibits - Alternative Concept





# Design Suggestion

## Title IE-43

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 2***

### Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained through out the site. See page 2.

### Alternative Concept

Similar to option 1 however Labieux Road is consolidated with the site. A single entrance and exit from Labieux is proposed that connects to a one way loop separating the storage area in the centre from the operations components to the east and administration to the West. Access to each of the sub-areas would be from the one way road. Storage would be accessed through a control point allowing for inventory control. See Page 3.

### Advantages

- Site area is increased through the addition of Labieux Road Site Area increases are greatest in west site.
- Site security can be further enhanced from option 1.
- Major circulation is confined to a single loop road minimizing cross overs
- Public safety is further enhanced from option 1.

### Disadvantages

- Closure of Labieux Road to public traffic may not be possible or desirable.
- As with option 1 areas assigned to each of the zones need be carefully defined initially.
- May require utility relocates and create offsite traffic impacts.

### Discussion / Justification

There are significant obstacles to the closure of Labieux Road, however this option remains open to future consideration dependent upon how site is developed. considered in the proposed Beban Park Planning Process. (Cont. p4)

### Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

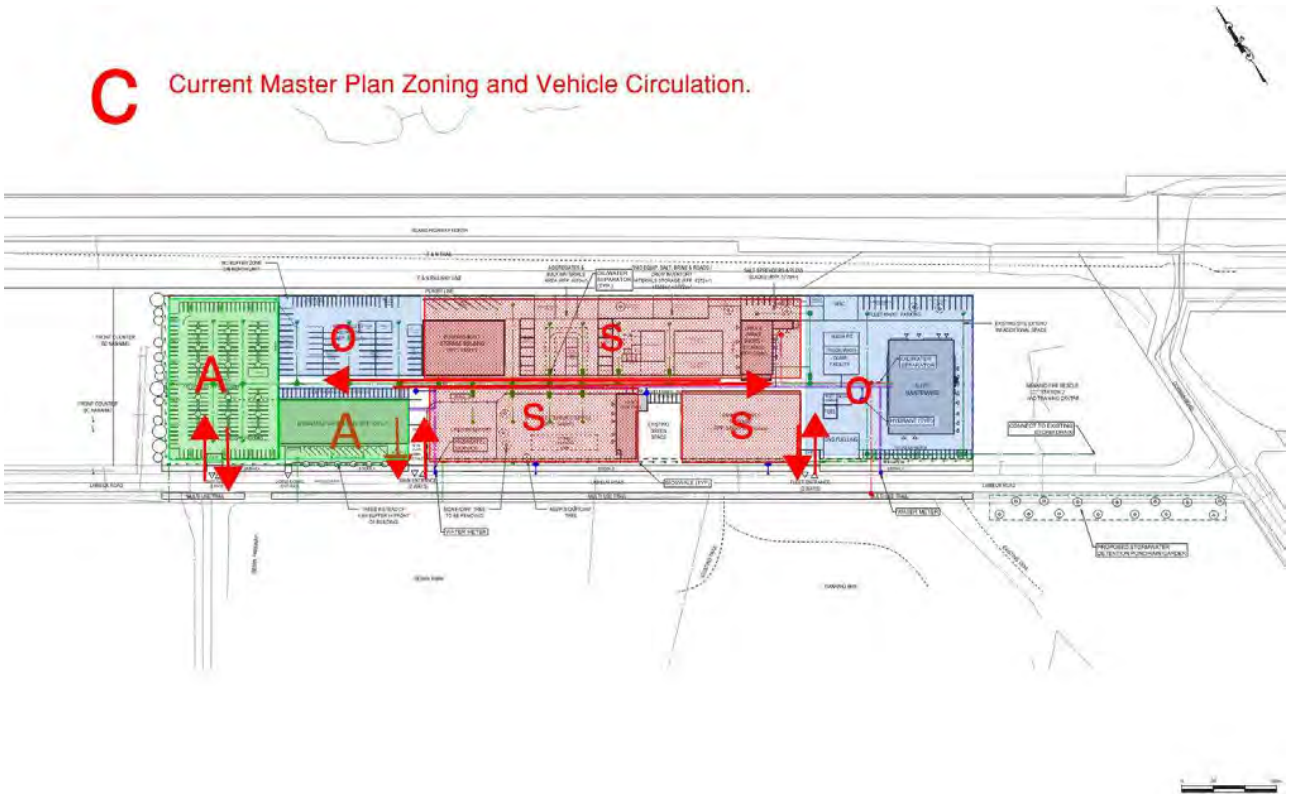
# Design Suggestion

**Title** **IE-43**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 2***

## Exhibits - Original Concept





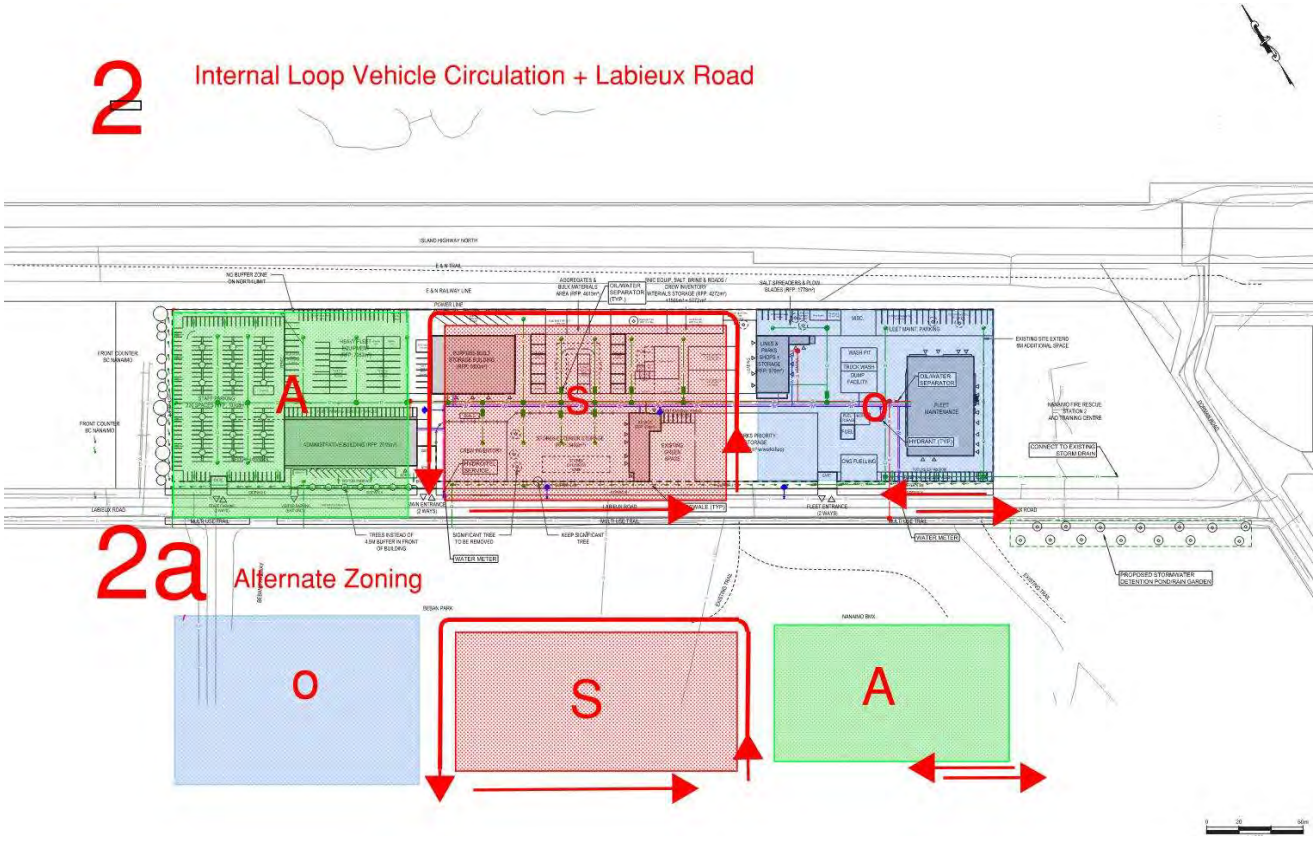
# Design Suggestion

**Title** **IE-43**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 2***

## Exhibits - Alternative Concept





# Design Suggestion

## Title IE-44

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 3***

### Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained throughout the site. See page 2.

### Alternative Concept

A single entrance and exit from Labieux is proposed with a perimeter one way loop that provides access to each of the sub-areas from the one way road. Storage would be accessed through a control point allowing for inventory control. See Page 3.

### Advantages

- In comparison to option 1 and 2 this option allows for a the adjacent zones to grow and shrink.
- Traffic is confined to a one way loop
- Site safety and security is enhanced.

### Disadvantages

- The one way loop may result in additional site circulation over present.

### Discussion / Justification

Subject to obtaining the public housing site sooner, this option would lend itself to placing the operations component to the west. This portion of the site is the least developed and would require the least decanting if developed first.

### Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

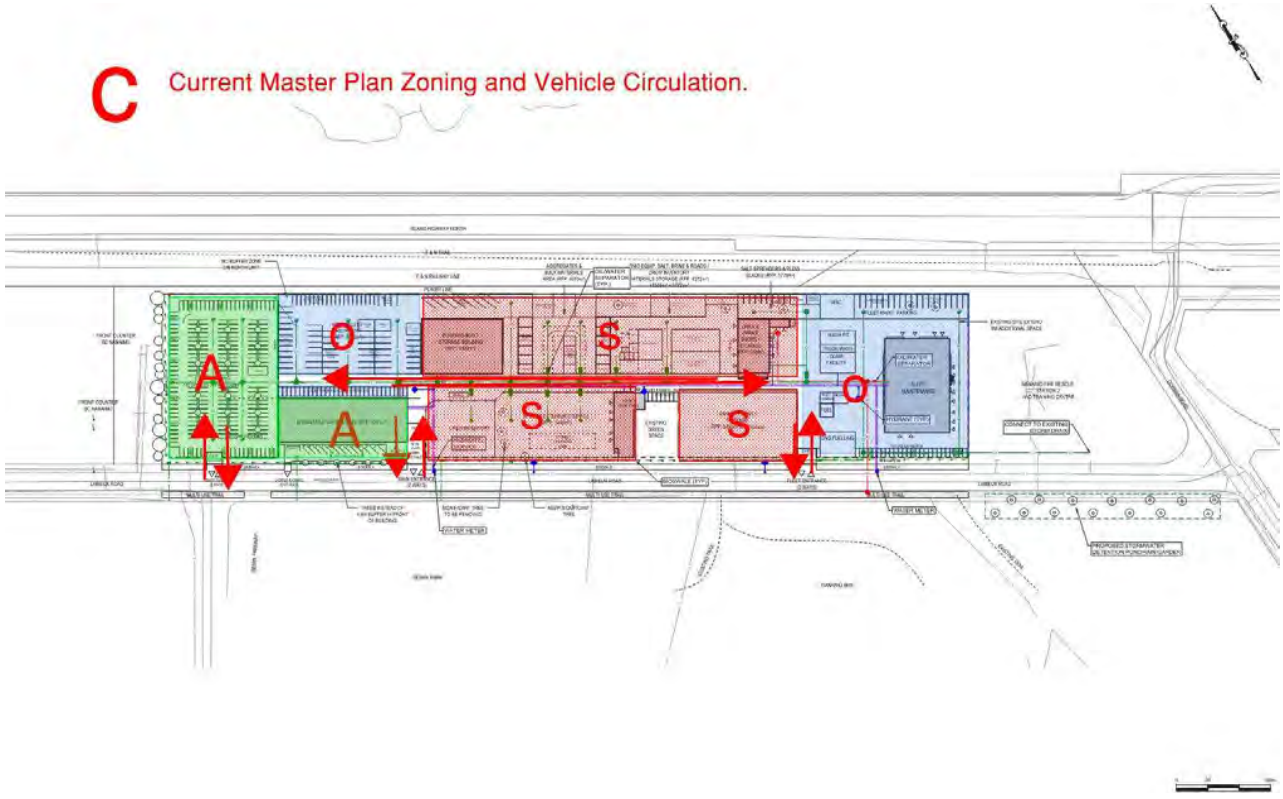
# Design Suggestion

**Title** **IE-44**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 3***

## Exhibits - Original Concept





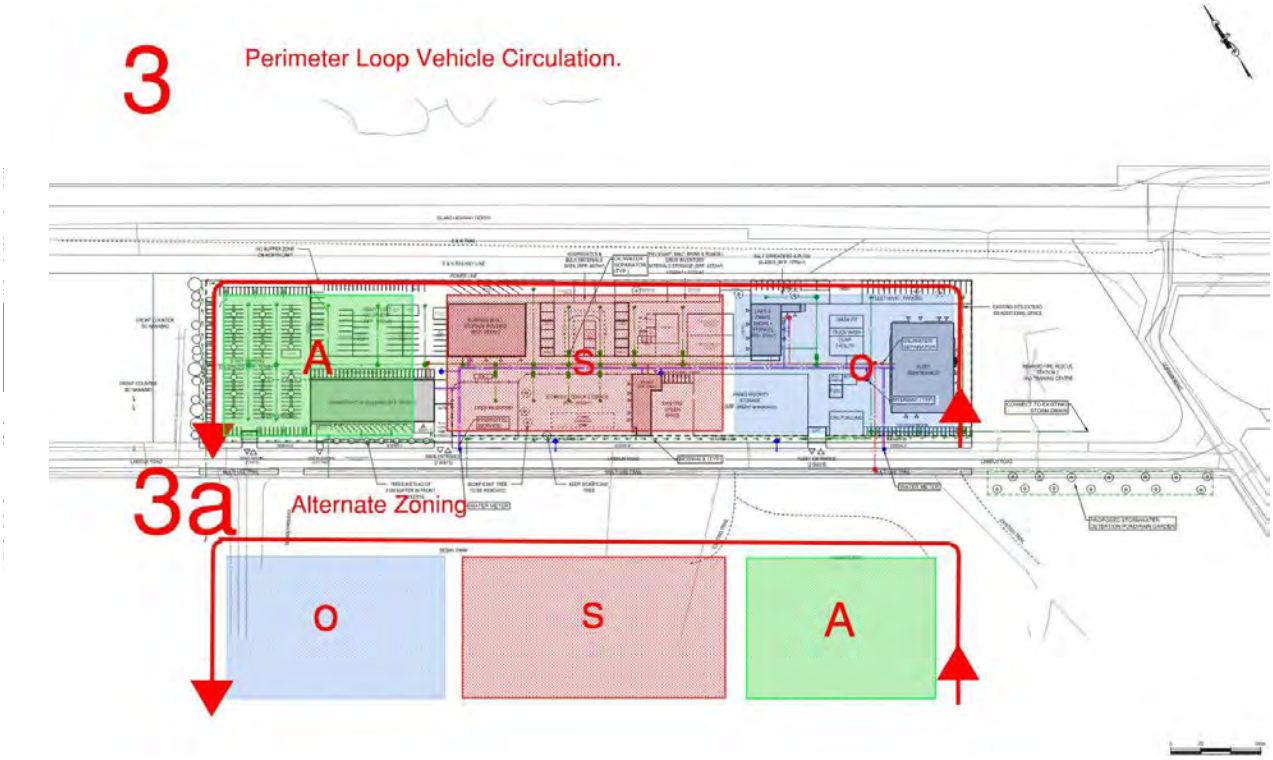
# Design Suggestion

**Title** **IE-44**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 3***

## Exhibits - Alternative Concept





# Design Suggestion

**Title** **IE-45**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 4***

## Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained throughout the site. See page 2.

## Alternative Concept

Similar to option 3 , a one way loop perimeter road is proposed. The incorporation of Labieux road into the site would allow for additional site area with a one way exit along the south extent of the site. As with other similar options the site zoning could be revisited with the operations component moved to the west.

## Advantages

- Larger site area allows for future expansion.
- Single point of entry allows for site security
- Consolidation of storage in one area allows for
- One way loop controls traffic and improves site safety.

## Disadvantages

- May require utility relocates and create offsite traffic impacts
- Closure of Labieux Road to public traffic may not be possible or desirable.

## Discussion / Justification

There are significant obstacles to the closure of Labieux Road, however this option remains open to future consideration dependent upon how site is developed. This option could be considered in the proposed Beban Park Planning Process. (Cont. p4)

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

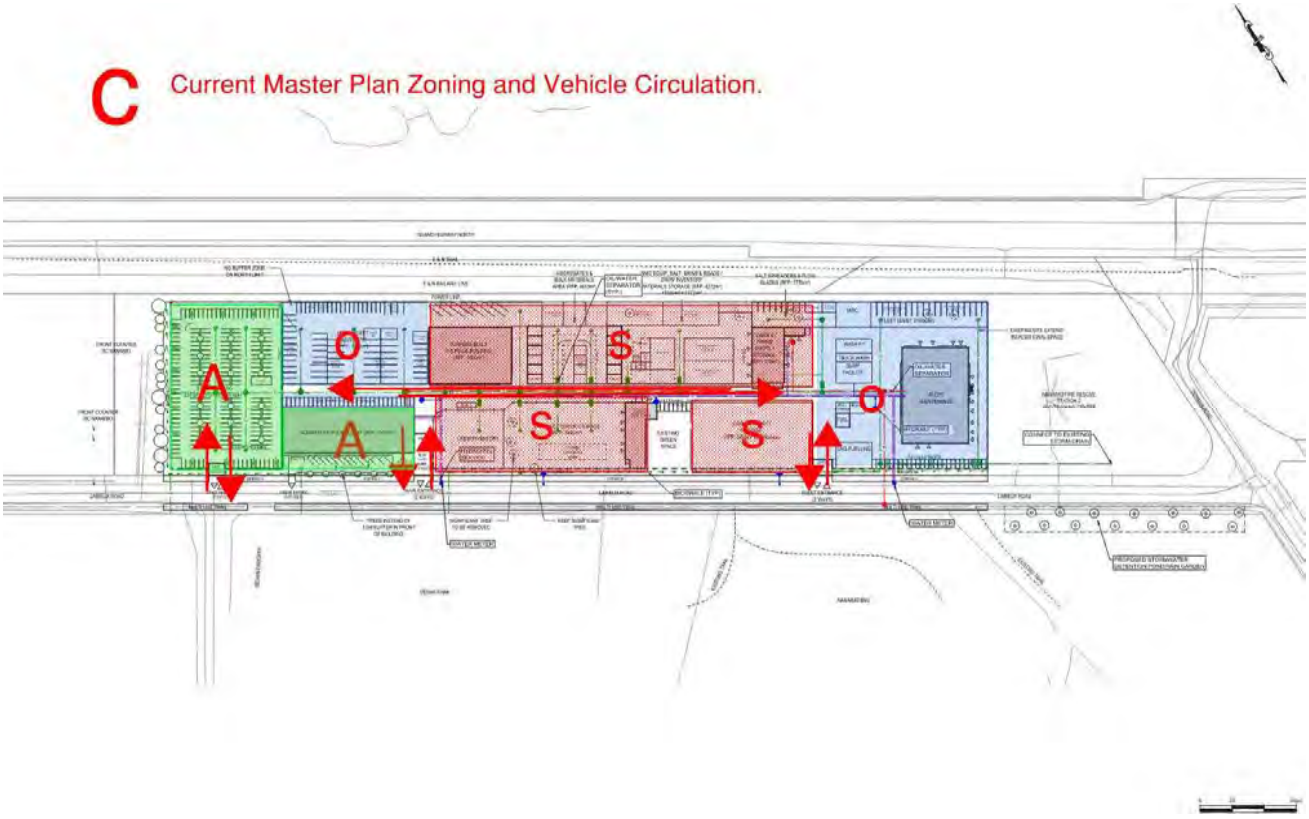
# Design Suggestion

**Title** **IE-45**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 4***

## Exhibits - Original Concept





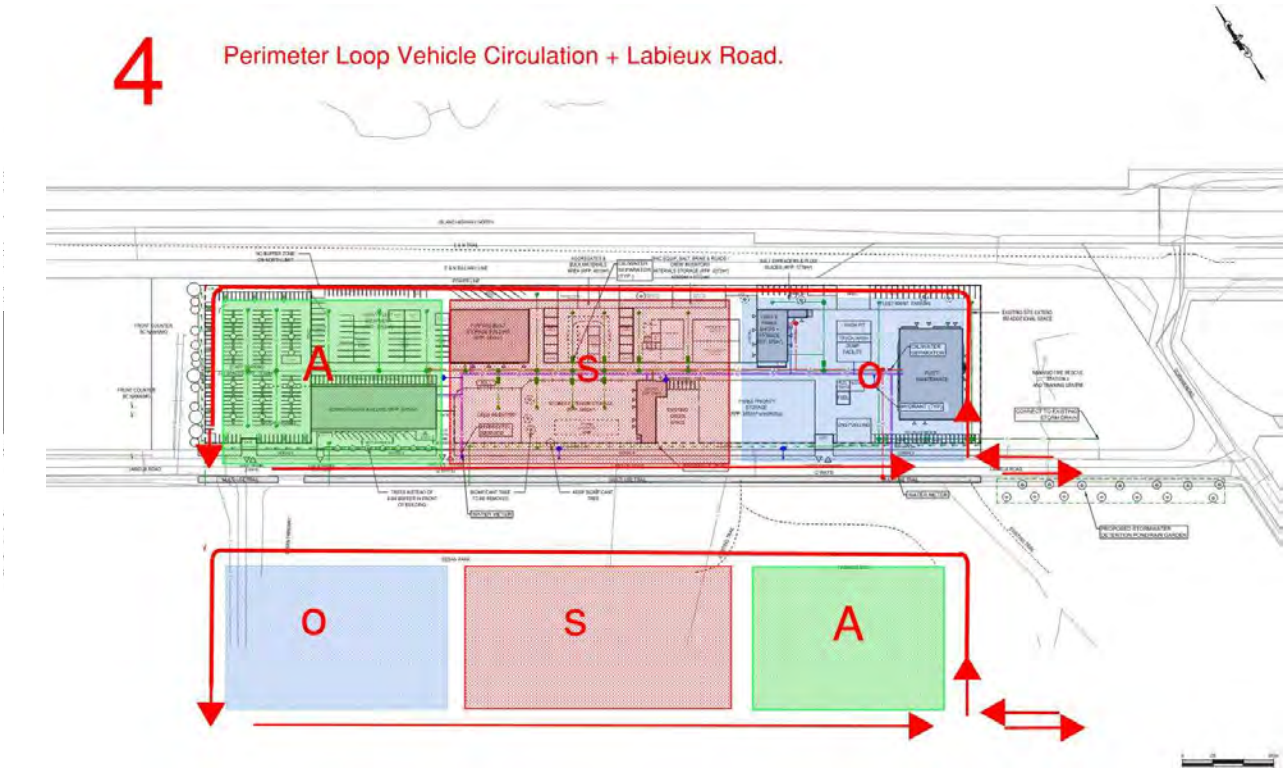
# Design Suggestion

**Title** **IE-45**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 4***

## Exhibits - Alternative Concept





# Design Suggestion

## Title IE-46

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 5***

### Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained through out the site. See page 2.

### Alternative Concept

This option envisions a loop road with a single entrance and exit. Similar to option 1 the site is zoned into three areas including administration, operations and storage. Unlike the other master planning options, this option envisions a further subdivision of the storage zone into a secure storage area and a less secure storage area.

### Advantages

- Further reduces the loop road distance, less traffic.
- Retains a portion of the existing central circulation.
- Allows the granular materials and low value storage to be outside of the most secure storage area.

### Disadvantages

- Reduces the ability to manage access to the less secure stores.

### Discussion / Justification

Access to the granular fill and salt materials may want to be outside of a secure area to allow after hours access to occur without additional staffing needs.

### Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

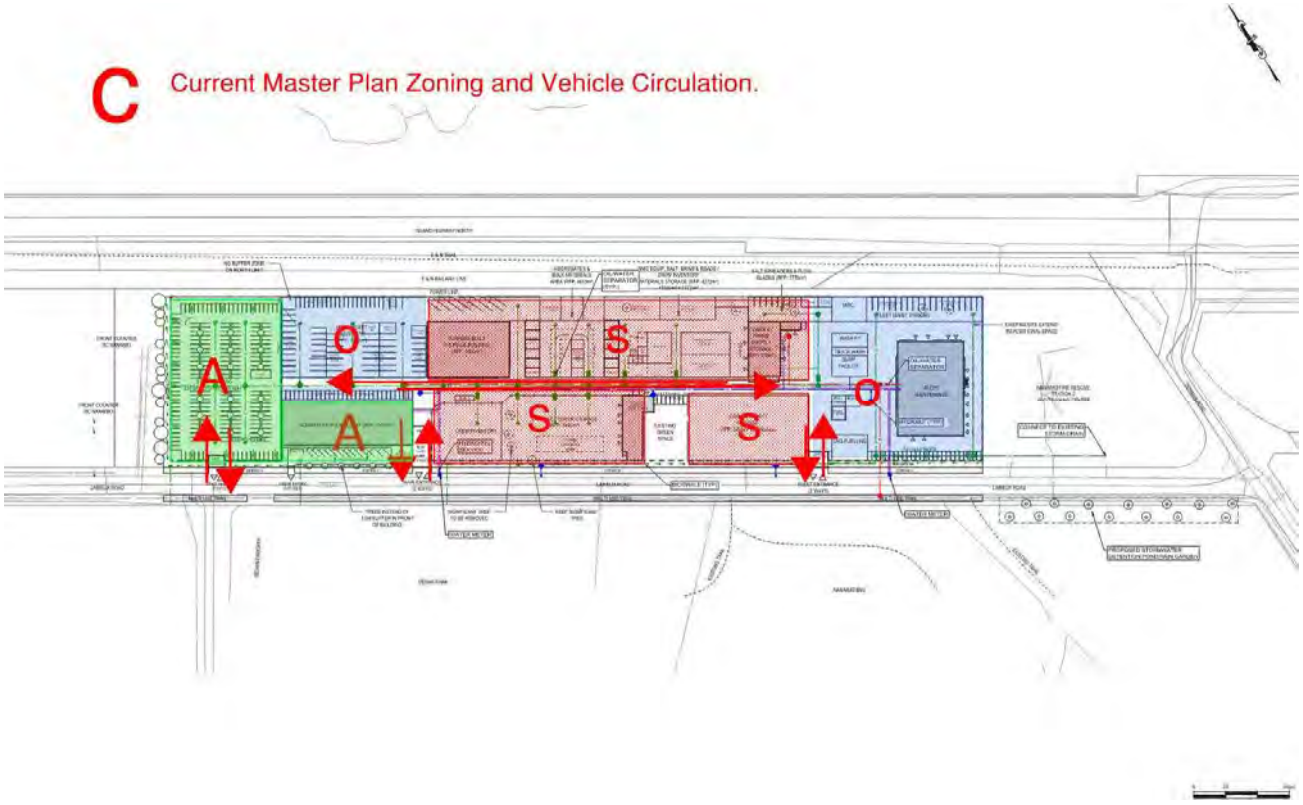
# Design Suggestion

**Title** **IE-46**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 5***

## Exhibits - Original Concept





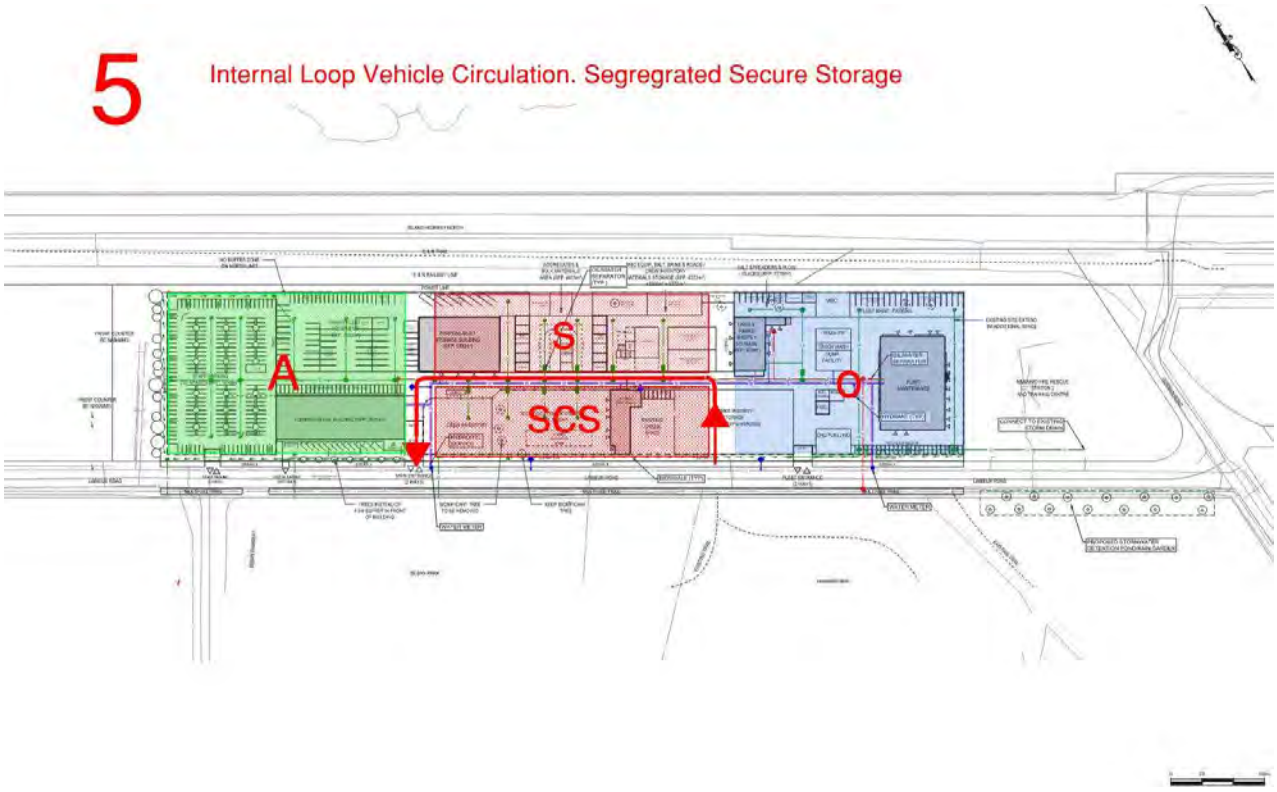
# Design Suggestion

**Title** **IE-46**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 5***

## Exhibits - Alternative Concept





# Design Suggestion

**Title** **IE-47**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 6***

## Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained through out the site. See page 2.

## Alternative Concept

This option eliminates all internal circulation between zones and envisions a separate entrance to each zone from Labeiux Road.

## Advantages

- Maximizes site area and usage.
- Allows for secure access to the storage area
- Allows for flexible boundaries between zones

## Disadvantages

- More traffic and potential safety issues on Labeiux road.
- Requires three access egress points.

## Discussion / Justification

This approach maximises the site area available for future expansion without adding additional site or requiring the closure of Labeiux Road.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

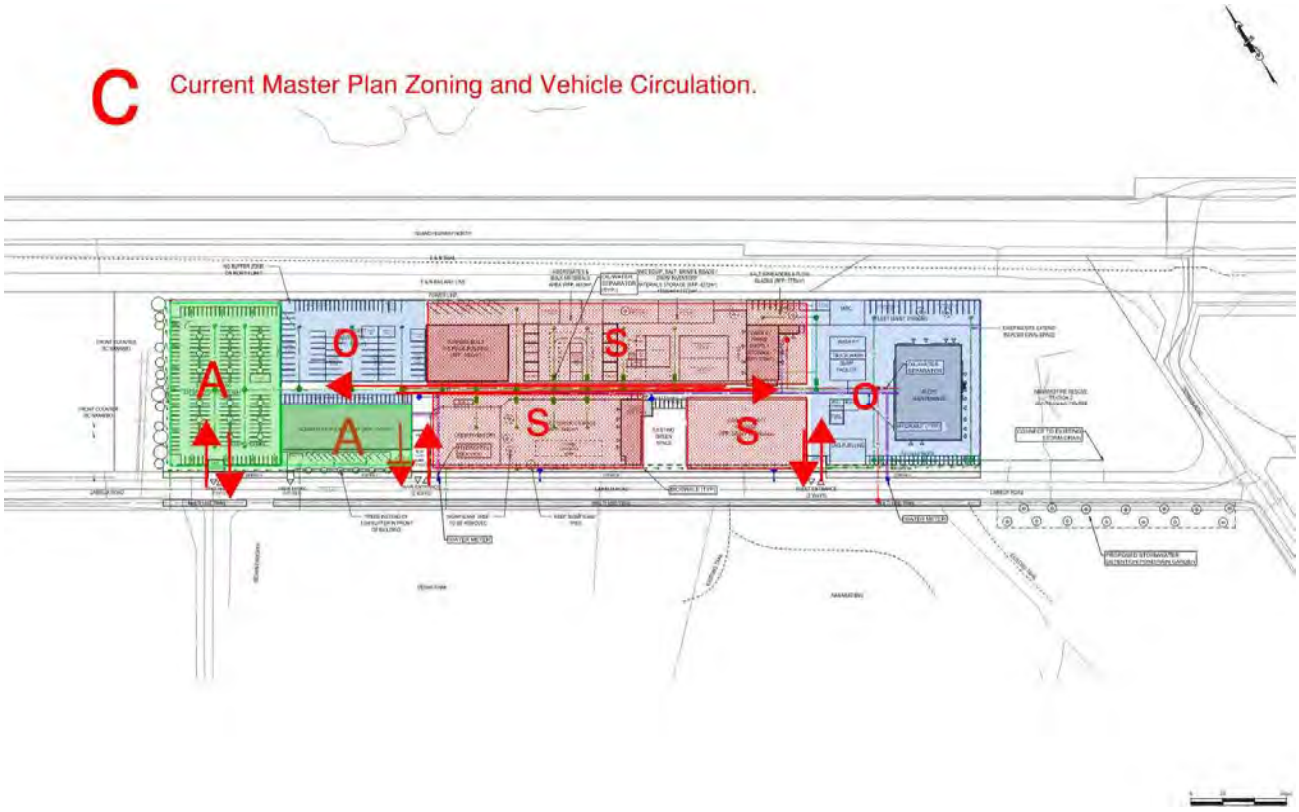
# Design Suggestion

**Title** **IE-47**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 6***

## Exhibits - Original Concept





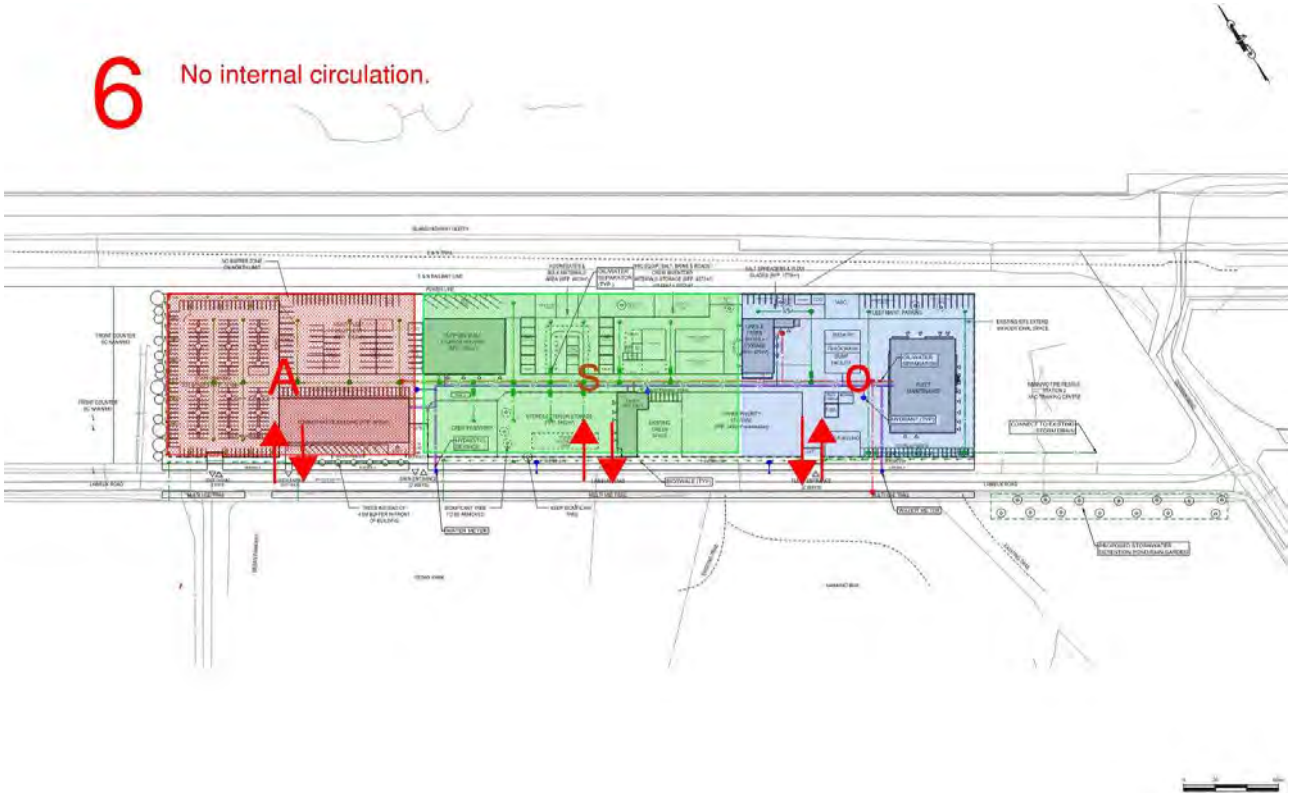
# Design Suggestion

**Title** **IE-47**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 6***

## Exhibits - Alternative Concept





# Design Suggestion

**Title** **IE-48**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 7***

## Original Concept



The current master plan envisions 3 separate in/out access points. Major uses include operations, storage and administration. These uses are loosely zoned with operations an storage intermingled on the site. The existing central circulation road is maintained through out the site. See page 2.

## Alternative Concept

This option envisions incorporating Labeiux Road into the site while using a portion of the road to provide all internal circulation between zones. The west portion of the road can provide additional area as it need not continue beyond.

## Advantages

- Single point of entry to the site.
- Secure access to the storage and operations area.
- Access to administration without going through the site
- Maximises the functional area of the site.

## Disadvantages

- May require utility relocation and cause offsite traffic issues

## Discussion / Justification

This option provides additional site area over that presently existing. The option lends itself to an alternative zoning that will allow the operations component to be constructed in the west on the most undeveloped portion of the site. This would however require early acquisition of the road and the public housing site.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

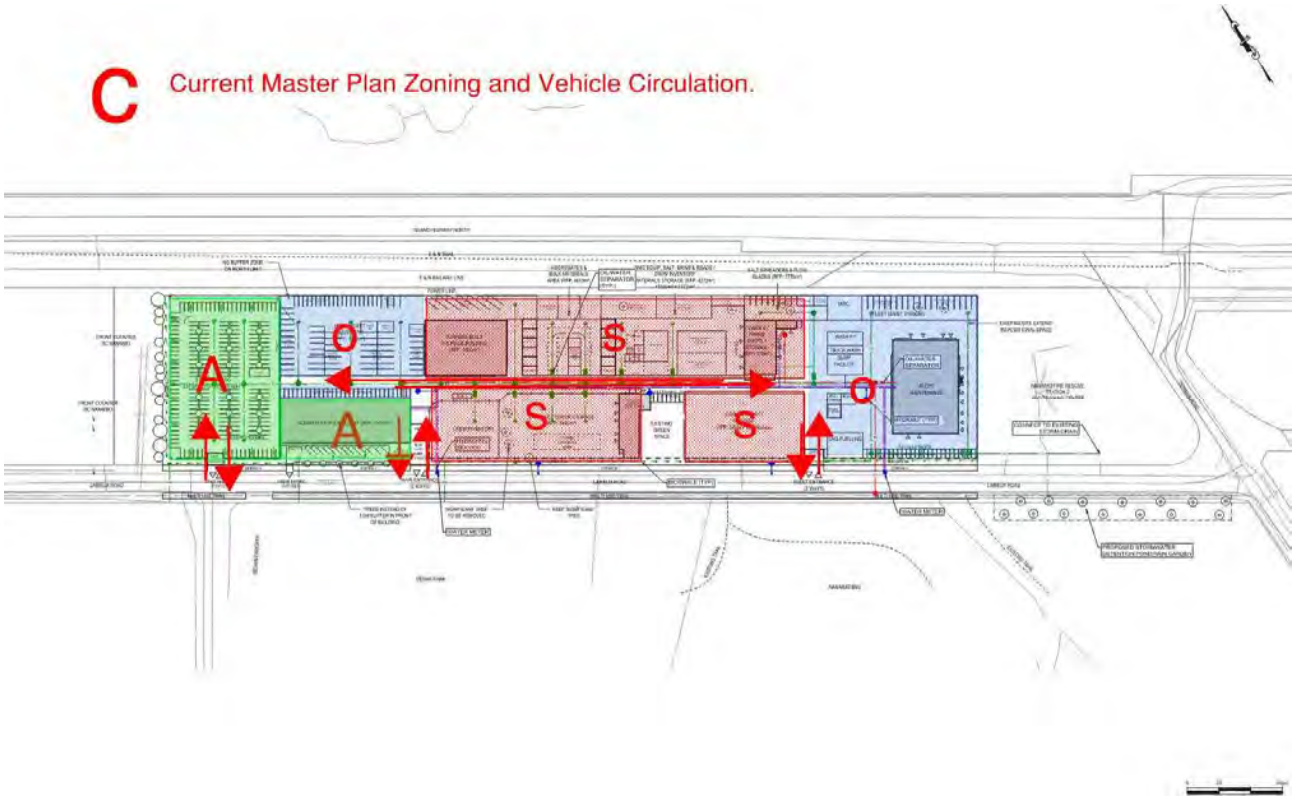
# Design Suggestion

**Title** **IE-48**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 7***

## Exhibits - Original Concept





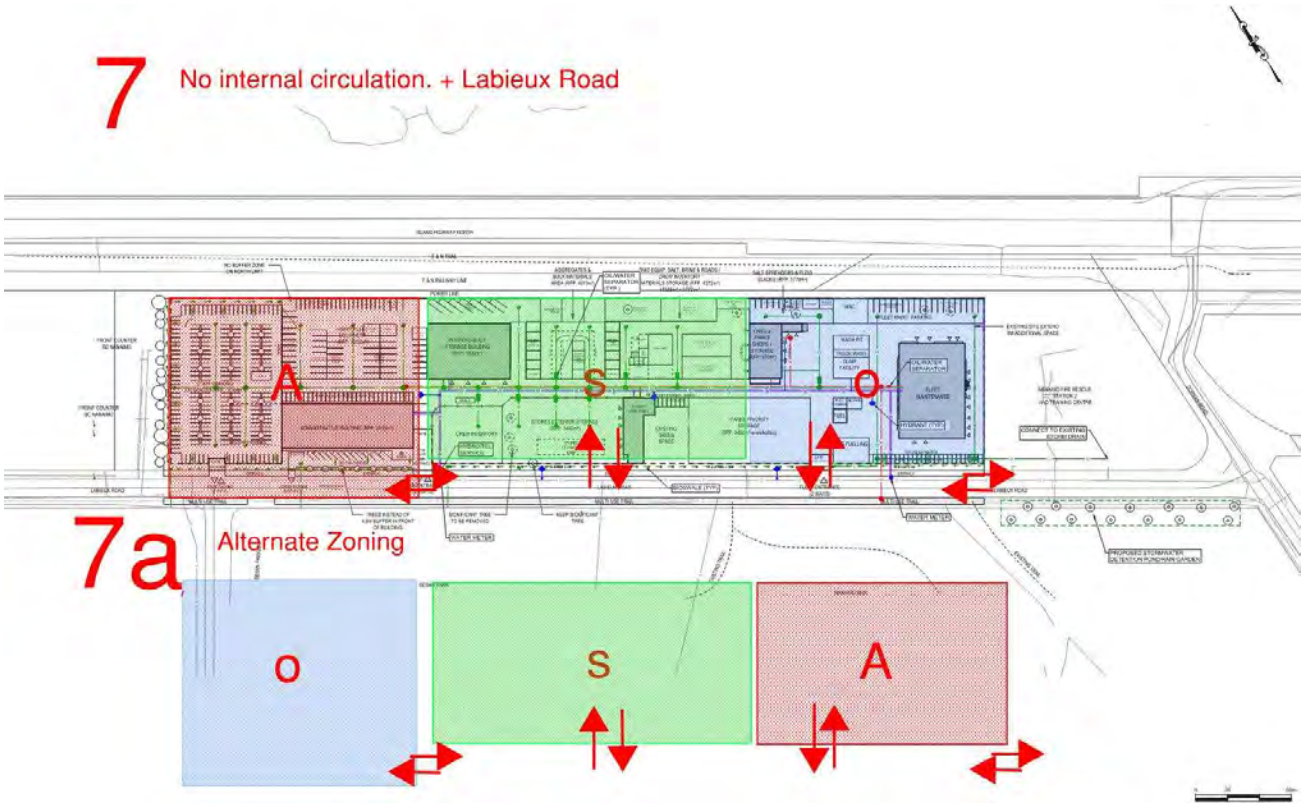
# Design Suggestion

**Title** **IE-48**

***REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 7***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-49**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG***

## Original Concept



The conceptual design of the fleet maintenance building has a mezzanine on the 2nd level at the rear of the building which totals 430.24 Sq. Meters. This space is designated as storage or could be used for future growth.

## Alternative Concept

Option 1: Eliminate the mezzanine and all the necessary construction materials associated with it.

Option 2: Eliminate the mezzanine, but construct a full-height ceiling and roof so that a mezzanine could be added in the future.

## Advantages

- Reduction in construction costs.
- Increased ceiling height on 1st floor in the parts and small equipment areas, which would allow for more storage space.
- Reduction in construction time.

## Disadvantages

- Loss of immediate storage and flex space.
- Increased cost of construction if mezzanine is built in the future.

## Discussion / Justification

The fleet maintenance building conceptual plan includes a mezzanine that is located on the 2nd level at the rear of the building. The mezzanine is located over the small equipment, parts, washrooms, and multi-purpose room areas. The intended use of the mezzanine is for storage and future office space.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 1,732,500 | $ | $ 1,732,500 |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$ 1,732,500** | **$** | **$ 1,732,500** |

# Quantitative Value Alternative

**Title** **IE-49**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG***

## Pick the Correct Title

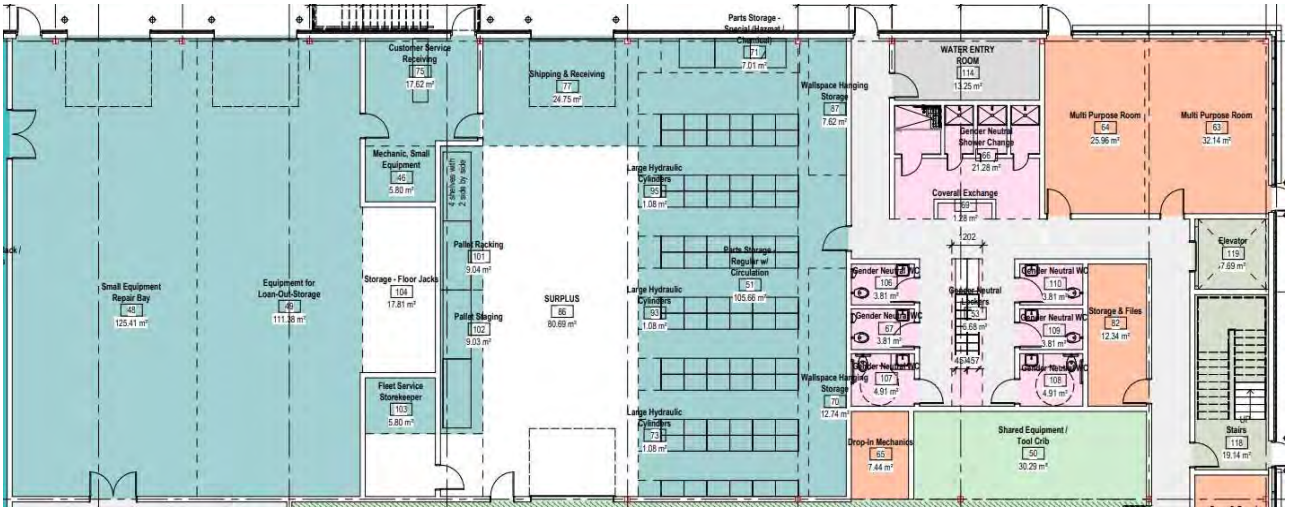


Fleet Maintenance Building - 1st Floor

The mezzanine is not a critical component of the fleet maintenance building and could be eliminated to save construction costs and time.

Option 1 - eliminate the mezzanine completely and all the construction materials associated with it.

Option 2 - eliminate the mezzanine, however construct the rear section of the roof full-height to match the roof height over the high-head bays. This would allow for the mezzanine to be constructed in the future when additional space is needed.



# Quantitative Value Alternative

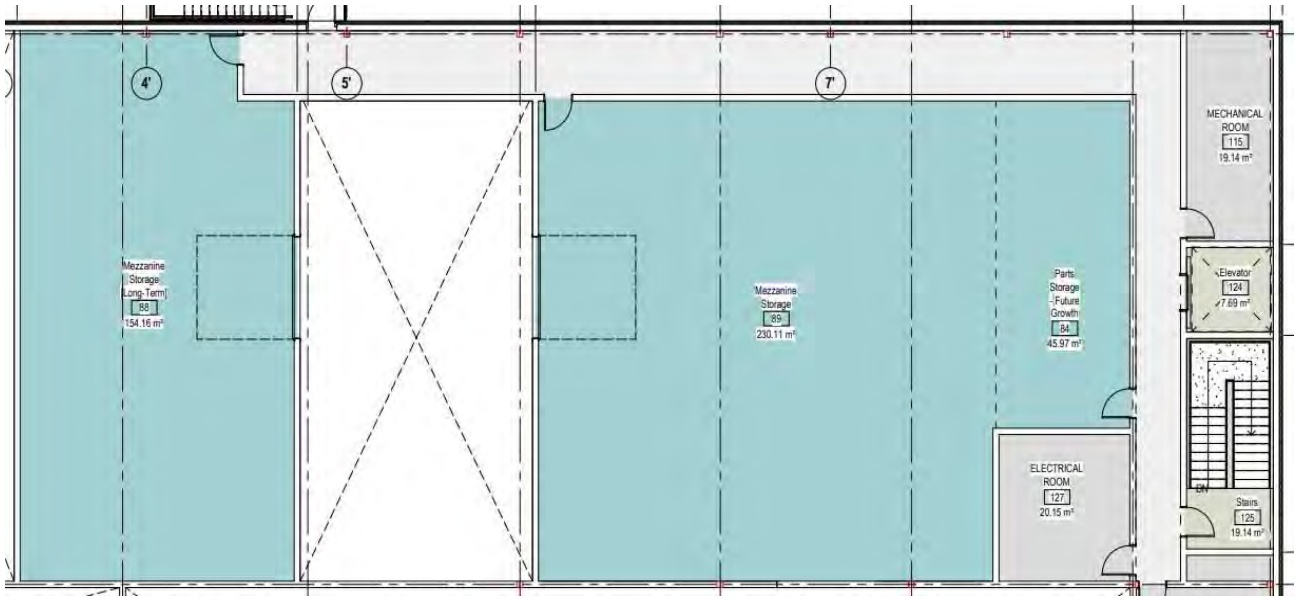
**Title** **IE-49**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG***

## Pick the Correct Title



Fleet Maintenance Building - 2nd Floor Mezzanine



# Quantitative Value Alternative

**Title** **IE-49**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Mezzanine floor -keep the height | m2 | 630 | $2,200.00 | $1,386,000 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **1,386,000** |
| 25.0% | Project Markup: | $ | 346,500 |
| | **Total Cost (Rounded):** | **$** | **1,732,500** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |
| | **Cost Difference:** | **$** | **1,732,500** |

# Quantitative Value Alternative

**Title** **IE-49**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 1,732,500 | 1,732,500 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | | |
| | | | **Total Initial Costs** | | **$ 1,732,500** | | **$ -** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 1,732,500** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| **Difference (Compared to Original)** | | | | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ 1,732,500 | | $ - |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **$ 1,732,500** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 94,901** | **Per Year:** | **$ -** |

# Quantitative Value Alternative

**Title** **IE-50**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0***

## Original Concept



The fleet maintenance building includes a mezzanine floor that is to used for storage.

## Alternative Concept

Delete the mezzanine in its entirety. Provision could be made in the structure for future add however the floor structure would not be constructed at this time.

## Advantages

- Significant Cost Savings due to simplified construction.
- Operating savings in eliminating the elevator and difficult to access storage.
- Eliminates a storage area that is outside of the future controlled storage area.
- Allows for future roof top mechanical changes.

## Disadvantages

- Reduces options for future storage.

## Discussion / Justification

The mezzanine will be difficult to manage and access on a day basis and may therefor be used for "dead storage" that has little value to the operations. Heavy and bulky objects must be lifted by forklift resulting in handling costs that may not justify the use of the space for day to day supply. The mezzanine complicates the mechanical systems and makes future mechanical changes and additions more difficult in the areas where the mezzanine is.

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 1,732,500 | $ | $ 1,732,500 |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$ 1,732,500** | **$** | **$ 1,732,500** |

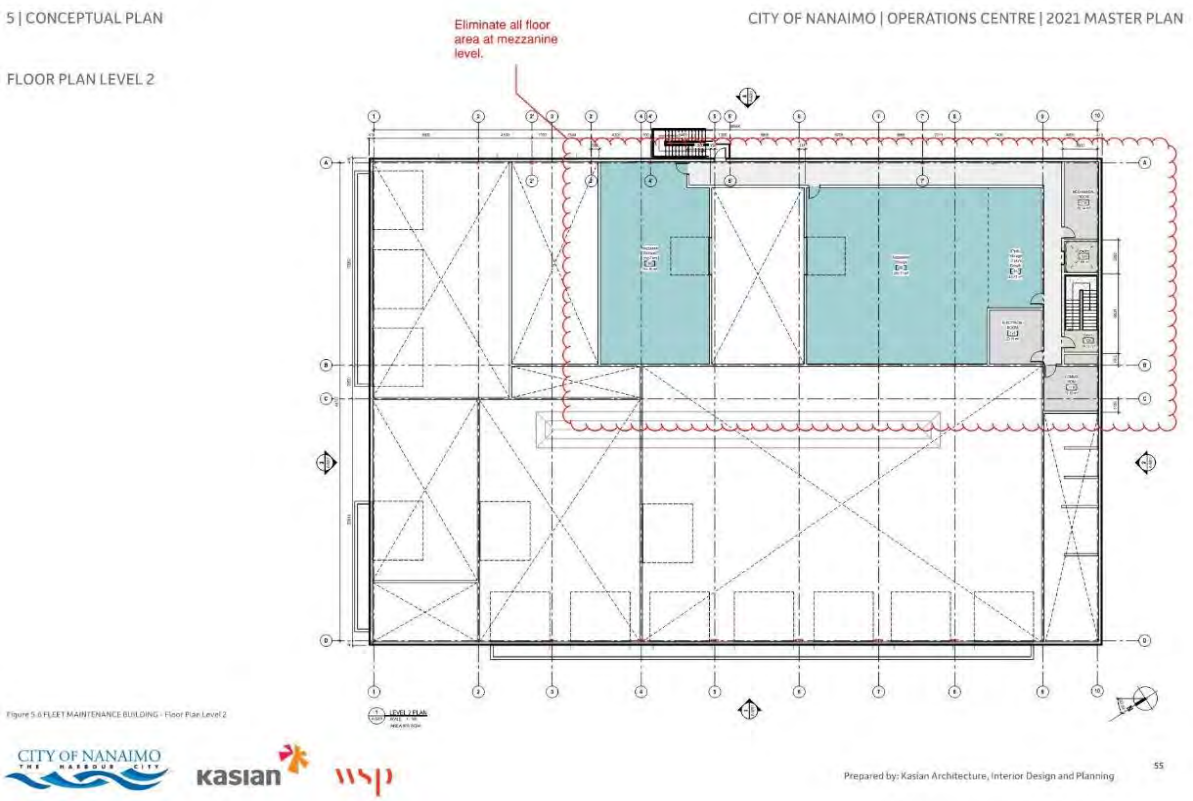
# Quantitative Value Alternative

**Title** **IE-50**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0***

## Exhibits - Alternative Concept





# Quantitative Value Alternative

**Title** **IE-50**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0***

**Estimated Cost of Original Concept** 

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Mezzanine floor -keep the height | m2 | 630 | $2,200.00 | $1,386,000 |

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | **1,386,000** |
| 25.0% | Project Markup: | $ | 346,500 |
| | **Total Cost (Rounded):** | **$** | **1,732,500** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | **Subtotal:** | **$** | |
| 25.0% | Project Markup: | $ | |
| | **Total Cost (Rounded):** | **$** | |
| | **Cost Difference:** | **$** | **1,732,500** |

# Quantitative Value Alternative

**Title** **IE-50**

***ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0***

## Life Cycle Cost Estimate

Page 4 of 4

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **5.00%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **50** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 1,732,500 | 1,732,500 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | | |
| | | | **Total Initial Costs** | | **$ 1,732,500** | | **$ -** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 1,732,500** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| **Difference (Compared to Original)** | | | | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ 1,732,500 | | $ - |
| **Life Cycle Difference (Compared to Original)** | | | | | | | **$ 1,732,500** |
| **Total Life Cycle Costs (Annualized)** | | | | **Per Year:** | **$ 94,901** | **Per Year:** | **$ -** |

# FUNCTION:

## OPTIMIZE OPERATIONAL CAPABILITY (OC)

# Design Suggestion

**Title** **OC-04**

***RECALCULATE BUDGET CONTINGENCY***

## Original Concept



The City of Nanaimo Project Management Framework defines levels of contingencies at various development stage gates. At this concept design stage for a special project classification, a standardized 15% contingency (14.3M) is applied in the latest project cost estimate along with a flat rate 10% contingency (9.5M). For Phase 1, these values are 4.8M and 3.2M, respectively. This is based on a degree of confidence at +30% to -20%. The current risk management plan includes a risk register.

## Alternative Concept

Refine the project risk register taking a consensus-based approach and elaborating on post-mitigation residual risk analysis which estimates a probability (%) and impact ($). The design suggestions and actions out of the VE workshop may help derive inputs for this calculation.
This could be a testing/validation of either one of or both contingency values.

## Advantages

- Verification of flat and confidence-based contingency values or may discover current contingency is inadequate
- Identification of under-developed or new risks post-VM workshopping
- Demonstrate greater rigour and justification of project budget to build trust (financial committees, public)
- Risk register is a living document so results from the VE workshop may present an opportunity to re-evaluate risk

## Disadvantages

- May result in an increase to project budget - may discover that current contingency is inadequate
- May result in a decrease to project contingency (advantage or disadvantage as it would decrease total project budget)

## Discussion / Justification

The borrowing approvals (AAP) process was initiated with the project separated into multiple phases to continue to build trust with the public and demonstrate rigour to the PM framework/process. A comprehensive risk register, including a quantitative residual risk analysis may help bolster this objective and help frame future borrowing requests.
A few examples from another project of similar budget at a Class C order of magnitude are included here as an exhibit.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

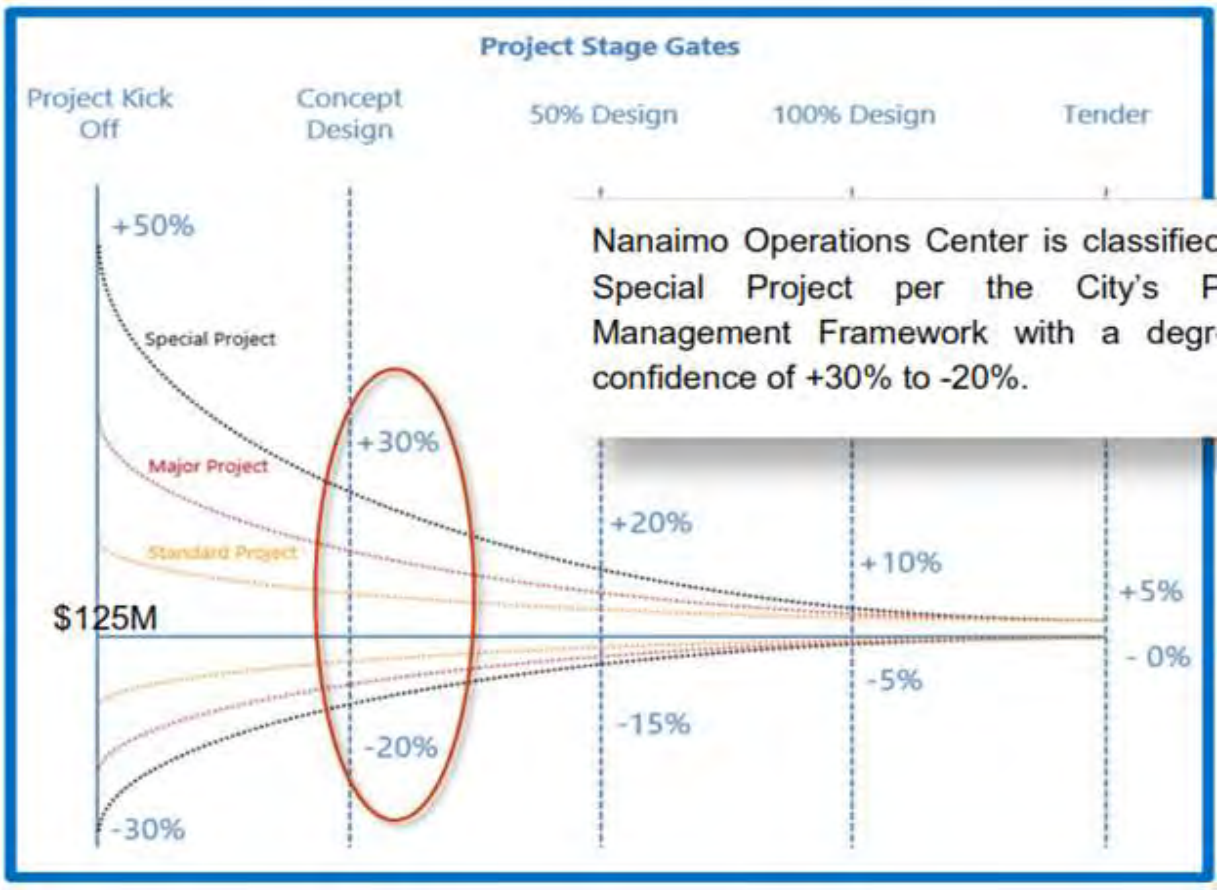
# Design Suggestion

**Title** **OC-04**

***RECALCULATE BUDGET CONTINGENCY***

## Exhibits - Original Concept





# Design Suggestion

**Title** **OC-04**

***RECALCULATE BUDGET CONTINGENCY***

## Exhibits - Alternative Concept



| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1. Economic and Financial** | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1 | Construction cost estimate uncertainty | Current Class C (+/-30%) from design/engineering consultants may result in actual costs exceeding the cost estimate. | **Scope:** Rescoping may be required.<br>**Time:** May result in delays due to rescoping or obtaining additional funding.<br>**Cost:** Potential increase in overall | Planning | | | | | | | Accept | Cost Estimate includes contingency to address risks that have been identified through an internal risk management review. | | | 20% | | 0 | | 6,000,000 | 1,200,000 | | Construction cost is ~$30M; assumed a scenario 20% over (based on Class C). |
| 1.2 | Construction cost estimates may be incorrect | Cost estimates may be incorrect and may not consider all the related costs. | **Scope:** Rescoping or re-tendering may be required.<br>**Time:** May result in delays due to rescoping or obtaining additional funding.<br>**Cost:** Potential increase in overall project costs. | Planning | | | | | | | Mitigate | Ongoing oversight, coordination and communication with the design/engineering consultants to review evolving estimate information and flag issues.<br><br>Option to also conduct market sounding to solicit input on attractive delivery methodology for qualified contractors to assess potential bidder alignment with estimate developed. | | | 20% | | 0 | | 10,000,000 | 2,000,000 | | Construction cost is ~$30M; assumed scenario is a 20% likelihood of incorrect estimating from consultant (i.e. 33% budget increase to the $30M base budget). |
| 1.3 | Escalation / Inflation costs | There may be risk due to insufficient cost escalation in the cost estimate. Unexpected inflation, commodity price changes, and other local and international economic effects can potentially impact the project as commodity escalation could impact cost of construction materials and consumables. | **Scope:** Rescoping may be required.<br>**Time:** May result in delays due to rescoping/retendering or obtaining additional funding.<br>**Cost:** Potential increase in overall project costs. | Planning | | | | | | | Mitigate | Fixed price equipment contracts will be pursued where possible and applicable;<br><br>$5.5M allowance for escalation is incorporated in estimate (captured within all of the 4 terminals).<br><br>Cost estimate is in 2021 $'s, with 2% escalation per year included EXCEPT for 2022 | | | 7% | | 0 | | 4,000,000 | 3,000,000 | | Construction market continues to be challenging in Metro Vancouver/Victoria, therefore high potential that inflationary pressures will continue to have a high probability of impacting the project costs.<br><br>Total Project Budget is ~$40M; assumed scenario is a 75% likelihood of a 10% budget increase beyond the base-budget escalation included at $5.5M. |

# Design Suggestion

**Title** **OC-09**

***REVISIT BUSINESS PROCESS/ MODEL FOR GREATER EFFICIENCY***

## Original Concept



Continue with status quo processes and models in the redeveloped NOC.

## Alternative Concept

Revise business processes to take advantage of the redeveloped NOC. These revised business processes would consider changes and benefits associated with new facilities, workflow, safe work practices, addition of parks and facilities staff, etc.

## Advantages

- improved efficiencies related to facility layouts, storage, etc.
- improved safety
- opportunity to rethink business models - centralized vs decentralized
- opportunity to modernize tools and equipment

## Disadvantages

- revised business process may be less efficient
- lack of staff buy-in for new business process

## Discussion / Justification

The redevelopment of the NOC presents an opportunity to revisit business processes and revise them to take advantage of facility and storage design, or other efficiencies. It also provides an opportunity for revised business processes to influence the facility design. Regardless, the facility design and operational business process are inherently linked.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **OC-09**

***REVISIT BUSINESS PROCESS/ MODEL FOR GREATER EFFICIENCY***

## Discussion / Justification



Several business processes are identified below that give examples of changes that might be beneficial and result in improved efficiencies or modernization.

-Under the current stores model, they charge out inventory items required for projects and by staff. If some of these items are not used and still in new condition, stores may take them back. However, if items are brought back in gently used condition, stores will not take them back. The department that has brought back the gently used item will then take this item to their own storage area and store it for use on another project. There is an opportunity to review this business process. For some items, it may be beneficial to take them back as long as there is an inspection process in place and the risk associated with reusing an item is low. In other cases, the lack of ability to complete an appropriate inspection and the risk of future failure may deem that the item should be disposed of. Regardless, under the current process, the items are being reused and for items that are being reused, it's recommended that they are taken back to stores. This will result in centralized storage of common items.
-the City of Surrey, has centralized their dispatch system and has screens with live GPS locations of vehicles and worksites. When crews request materials or equipment, the centralized dispatch model allows for optimization of how equipment is assigned and identifying the best method of delivering material based on current traffic conditions.
-There is potential for improvements in coordination among operational departments. The current process is that each department is assigned staff and vehicles/equipment and uses them when/where required with limited visibility of projects and other needs across the municipality. Supervisors talk to each other if they need something or to coordinate projects which works well, but doesn't always result in optimal assignment of equipment or resources. For example, assume that sewers, water, and roads each have a backhoe for a total of 3 backhoes and they each use their backhoes 3 days per week. In this case, 3 backhoes are used 3 days a week for a total of 9 days that backhoes are required. Improvements in coordination may allow for the reduction of equipment from 3 backhoes to 2 which have the ability to provide 10 days of work (2 backhoes x 5 days per week) which is still greater than the 9 days of work required. This is a hypothetical example but illustrates the concept and possible benefits that were discussed with operational management. A thorough review of the business process would identify specific and relevant opportunities.
-increasing the storage capacity of the NOC by using racking and storing items off the ground may increase the need for the use of a forklift. Revised safe work practices will likely be required. A review of business processes should identify numerous safe work practices that need to be updated to reflect the redeveloped NOC.

The above are just some examples of business process updates or improvements that might be beneficial with the revised NOC. By actively supporting this initiative, these business processes can be proactively identified and revised to better align with changing practices and NOC upgrades.

# Quantitative Value Alternative

**Title** **OC-11**

***DIVIDE THE PROJECT INTO TWO PHASES ONLY***

## Original Concept

**Page 1 of 6**

The original/existing concept is to deliver the NOC project in two phases and phase construction in the second phase across five construction phases.

## Alternative Concept

If NOC is delivered across five distinct phases each phase would be comprised of its own approximately similar sub-phases, which would be repeated five times:
~ Gain approval to initiate phase
~ Draft, approve, gain electoral approval for (AAP or Referendum), and adopt a Borrowing Bylaw
~ Detailed design

## Advantages

- Cost savings will be realised by running the sub-phases for the work concurrently instead of consecutively.
- Schedule savings will be realised by running the sub-phases for the work concurrently instead of consecutively.
- Less exposure to risk of voter fatigue or loss of political will over time which could end the project.
- ~ Increase staff morale, retention, and attraction.
- ~ Reduced disruption within the operations yard.
- ~ Ensures greater continuity between constructed elements.

## Disadvantages

- May require additional staffing or draw staffing/resources away from other City initiatives in order to accomplish.
- May encounter a greater degree of resistance and 'sticker shock' with the public or Council.
- Higher project risk and less opportunity to mitigate that risk or implement 'lessons learned' across phases.

## Discussion / Justification

Rapid inflation and associated escalation costs are a real threat to the success of the NOC project. These rapidly rising costs could result in eroding public confidence in the City's ability to deliver this project, decreased community belief that this project is worth the price to complete it, and a loss of political support. As well, by continuing to operate the current operations buildings, the City is spending a great deal of money on operating inefficient and unsuitable facilities while staff morale continues to diminish.

## Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 185,515,200 | $ | $ 185,515,200 |
| **Alternative Concept** | $ 101,795,600 | $ | $ 101,795,600 |
| **Difference** | **$ 83,719,600** | **$** | **$ 83,719,600** |

# Quantitative Value Alternative

**Title** **OC-11**

***DIVIDE THE PROJECT INTO TWO PHASES ONLY***

## Discussion / Justification



Reducing the project timeline and delivering the NOC project as expediently as possible is a potential cost savings for the City and will help support the City realising its operational and staff management goals in a more timely manner. Expanding the project to more individual phasing will expose the City to more risks and increase costs while lowering the level of benefits brought forward by this project. The decision to change the project delivery plan from two phases to five phases for the NOC project is a significant one, with profound implications for the project's timeline, budget, and overall success. This quantitative value alternative write-up explores the reasons why such a change can negatively affect the project and will discuss project management, construction efficiency, cost-effectiveness, and community impact to make a case for the advantages of condensing the project timeline.

**Expedited Completion**

One of the most prominent advantages of maintaining the delivery plan at two phases is the expedited completion of the project. Completing the NOC in a shorter timeframe allows the City to start realizing the benefits and operational advantages sooner. With fewer phases, the delivery timeline is significantly reduced because repetition of project sub-phases is eliminated. This not only accelerates the realization of operational benefits but can also provide a competitive hiring and retention advantage.

Cities are dynamic, constantly evolving entities, and there is often a pressing need for efficient facilities to support various municipal functions. By completing the operations yard in two phases, the City can meet its expanding operational needs faster, which, in turn, can improve public services and enhance overall community wellbeing.

Finally, throughout this project the City needs to continue to meet the operational needs of the community. By reducing the level of disruption within the operational yard crews will be better able to continue to meet these needs and less 'temporary inefficiencies' will be introduced. New contractors will not need to be 'trained' on how to work in/around our crews spaces through each phase and a greater degree of continuity and momentum can be achieved which will help drive the success of this project.

**Cost Savings**

Increasing the delivery timeline by changing from two phases to five phases can lead to substantial cost implications. In a construction project, time equates to money. A longer project delivery timeline means increased labor and material costs, equipment rental expenses, and other overheads that escalate over the duration of the project. By compressing the completion schedule, the City can significantly reduce these ongoing costs.

# Quantitative Value Alternative

**Title** **OC-11**

***DIVIDE THE PROJECT INTO TWO PHASES ONLY***

## Discussion / Justification (Continued)



Shorter projects reduce the financing costs associated with long-term projects. The City can save on interest payments and redirect those funds toward other essential municipal projects and services. With a constrained budget, saving on construction and financing costs can make a considerable difference in the overall financial health of the City. As well, the potential savings of the buying power present in delivering a large single second phase for the project rather than dividing that work across four phases are also significant.

As an estimate of the time savings between two and five phases, it is anticipated the following could be achieved:

1.5 years (assumed between 1 and 2 years running concurrently with 0.5 year project wrap-up activities) to gain approval to proceed per phase
0.25 years (assuming AAP to be conservative) to complete borrowing approval process per phase
0.5 year (assumed 1.5 years running concurrently with 12 months of permitting) of design per phase
1 year (assumed to run concurrently with 1.5 months of design) of permitting per phase0.25 years (assumed average) of construction procurement per phase
0.25 years (assumed average) of construction mobilization/demobilization, documentation, etc. per phase

Using these projections and multiplying across a reduction of three project phases gives us a potential time savings of 10.5 years.

Finally, there are the costs required costs required to gain approval for borrowing which can be eliminated. An AAP costs the City approximately $25,000 and a Referendum costs approximately $300,000. By eliminating three requests for borrowing the City would save between $75,000 and $900,000.

# Quantitative Value Alternative

**Title** **OC-11**

***DIVIDE THE PROJECT INTO TWO PHASES ONLY***

## Exhibits - Alternative Concept



| | | | 2 Phases | 5 phases | Diff. |
|---|---|---|---|---|---|
| 6 | | Project Cost: | $ 80,000,000 | $ 80,000,000 | |
| 7 | | Year Start: | 2024-Jan | 2024-Jan | |
| 8 | | Year End: | 2044-Dec | 2054-Jun | |
| 10 | Financing | | | | |
| 11 | | Construction Loan %: | 50.00% | 50.00% | |
| 12 | | Construction Loan: | $ 40,000,000 | $ 40,000,000 | |
| 14 | | No. of Years: | 20.0 | 30.5 | |
| 15 | | Annual Interest Rate: | 4.65% | 4.65% | |
| 16 | | **Interest:** | **$ 59,276,086** | **$ 119,995,065** | **$ 60,718,980** |
| 18 | Escalation | | | | |
| 19 | | Escalation Rate: | 4.00% | 4.00% | |
| 20 | | **Escalation to Mid-Pt:** | **$ 38,419,543** | **$ 65,495,115** | **$ 27,075,572** |
| 22 | | | | | 87,794,552 |

# Quantitative Value Alternative

**Title** **OC-11**

***DIVIDE THE PROJECT INTO TWO PHASES ONLY***

**Estimated Cost of Original Concept** **Page 5 of 6**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| AAPs (assumed instead of Ref.) | LS | 1 | $25,000.00 | $25,000 |
| Financing Costs | sum | 1 | $119,995,065.27 | $119,995,065 |
| Escalation Costs | sum | 1 | $65,495,114.72 | $65,495,115 |

| | | |
|---|---|---|
| **Subtotal:** | **$** | **185,515,180** |
| Project Markup: | $ | |
| **Total Cost (Rounded):** | **$** | **185,515,200** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| AAPs (assumed instead of Ref.) | LS | 4 | $25,000.00 | $100,000 |
| Est. costs due to tendering four smaller projects rather than a single larger project (5% of $80M) | LS | 1 | $4,000,000.00 | $4,000,000 |
| Financing Costs | sum | 1 | $59,276,085.60 | $59,276,086 |
| Escalation Costs | sum | 1 | $38,419,542.79 | $38,419,543 |

| | | |
|---|---|---|
| **Subtotal:** | **$** | **101,795,628** |
| Project Markup: | $ | |
| **Total Cost (Rounded):** | **$** | **101,795,600** |
| **Cost Difference:** | **$** | **83,719,600** |

# Quantitative Value Alternative

**Title** **OC-11**

***DIVIDE THE PROJECT INTO TWO PHASES ONLY***

## Life Cycle Cost Estimate



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Discount Rate** | **0.65%** | **Net** | | **Original Concept** | | **Alternative Concept** | |
| **Life Cycle Period** | **20** | **Years** | | | | | |
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 185,515,200 | 185,515,200 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 101,795,600 | 101,795,600 |
| | | | **Total Initial Costs** | | **$ 185,515,200** | | **$ 101,795,600** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 83,719,600** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| | | | | 520,000 | | | |
| | | | **Total Annual Costs (Present Worth)** | | **$ -** | | **$ -** |
| **Life Cycle Cost Summary** | | | | | **Present Worth (PW)** | | **Present Worth (PW)** |
| Subtotal Replacement / Salvage + Annual Costs | | | | | $ - | | $ - |
| | | | **Difference (Compared to Original)** | | | | - |
| Total Life Cycle Costs (Present Worth) | | | | | $ 185,515,200 | | $ 101,795,600 |
| | | | **Life Cycle Difference (Compared to Original)** | | | | **$ 83,719,600** |
| | | | **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 9,921,816** | **Per Year:** | **$ 5,444,283** |

# Quantitative Value Alternative

## Title OC-12

***INTRODUCE SATELLITE OWC (SANDSTONE)***

### Original Concept



At this time no original concept has been developed.

### Alternative Concept

A need for a satellite yard on the south end of the city will provide a more efficient means to service the operational and maintenance needs of the South Nanaimo / Extension / Cinnabar and Duke Point Area in future as required based on development in the next 20-50 years.

### Advantages

- Provides post disaster / redundant public works yard
- Reduces travel time for certain operations and provides efficiencies for future development

### Disadvantages

- Additional capital costs
- Potential land purchase

### Discussion / Justification

Having a Satellite Public Works Yard will not lessen the current storage constraints at 2020 Labieux Road but will provide future redundancy and operational efficiency to the south end of Nanaimo. It would be recommended to situate the site on current City owned land and phase the project site in as operational needs grow with development.

### Cost Summary

| | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ 1,956,300 | $ 162,800 | $ 2,119,100 |
| **Alternative Concept** | $ 12,500 | $ | $ 12,500 |
| **Difference** | **$ 1,943,800** | **$ 162,800** | **$ 2,106,600** |

# Quantitative Value Alternative

## Title OC-12

***INTRODUCE SATELLITE OWC (SANDSTONE)***

### Exhibits - Alternative Concept



**Areas:**

| Location | City Owned | Power | Services | Comments |
|---|---|---|---|---|
| Extension Reservoir Site | Yes | Yes | No | Requires Septic |
| Extension Old Water Process Center | Yes | Yes | No | Requires Septic |
| Duke Point Reservoir – Pump Station | Yes | Yes | No | Requires Septic |
| Sandstone Development | No | No | No | Requires land and services – acquired through development |
| Nanaimo River Road Pit | Yes | No | No | Outside City Boundary – no services |

# Quantitative Value Alternative

**Title** **OC-12**

***INTRODUCE SATELLITE OWC (SANDSTONE)***

**Exhibits - Alternative Concept** **Page 3 of 5**

**Needs:**

- Small heated building (1,200 square feet) / indoor and outdoor storage
- Parking for outside and inside covered vehicles – Garbage Truck / Sweeper
- EV Plug-in
- Washroom / sewer – septic field
- Fenced compound
- Power
- Communication (Radio / Phone / SCADA – Alarming)
- Fill Materials Bins
- Covered Salt Bins
- Clean Team Storage
- Emergency Supplies / Storage
- Security – lighting and CCTV

**Minimum Required Lot Size:**

- 1 acre (4,100 $m^2$)

# Quantitative Value Alternative

**Title** **OC-12**

***INTRODUCE SATELLITE OWC (SANDSTONE)***

**Estimated Cost of Original Concept** **Page 4 of 5**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Land | | 1 | $750,000.00 | $750,000 |
| Building | | 1 | $600,000.00 | $600,000 |
| Site Preparation | | 1 | $40,000.00 | $40,000 |
| Outdoor Shelter | | 1 | $50,000.00 | $50,000 |
| Material Bins | | 1 | $30,000.00 | $30,000 |
| Salt Shed | | 1 | $60,000.00 | $60,000 |
| Servicing | | 1 | $15,000.00 | $15,000 |
| Fencing / Lighting Security | | 1 | $20,000.00 | $20,000 |
| | | | **Subtotal:** | **$ 1,565,000** |
| | | 25.0% | Project Markup: | $ 391,250 |
| | | | **Total Cost (Rounded):** | **$ 1,956,300** |

**Estimated Cost of Alternative Concept Proposed**

| Description | Unit | Quantity | Unit Cost | Total |
|---|---|---|---|---|
| Outside Storage Racking | 1 | 1 | $10,000.00 | $10,000 |
| | | | **Subtotal:** | **$ 10,000** |
| | | 25.0% | Project Markup: | $ 2,500 |
| | | | **Total Cost (Rounded):** | **$ 12,500** |
| | | | **Cost Difference:** | **$ 1,943,800** |

# Quantitative Value Alternative

**Title** **OC-12**

***INTRODUCE SATELLITE OWC (SANDSTONE)***

## Life Cycle Cost Estimate



**Discount Rate** 5.00% Net
**Life Cycle Period** 50 Years

| | | | | Original Concept | | Alternative Concept | |
|---|---|---|---|---|---|---|---|
| **First Costs** | | | | **Estimated First Costs** | **Present Worth (PW)** | **Estimated First Costs** | **Present Worth (PW)** |
| Original Concept (from First Costs Worksheet) | | | | 1,956,300 | 1,956,300 | | |
| Alternative Concept (from First Costs Worksheet) | | | | | | 12,500 | 12,500 |
| | | | **Total Initial Costs** | | **$ 1,956,300** | | **$ 12,500** |
| | | | **Difference (Compared to Original Concept)** | | | | **$ 1,943,800** |
| **Replacement / Salvage Value** | **Occurrence Yr - or-Cycle** | **Inflat. Rate** | **PW Factor** | **Estimated Replacement Costs** | **PW Replacement Costs** | **Estimated Replacement Costs** | **PW Replacement Costs** |
| | | | **Total Replacement/Salvage Costs** | | **$ -** | | **$ -** |
| **Annual Costs** | | **Inflat. Rate** | **PWA Factor** | **Estimated Annual Costs** | **PW Annual Costs** | **Estimated Annual Costs** | **PW Annual Costs** |
| O=M | | | 18.256 | 8,919 | 162,819 | | |
| | | | **Total Annual Costs (Present Worth)** | | **$ 162,800** | | **$ -** |

| **Life Cycle Cost Summary** | | **Present Worth (PW)** | | **Present Worth (PW)** |
|---|---|---|---|---|
| Subtotal Replacement / Salvage + Annual Costs | | $ 162,800 | | $ - |
| **Difference (Compared to Original)** | | | | **162,800** |
| Total Life Cycle Costs (Present Worth) | | $ 2,119,100 | | $ 12,500 |
| **Life Cycle Difference (Compared to Original)** | | | | **$ 2,106,600** |
| **Total Life Cycle Costs (Annualized)** | **Per Year:** | **$ 116,077** | **Per Year:** | **$ 685** |

# Design Suggestion

**Title** **OC-13**

***CONSIDER STAGING AREAS FOR CONSTRUCTION AND EQUIPMENTS***

## Original Concept



This speaks to the provision of areas specific for the following:
1. crews to make pre-operation preparations
2. crews to pre-assemble materials in a controlled environment before delivering to site
3. to test equipment (specifically line painting was highlighted)

The original concept has provided a "Purpose-Built Storage Building" (Mater Plan pages 66 to 68) which provides "crew specific" areas for parts and tools that are not held in stores and are specific to their operations. It also provides a "Common Maintenance Shop". These facilities are enclosed and heated.

## Alternative Concept

The current concept effectively addresses these operational requirements with the exception of a specific area for testing the line painting.

1. A specific "strip" of gravel area should be identified for line paint line testing. This can be established with no cost impact.
2. The layout of the "Purpose-Built Storage Building" should be established to ensure movement of larger assemblies (valve clusters etc.) Current layout appears adequate however access to the "Common Maintenance Shop" should be confirmed.

## Advantages

## Disadvantages

## Discussion / Justification

This Concept has already been dealt with in the existing design. **Does not require any additional investigation at this time.**

| Cost Summary | Initial Costs | O&M Cost | Life Cycle Cost |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **OC-15**

***RIGHTSIZING THE FLEET MAINTENANCE BLDG.***

## Original Concept



The original concept has 7 high head repair bays and 3 light duty repair bays as per the drawing shown in this document.

## Alternative Concept

A review of the number and size of the repair bays in the fleet maintenance facility has been undertaken.

## Advantages

- Ensure appropriate design and sizing of the building for its primary purpose of repairing vehicles.

## Disadvantages

- None

## Discussion / Justification

There were some concerns that the fleet maintenance building is oversized. The review is to understand if the number of maintenance bays can be reduced or whether they are appropriate.

## Design Suggestion

| | | | |
|---|---|---|---|
| **Original Concept** | $ | $ | $ |
| **Alternative Concept** | $ | $ | $ |
| **Difference** | **$** | **$** | **$** |

# Design Suggestion

**Title** **OC-15**

***RIGHTSIZING THE FLEET MAINTENANCE BLDG.***

## Discussion / Justification



The fleet maintenance facility conceptual design is shown on the next page and includes 7 high head repair bays, and 3 light duty repair bays to support a fleet of approximately 200 vehicles. The 200 vehicles consist of fire and municipal fleet broadly categorized as follows:

-passenger cars
-pickup trucks
-vans
-Medium-duty work trucks (dump trucks, snow plows, service trucks, etc.)
-garbage trucks
-heavy-duty dump trucks
-Aerial trucks
-Hydro excavators
-fire trucks (ladders, pumpers, water tenders, etc.)
-equipment (backhoes/excavators/skid steers/etc.)
-other (rollers, paving machines, etc.)

These vehicles range in size from approximately 20 feet long to approximately 60 feet long for the largest fire truck. Most heavy duty trucks including the garbage trucks, dump trucks and other fire trucks are approximately 40 feet long. The high head bays are sized at 62 feet long, which will just barely accommodate the fire truck. While a 62 foot long bay is a bit large for a 40 foot truck, the Architects have indicated that the cost to build a few bays at 62 feet and a few bays that are shorter (50 feet) is nominal. The longer bays will allow for some additional storage of equipment that is used by mechanics, and required within close proximity of a repair bay, such as portable hoists, tool boxes, workbenches, etc. The ratio of high head to light duty repair bays is approximately correct based on typical allocation of maintenance and repairs on a mixed municipal fleet. Large vehicles with complex bodies, such as garbage trucks, require substantially more staff time and shop space to repair.

In order to maintain and repair these vehicles, there are currently 8 technicians that regularly work in repair bays, with an additional 2 planned to be added in 2024. These technicians work various shifts between 6 am and 5:30 pm Monday to Friday. As these shifts all have substantial overlap, it is modelled that all technicians work the same shift.

# Design Suggestion

**Title** **OC-15**

***RIGHTSIZING THE FLEET MAINTENANCE BLDG.***

## Discussion / Justification (Continued)



In a fleet maintenance facility, the optimal design is for more than one repair bay per mechanic per shift. Examples that illustrate this design criteria include:
-It's common for vehicles to be disassembled and sometimes inoperable for several days while waiting for a part, undergoing a complex repair, undergoing complex diagnostics or for some other reason. The vehicle will then take up a repair bay for this period of time and not always have a technician working on it. The technician may be working on a different vehicle in another repair bay.
-In other circumstances, a technician will be completing a regular service such as an oil change, brake job, or other common repair. These repairs can take several hours to 2 days. While this vehicle is undergoing service, it's inoperable, and the technician may be required to have a quick look at another vehicle that an operator has brought in with a suspected defect. This vehicle may need to be brought into a repair bay for the use of a hoist or other shop equipment. While the repair of this defect can take 15-30 minutes, a repair bay is still required for this repair.

In order to determine the exact number of bays per technician per shift, a thorough operational review would be required. However, without a thorough operational review, a generally accepted standard is 1.5 bays per technician per shift. Based on 10 technicians, a single shift and the current design of 10 repair bays, the fleet maintenance facility has a ratio of 1 bays per mechanic per shift which indicates that it may be undersized. Even though this ratio suggests it may be undersized, operational methods of optimizing the use of the bays, such as vacation scheduling, implementing two separate shifts, highly optimized planned maintenance, etc. may be used, which can drastically change the ratio.

When designing a maintenance facility for the next 50 years, future vehicle technologies also need to be considered to estimate potential facility needs or design impacts. For municipal return-to-base fleets, battery electric vehicles are currently the most mature technology for zero-emission vehicles and they are well suited to the return-to-base nature of a municipal fleet. Battery electric vehicles also have lower maintenance costs. For light-duty vehicles (cars, pickup trucks, vans, SUVs) costs are well documented to be approximately 40-60% of a comparable gasoline or diesel. These cost reductions include both parts and labour. For heavy-duty vehicles such as dump trucks, garbage trucks, etc., there are limited maintenance cost trends available as the technology is still very new. It would be realistic to assume a conservative cost of 60% of comparable diesel chassis. While there are projected to be cost and labour savings on the chassis, it's important to note that the vehicle is comprised of a chassis and body. For the body, there is not expected to be significant maintenance savings even if the chassis is electric. Examples of bodies include the garbage truck arm/packer, dump truck box, fire truck apparatus, etc.

# Design Suggestion

**Title** **OC-15**

***RIGHTSIZING THE FLEET MAINTENANCE BLDG.***

## Discussion / Justification (Continued)



Further breaking down the estimated maintenance costs, there is a split between parts and labour. A 50/50 split of parts and labour is a realistic, generalized estimate. With a 50/50 split, this means the maintenance costs for battery electric of 60% of gasoline/diesel would still require 80% labour and 80% parts. With this rationalization, it can be concluded that a good estimate of technician requirements when the fleet is 100% electric is 80% of today's technician needs. The space needs for the fleet maintenance facility is directly tied to the staffing needs which would suggest that there is a potential that the future repair bay space needs are 80% of today's needs. There are two important considerations with regard to the 80% space needs though, this does not account for future fleet growth and the realistic timeframe for a 100% electric fleet is likely 2045-2050. Considering the current ratio of 1 for bays per technician per shift, and the timeline to a 100% fleet, its likely not realistic to assume that reduced maintenance associated with electric vehicles will result in a reduced need for repair bays.

While there are likely some opportunities to reduce the footprint of the fleet maintenance facility by optimizing the layout and reviewing the size of some of the repair bays, welding bay, and storage areas, the small reduction in facility footprint that might be realized is not likely to result in any meaningful cost savings. The real opportunity for reducing the footprint in a meaningful manner would be to operate 2 shifts for technicians. However, this will pose challenges for staff hiring, retention, morale, and is currently not an option in the collective agreement.

# Design Suggestion

**Title** **OC-15**

***RIGHTSIZING THE FLEET MAINTENANCE BLDG.***

## Exhibits - Original Concept



# Appendix B

## Function Analysis Systems Technique (FAST) Diagram

# Appendix B: FAST Diagram

The Function Analysis Systems Technique (FAST) Diagram that follows documents the results of the function analysis performed for the Nanaimo Operations Centre (NOC), the City of Nanaimo, BC. Function analysis helps the VM Team understand the relationships of the functions to one another, and how they work together to satisfy the requirements of the Program/ Project. A FAST diagram graphically illustrates the interrelationships of the Program functions and is often invaluable in accomplishing this understanding.

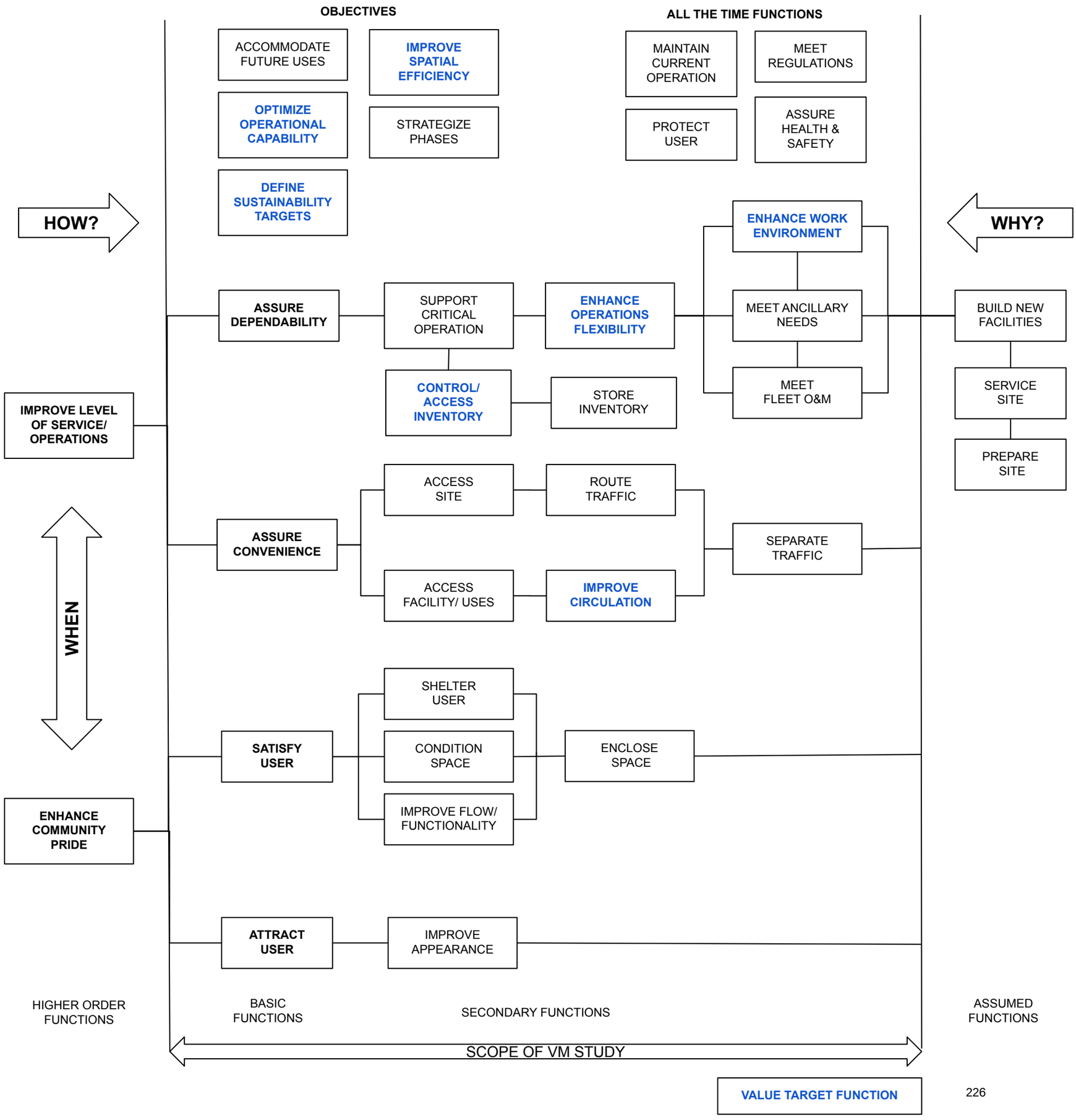
Guidelines for arranging functions logically into a FAST diagram are included below to assist the reader in understanding the FAST diagram which follows.

1. Two vertical dashed lines, known as Scope Lines, define the scope of the initiative and the VM Study. The scope lines are usually near the left and right margins.
2. The FAST diagram has a "critical path of functions" going from left to right across the scope lines. A bold line represents the critical path.
3. The critical path contains only the basic function(s) (immediately to right of left scope line) and required secondary functions. Higher order functions (related goals beyond the scope of the VM Study) are sometimes included on the critical path, left of the basic function(s). The critical path can have parallel branches.
4. Required secondary functions are to the right of the basic function.
5. All other secondary functions, which can be supporting functions, aesthetic functions or unwanted functions, are either above or below the critical path.
6. Functions that "happen at the same time" and/or "are caused by" a function on the critical path are placed below the related critical path function.
7. Functions which happen "all the time", such as an aesthetic function, are placed above the critical path function to the extreme right of the diagram.
8. Specific "design objectives" are placed above the basic function to the extreme left.
9. Proper arrangement and relationships of the functions in the FAST diagram can be confirmed with the how-why logic test as follows:
    a. Ask the question of any function, "How do I verb-noun?" The answer should be the function to the immediate right.
    b. Ask the question "Why do I verb-noun?" The answer should be the function to the immediate left i.e., "So that I can verb-noun."
    c. A function that does not pass the how-why test is either described improperly or is in the wrong place. The answer must make sense.
10. Our prime concern when constructing a FAST diagram is the essential functions. All functions on the critical path must occur to accomplish the basic function. All other functions on the FAST diagram are subordinate to the critical path function and may or may not have to take place to accomplish the basic functions. These functions are often the source for VM targets and resulting cost avoidance or deferral.

The FAST diagram for the Nanaimo Operations Centre (NOC) Master Plan, the City of Nanaimo, BC is presented on the following page.

# NANAIMO OPERATIONS CENTRE (NOC) MASTER PLAN

## FAST (FUNCTION ANALYSIS SYSTEMS TECHNIQUE) DIAGRAM

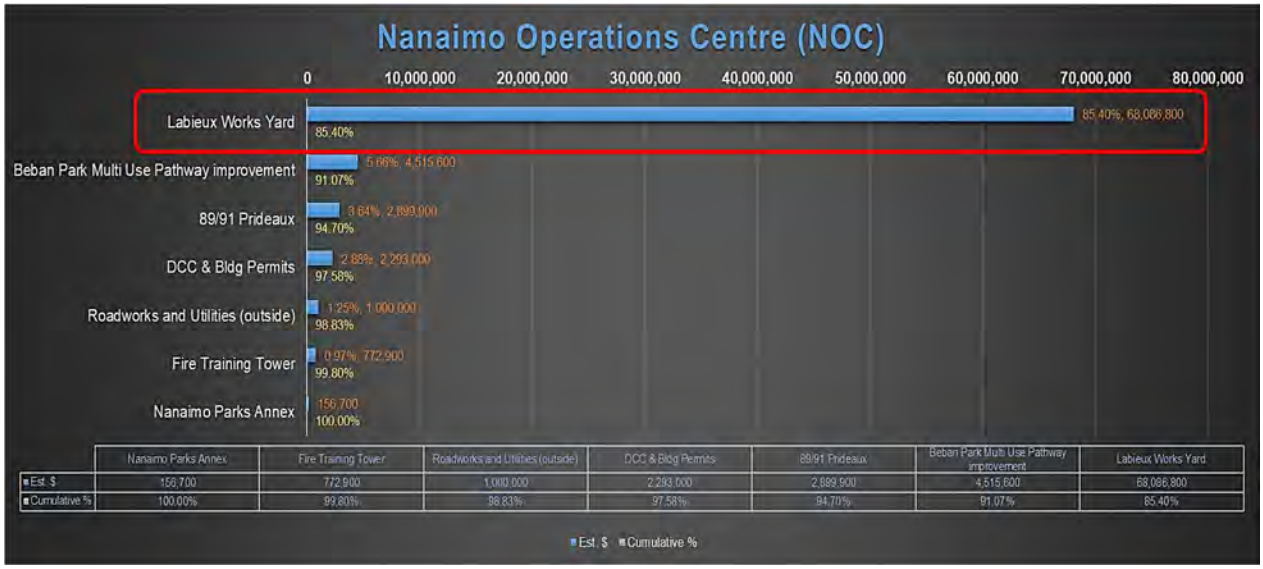


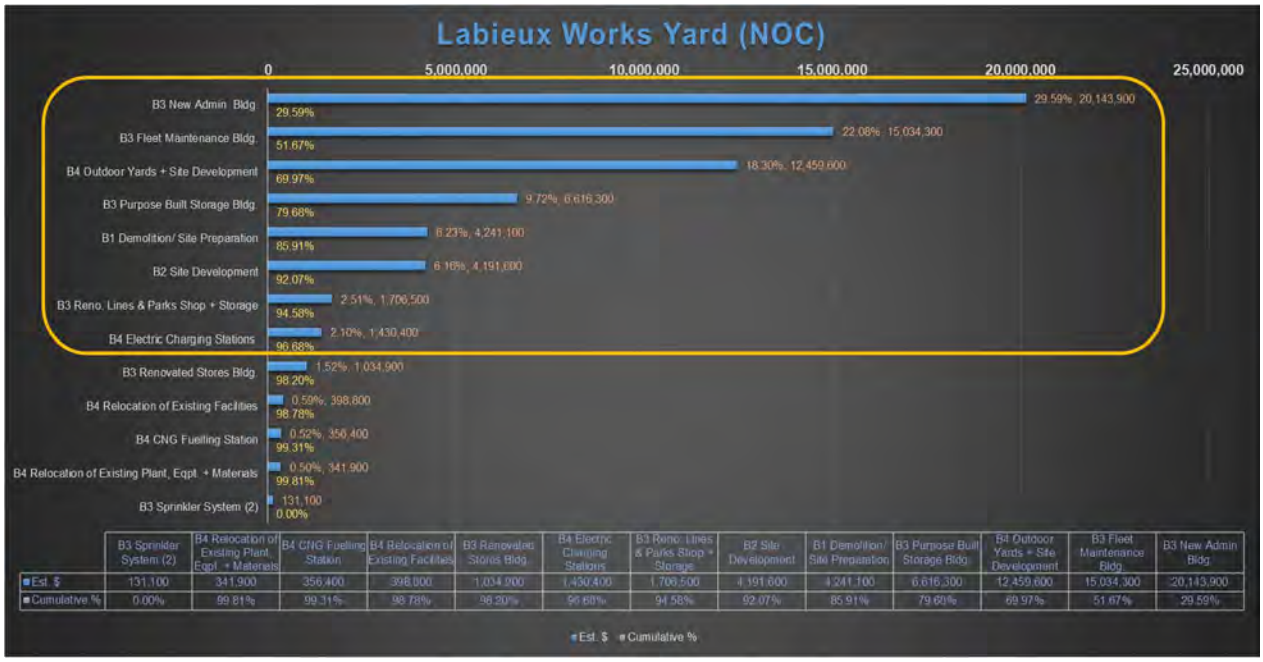
| RANDOM FUNCTION ANALYSIS | WHAT DOES IT DO? |
|---|---|
| AREA OF INTEREST/ ASPECT | ACTIVE VERB --- MEASURABLE NOUN |
| SITE MASTER PLAN | FUTUREPROOF DECISION |
| | OPTIMIZE LAYOUT |
| | ENSURE AGREEMENT |
| | DEVELOPMENT FRAMEWORK |
| | DEFINE FUTURE |
| | COMMUNICATE DECISION |
| ADMIN BLDG | SUPPORT OPS |
| | COORDINATE OPS |
| | SHELTER STAFF |
| | PROTECT STAFF |
| | IMPROVE EFFICIENCY |
| | INTERFACE COMMUNITY |
| | HOST EOC |
| FLEET MAINTENANCE BLDG | REPAIR FLEET |
| | MAINTAIN FLEET |
| | SUSTAIN FLEET |
| | ENHANCE EFFICIENCY |
| | PROTECT/ SHELTER STAFF |
| | STORE MATERIALS |
| | ENSURE OH&S |
| | RECORD DATA |
| | ENHANCE PUBLIC SAFETY |
| OUTDOOR YARDS | GAIN ACCESS |
| | FACILITATE CIRCULATION |
| | STORE/ ACCESS MATERIALS |
| | STORE/ ACCESS VEHICLES |
| | STORE/ ACCESS EQUIPMENT |
| | CLEAN VEHICLE |
| | DISPOSE REFUSE |
| SITE DEVELOPMENT | MANAGE RUN-OFF |
| | SEPARATE CONTAMINANTS |
| | IMPROVE SERVICES |
| | REORGANIZE SERVICES |
| | SUPPORT CIRCULATION |
| | ENERGIZE EQUIPMENT |
| | SCREEN O&M |
| | ENHANCE APPEARANCE |
| | SECURE APPROVAL |

| RANDOM FUNCTION ANALYSIS | WHAT DOES IT DO? |
|---|---|
| AREA OF INTEREST/ ASPECT | ACTIVE VERB --- MEASURABLE NOUN |
| SITE PREPARATION | STAGE WORK/ CONSTRUCTION |
| | RELOCATE BOUNDARIES |
| | INCREASE USEABLE AREA |
| | ENHANCE OH&S |
| RENO. LINES, PARKS SHOP + STORAGE | RELOCATE OPERATIONS |
| | ENHANCE SAFETY |
| | SHELTER STAFF |
| | ADAPT WORKSPACE |
| | STORE MATERIALS + EQUIPMENTS |
| ELECTRIC CHARGING STATIONS | ENERGIZE VEHICLES |
| | REDUCE GHG |
| | IMPROVE EFFICIENCY |
| | STORE VEHICLE |
| | ADD CONVENIENCE |

# Appendix C

## Pareto Distribution of Capital Investments


Nanaimo Operations Centre (NOC)
0
10,000,000
20,000,000
30,000,000
40,000,000
50,000,000
60,000,000
70,000,000
80,000,000
Labieux Works Yard
85.40%
85.40%, 68,086,800
Beban Park Multi Use Pathway improvement
5.66%, 4,515,600
91.07%
89/91 Prideaux
3.64%, 2,899,900
94.70%
DCC & Bldg Permits
2.88%, 2,293,000
97.58%
Roadworks and Utilities (outside)
1.25%, 1,000,000
98.83%
Fire Training Tower
0.97%, 772,900
99.80%
Nanaimo Parks Annex
156,700
100.00%
Nanaimo Parks Annex
Fire Training Tower
Roadworks and Utilities (outside)
DCC & Bldg Permits
89/91 Prideaux
Beban Park Multi Use Pathway improvement
Labieux Works Yard
Est. $
156,700
772,900
1,000,000
2,293,000
2,899,900
4,515,600
68,086,800
Cumulative %
100.00%
99.80%
98.83%
97.58%
94.70%
91.07%
85.40%
Est. $
Cumulative %


Labieux Works Yard (NOC)
0
5,000,000
10,000,000
15,000,000
20,000,000
25,000,000
B3 New Admin. Bldg.
29.59%
29.59%, 20,143,900
B3 Fleet Maintenance Bldg.
51.67%
22.08%, 15,034,300
B4 Outdoor Yards + Site Development
69.97%
18.30%, 12,459,600
B3 Purpose Built Storage Bldg.
79.68%
9.72%, 6,616,300
B1 Demolition/ Site Preparation
85.91%
6.23%, 4,241,100
B2 Site Development
92.07%
6.16%, 4,191,600
B3 Reno. Lines & Parks Shop + Storage
94.58%
2.51%, 1,706,500
B4 Electric Charging Stations
96.68%
2.10%, 1,430,400
B3 Renovated Stores Bldg.
98.20%
1.52%, 1,034,900
B4 Relocation of Existing Facilities
98.78%
0.59%, 398,800
B4 CNG Fueling Station
99.31%
0.52%, 356,400
B4 Relocation of Existing Plant, Eqpt. + Materials
99.81%
0.50%, 341,900
B3 Sprinkler System (2)
0.00%
131,100
B3 Sprinkler System (2)
B4 Relocation of Existing Plant, Eqpt. + Materials
B4 CNG Fueling Station
B4 Relocation of Existing Facilities
B3 Renovated Stores Bldg.
B4 Electric Charging Stations
B3 Reno. Lines & Parks Shop + Storage
B2 Site Development
B1 Demolition/ Site Preparation
B3 Purpose Built Storage Bldg.
B4 Outdoor Yards + Site Development
B3 Fleet Maintenance Bldg.
B3 New Admin Bldg.
Est. $
131,100
341,900
356,400
398,800
1,034,900
1,430,400
1,706,500
4,191,600
4,241,100
6,616,300
12,459,600
15,034,300
20,143,900
Cumulative %
0.00%
99.81%
99.31%
98.78%
98.20%
96.68%
94.58%
92.07%
85.91%
79.68%
69.97%
51.67%
29.59%
Est. $
Cumulative %

# Appendix D
## List of Creative Ideas with Evaluation Score and Action

# List of Creative Ideas

| Alter. No. | Creative Idea Description | Rank | Action | Grouped With | Comments / Notes |
|---|---|---|---|---|---|
| **CI-00** | **CONTROL/ ACCESS INVENTORY** | #T | #T | | |
| CI-01 | ENSURE SECURITY OF ACCESS POINT/S USING TECHNOLOGY | 9 | G | CI-02 | e.g. CCTV, INCL. STORAGE AREAS |
| CI-02 | DEVELOP CONTROL STRATEGY FOR STORES | 10 | A | | |
| CI-03 | INTRODUCE PROPER SCALE RIGHT AT THE ENTRANCE OF STORAGE | 9 | G | CI-02 | |
| CI-04 | USE FABRIC STRUCTURE FOR MULTIPURPOSE STORAGE | 5 | X | | |
| **DT-00** | **DEFINE SUSTAINABILITY TARGETS** | #T | #T | | |
| DT-01 | INSTALL SEPARATE STORM SYSTEMS | 5 | ABD | | FLOW DETENTION; ADDITIONAL |
| DT-02 | DEVELOP A WORKABLE LEED STRATEGY, CONSIDER LEED SILVER (OUTSIDE OF BLDGS.) | 10 | A | | DT-05 TO 09 GROUPED HERE |
| DT-03 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO | 8 | A | | |
| DT-04 | INTRODUCE INFRASTRUCTURE TO SUPPORT PV CELLS | 8 | G | DT-02 | EF-09 MAY BE LINKED |
| DT-05 | DEFINE THE AREAS FOR LEED POINTS | 9 | G | DT-02 | STORMWATER, PARKLAND |
| DT-06 | RESTRICT LEED TO A SPECIFIC BLDG. | 9 | G | DT-02 | |
| DT-07 | CONSIDER PASSIVE HOUSE AND NET ZERO BLDG FOR THE ADMIN FACILITY | 9 | G | DT-02 | |
| DT-08 | CONSIDER NET ZERO FACILITY | 9 | G | DT-02 | |
| DT-09 | CONSIDER ESTABLISHING FACILITY SPECIFIC SUSTAINABILITY TARGETS | 9 | G | DT-02 | |
| DT-10 | INTRODUCE ON-DEMAND HOT WATER SYSTEM IN FLEET FOR SNOW AND ICE | 7 | X | | |
| DT-11 | RECOVER HEAT FROM SEWAGE SYSTEM | 5 | X | | |
| DT-12 | MINIMIZE PAVED SURFACES | 5 | X | | PARKING, MULTIUSE PATH |
| DT-13 | REUSE STORMWATER FOR WASHBAY | 5 | X | | |
| DT-14 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 2.0 | 10 | A | | |
| DT-15 | ANALYZE COST-BENEFIT TO UPGRADING VS DEMO (DT-03) 3.0 | 10 | A | | |
| **EE-00** | **ENHANCE WORK ENVIRONMENT** | #T | #T | | |
| EE-01 | ZONE THE LOCKERS SPACES INTO CLEAN AND DIRTY | 7 | ABD | | IN FUTURE DETAILED DESIGN |
| EE-02 | INTRODUCE DIRECT ACCESS TO LOCKER AREA FROM MUDROOM | 7 | ABD | | |
| EE-03 | SEPARATE SPACES FOR SEWER AND WATER CREWS | 7 | ABD | | |
| EE-04 | INTRODUCE FULL LOCKER FACILITY INTO PHASE 1 | 5 | X | | |
| EE-05 | MOVE GARBAGE TRUCK WASHOUT OFF SITE | 10 | ABD | | |
| EE-06 | ELIMINATE METAL SIDINGS AND INCLUDE A ROBUST SURFACE BELOW 2.4 M HEIGHT | 8 | A | | |
| EE-07 | INCLUDE PROTECTED PEDESTRIAN WALKWAYS | 7 | X | | |

# List of Creative Ideas

| Alter. No. | Creative Idea Description | Rank | Action | Grouped With | Comments / Notes |
|---|---|---|---|---|---|
| EE-08 | ADD STAFF TRAINING AND CHANGE | 8 | DS | | LIVING O&M DOCUMENT |
| EE-09 | INCREASE PRIVATE WORKSPACES VS SHARED WORKSPACES | 7 | ABD | | INTERIOR SPACE STANDARDS |
| EE-10 | GIVE FLEET MANAGER A **CHALLENGE** | 3 | X | | |
| EE-11 | REDUCE HARDSCAPE AND MORE | 7 | X | | |
| EE-12 | INTRODUCE HOT SEATING FOR HYBRID WORKERS | 7 | X | | |
| EE-13 | ELEIMINATE OIL PITS IN FLEET MAINTENANCE | 3 | X | | |
| EE-14 | INTRODUCE DAY CARE ON SITE | 2 | X | | |
| EE-15 | ADD A GYM TO THE FACILITY | 6 | ABD | | |
| EE-16 | CO-LOCATE SIMILAR OPERATIONS FUNCTIONS | 8 | G | IE-41 | EXPLORE SYNERGIES |
| EE-17 | DESIGN FOR MAXIMIZING NATURAL LIGHT | 8 | ABD | | |
| EE-18 | INTRODUCE LANDSCAPING WITHIN THE PARKING AREAS | 7 | X | | REDUCES HEAT ISLAND EFFECT |
| EE-19 | INTRODUCE MASSTIMBER FOR FACILITIES | 7 | X | | |
| EE-20 | OBTAIN VARIANCES ON ZONING FOR THE SITE USAGE | 8 | G | IE-40 | |
| **EF-00** | **ENHANCE OPERATIONS FLEXIBILITY** | #T | #T | | |
| EF-01 | CONSIDER TRAFFIC PROVING WITHIN THE | 8 | G | IE-41 | |
| EF-02 | COMBINE PURPOSE BUILT STORAGE BUILDING WITH ADMINISTRATIVE BUILDING | 8 | A | | |
| EF-03 | DEMOLISH PARKS STORAGE BLDG. | 8 | G | DT-03 | TRUCK BARN |
| EF-04 | LONG SPAN BEAMS IN ADMIN BLDG FOR | 8 | A | | |
| EF-05 | CONSIDER POOLED ADMIN STAFF AMONGST PARKS (INCL. FACILITY OPS), | 8 | A | | |
| EF-06 | STAGGER START TIME FOR STAFF | 8 | G | EF-05 | |
| EF-07 | COMBINE LINES PARKSHOP WITH FLEET | 8 | G | IE-41 | WORK WITH BRANDON MILLER |
| EF-08 | ADD EV CHARGING IN THE SHOP | 5 | X | | |
| EF-09 | INTRODUCE INFRASTRUCTURE TO SUPPORT BATTERY ENERGY STORAGE | 8 | A | | |
| EF-10 | INCORPORATE MARKET HOUSING WITHIN | 2 | X | | |
| EF-11 | RE-EVALUATE PROJECT DELIVERY METHOD | 8 | DS | | |
| EF-12 | DEMOLISH EXISTING STORES AND REPLACE WITH NEW FACILITY | 8 | G | DT-03 | |
| EF-13 | INCORPORATE COMMUNICATIONS TOWER WITHIN THE PLAN | 5 | X | | GENERATES REVENUE |
| EF-14 | ADD OFFICES TO THE FLEET MAINTENANCE FACILITY BEYOND INTIAL PROGRAM | 8 | A | | |
| EF-15 | IDENTIFY EMERGENCY RESPONSE AREA | 7 | ABD | | BACKUP EOC |
| EF-16 | BUILD/PLAN FACILITIES AROUND THE PERIMETER TO FREE UP CENTRAL AREA | 8 | G | IE-41 | |
| EF-17 | REEVALUATE STRATEGIC GROWTH TO REFLECT WITHIN THE MASTER PLAN OF NOC | 9 | DS | | |

# List of Creative Ideas

| Alter. No. | Creative Idea Description | Rank | Action | Grouped With | Comments / Notes |
|---|---|---|---|---|---|
| EF-18 | REGULARIZE STRUCTURAL BAYS IN THE | 8 | DS | | |
| **IC-00** | **IMPROVE CIRCULATION** | #T | | | |
| IC-01 | CONSIDER SAWTOOTH PARKING | 8 | G | IC-13 | |
| IC-02 | ELIMINATE THE SCALE | 8 | G | CI-02 | |
| IC-03 | CONSIDER SAWTOOTH FOR AGGREAGTE STORAGE | 8 | G | IC-13 | |
| IC-04 | COVERED STORAGE IN LIEU OF ENCLOSED | 8 | A | | |
| IC-05 | INCLUDE LABIEAUX ROAD AS PART OF THE SITE CIRCULATION | 8 | G | IC-13 | |
| IC-06 | CONSIDER A SINGLE POINT OF ENTRY TO | 8 | G | IC-13 | |
| IC-07 | MOVE HV TRUCK DUMP FACILITY OFF SITE | 8 | A | | |
| IC-08 | MOVE SITE CIRCULATION ADJACENT TO LABIEAUX RD | 8 | G | IC-13 | |
| IC-09 | MOVE VEHICLE WASH OFFSITE | 5 | X | | |
| IC-10 | RELOCATE SHIPPING AND RECEIVING OFF SITE ON LABIEAUX RD. | 8 | G | IC-13 | |
| IC-11 | LIMIT/ REDUCE MOVEMENT OF PEDESTRIANS AND VEHICLES WITHIN THE | 8 | G | IE-41 | BRING IT TO MINIMUM |
| IC-12 | INTRODUCE UNI-DIRECTIONAL FLOW IN | 8 | G | IC-13 | |
| IC-13 | SEPARATE INGRESS AND EGRESS POINTS TO THE SITE | 8 | A | | |
| **IE-00** | **IMPROVE SPATIAL EFFICIENCY** | #T | #T | | |
| IE-01 | DEVELOP OFF SITE STORAGE | 9 | A | | |
| IE-02 | CONSIDER VERTICAL STACKING OF ADMIN | 8 | G | EF-02 | |
| IE-03 | DEVELOP A STRATEGY FOR CONTROLLED | 8 | DS | | DISCUSS WITH STACY MCGHEE |
| IE-04 | ELIMINATE CNG FUELING IN FLEET MAINTENANCE AREA | 8 | A | | |
| IE-05 | DEVELOP OFF SITE STAFF PARKING | 8 | A | | |
| IE-06 | ELIMINATE ON SITE FUELING | 8 | A | | |
| IE-07 | MOVE NON-PUBLIC WORK ADMIN FUNCTIONS OFF SITE | 5 | X | | |
| IE-08 | MOVE RCMP/ BYLAW STORAGE OFF SITE | 8 | ABD | | |
| IE-09 | DEVELOP A STACKED YARD STORAGE SYSTEM FOR VALVES AND FITTINGS | 8 | ABD | | |
| IE-10 | CENTRALIZE VARIOUS GROUPS IN ONE FACILITY ON SITE | 8 | G | IE-41 | |
| IE-11 | INCLUDE CARPENTRY INTO FLEET | 8 | A | | |
| IE-12 | INTRODUCE THREE LEVELS IN THE FACILITIES | 9 | A | | WORK WITH PAUL ROSEN |
| IE-13 | OPEN OFFICE CONCEPT RATHER THAN | 5 | X | | |
| IE-14 | MOVE W&R BINS TO OFFSITE | 8 | G | IC-04 | |
| IE-15 | MOVE AGGREGATE BINS OFF SITE | 8 | G | IE-01 | |
| IE-16 | OUTSOURCE LIGHT DUTY FLEET | 8 | A | | LEASED VEHICLES, REPAIR |
| IE-17 | ELIMINATE SEPARATE SHOWERS FOR BIKE | 5 | X | | |
| IE-18 | INSTALL A COVERED BIKE STORAGE | 5 | X | | |
| IE-19 | DECENTRALIZE WASH AREA | 5 | X | | |
| IE-20 | ELIMINATE INDIVIDUAL BAYS IN FLEET AND INCLUDE FLEXIBLE SPACE | 5 | X | | |
| IE-21 | RELOCATE WASHPIT + FUELING STATION | 5 | X | | |

# List of Creative Ideas

| Alter. No. | Creative Idea Description | Rank | Action | Grouped With | Comments / Notes |
|---|---|---|---|---|---|
| IE-22 | ELIMINATE CONTRACTOR USEAGE OF SITE FACILITIES | 8 | G | IC-07 | |
| IE-23 | USE BEBAN PARK FOR ADDITIONAL STORAGE CAPACITY | 5 | ABD | | |
| IE-24 | INTRODUCE SEMI-PERMANENT REFUELING STATION | 8 | G | EF-09 | |
| IE-25 | USE CARDLOCK FOR REFUELING | 8 | G | IE-06 | |
| IE-26 | USE LABIEAUX RD FOR OFF SITE PARKING | 8 | G | IE-05 | |
| IE-27 | DEVELOP AN OFFSITE LOCATION/ | 7 | ABD | | |
| IE-28 | WHAT IF THE CURRENT HOUSING | 8 | DS | | |
| IE-29 | REDUCE THE SIZE OF THE SIGN SHOP | 8 | ABD | | DAVID THOMPSON WILL DISCUSS |
| IE-30 | DESIGN THE ADMIN BLDG. TO ACCOMMODATE ADDITIONAL FLOORS | 8 | G | IE-12 | FUTURE EXPANSION |
| IE-31 | CHARGE FOR STAFF PARKING | 2 | X | | |
| IE-32 | EVALUATE EVOLVING TECHNOLOGY FOR FLEET TO RIGHT SIZE SPACE NEEDS | 7 | ABD | | |
| IE-33 | INCORPORATE LABIEAUX RD WITHIN THE SITE FUNCTIONS | 8 | G | IC-13 | ROW |
| IE-34 | INTRODUCE UNDERGROUND PARKING | 2 | X | | |
| IE-35 | ELIMINATE DUPLICATE STORAGE AREAS | 8 | G | CI-02 | |
| IE-36 | LEASE SURPLUS SPACE (ON SITE) | 8 | G | IE-12 | |
| IE-37 | INCLUDE CENTRAL STORAGE FOR ALL USERS | 8 | G | CI-02 | |
| IE-38 | MOVE THE TRUCK WASH CLOSER TO THE SITE ENTRANCE | 2 | X | | |
| IE-39 | PHASE 1 SHOULD OCCUR IN THE LEAST DEVELOPED AREA OF THE SITE | 8 | G | IE-41 | |
| IE-40 | COORDINATE OVERALL PROGRAM WITH BEBAN PARK MASTER PLAN | 9 | DS | | |
| IE-41 | REVISIT MASTERPLAN/ ZONING AND | 9 | DS | | |
| IE-42 | DEISGN FOR RODENT CONTROL | 7 | X | | |
| IE-43 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 2 | 9 | DS | | |
| IE-44 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 3 | 9 | DS | | |
| IE-45 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 4 | 9 | DS | | |
| IE-46 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 5 | 9 | DS | | |
| IE-47 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 6 | 9 | DS | | |
| IE-48 | REVISIT MASTERPLAN/ ZONING AND CIRCULATION OPTION 7 | 9 | DS | | |
| IE-49 | ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG | 8 | A | | |

# List of Creative Ideas

| Alter. No. | Creative Idea Description | Rank | Action | Grouped With | Comments / Notes |
|---|---|---|---|---|---|
| IE-50 | ELIMINATE MEZZANINE LEVEL FROM FLEET MAINTENANCE BLDG (IE-49) 2.0 | 8 | A | | |
| **OC-00** | **OPTIMIZE OPERATIONAL CAPABILITY** | #T | | | |
| OC-01 | ELIMINATE CNG PROVISIONS IN FLEET MAINTENANCE | 8 | G | IE-06 | |
| OC-02 | UPGRADE VEHICLE WASH | 7 | ABD | | |
| OC-03 | USE OIL/ INDUSTRIAL FLUID STORAGE FOR FLEET | 7 | ABD | | |
| OC-04 | RECALCULATE BUDGET CONTINGENCY | 8 | DS | | |
| OC-05 | INCLUDE ADDITIONAL SERVICES FOR | 7 | ABD | | |
| OC-06 | EVALUATE BUSINESS SERVICES THAT MIGHT BE REDUNDANT IN THE FUTURE | 7 | ABD | | POLITICAL IMPACT |
| OC-07 | DEPLOY STAFF FROM HOME BASE | 5 | X | | |
| OC-08 | CONSIDER INTERGOVERNMENTAL PARTNERSHIP | 7 | ABD | | |
| OC-09 | REVISIT BUSINESS PROCESS/ MODEL FOR GREATER EFFICIENCY | 8 | DS | | |
| OC-10 | PHASE BUSINESS PROCESS IMPROVEMENT | 8 | G | OC-09 | |
| OC-11 | DIVIDE THE PROJECT INTO TWO PHASES | 8 | A | | |
| OC-12 | INTRODUCE SATELLITE OWC | 8 | A | | SANDSTONE SITE |
| OC-13 | CONSIDER STAGING AREAS FOR CONSTRUCTION AND EQUIPMENTS | 8 | DS | | PAINTING, ASSEMBLING PARTS, PRE-CONSTRUCTION, WATER |
| OC-14 | REVIEW AND REPURPOSE VISITOR PARKING AREA | 9 | G | IC-13 | |
| OC-15 | RIGHTSIZE THE FLEET MAINTENANCE BLDG. | 9 | DS | | |

# Appendix E
## VM Study Agenda

CITY OF NANAIMO
THE HARBOUR CITY

# AGENDA

## NANAIMO OPERATIONS CENTRE (NOC) VALUE MANAGEMENT STUDY

2023 OCTOBER 23 - 27

| DAY 01 (PST) | VM Phase (Six Phase Method) | ITEM | HOST |
|---|---|---|---|
| 7:30 | | **COFFEE/ BREAKFAST/ NETWORKING TECHNOLOGY TEST** | |
| 8:00 | **INFORMATION** | Workshop and Team Introduction, Agenda Overview | Mushtaq Rabbi |
| 8:15 | | VM Principles and Process Overview | Mushtaq Rabbi |
| 8:30 | | Program/ Project Overview Presentation: Goals, Constraints, Commitments, Business Drivers | City Team |
| 8:45 | | Q&A | All |
| 9:00 | | Project Overview: Site Analysis, Technical Aspects, Key Aspects of Plan | Kasian |
| 9:30 | | Q & A | All |
| 10:00 | | **MORNING B R E A K** | |
| 10:15 | **INFORMATION** | ***SITE VISIT*** | VM Team |
| 12:30 | | **L U N C H** | |
| 1:15 | **FUNCTION ANALYSIS** | Discussion, Questions on Project Scope, Design<br>Understand Risks to Performance, Pareto Distribution of Capital Investments | VM Team |
| 2:00 | **FUNCTION ANALYSIS** | Random Function Generatiion based Master Plan and Operational Components | VM Team |
| 3:00 | | **AFTERNOON BREAK** | |
| 3:15 | **FUNCTION ANALYSIS** | Create, Review, Amend, Validate FAST diagram, Identify and Classify Project Functions for each segment (i.e. Basic Function, Required Secondary, Secondary Functions); Identify Value Target Functions (5-7) | VM Team |
| 5:30 | | Adjourn for the day | |
| **DAY 02 (PST)** | | | |
| 7:30 | | **COFFEE/ BREAKFAST/ NETWORKING TECHNOLOGY TEST** | |
| 8:00 | | Recap from Previous Day. Ask questions. | Mushtaq Rabbi |
| 8:15 | **CREATIVITY** | Brainstorm Alternative Ideas around Value Target Functions. Generate large number of ideas. No restriction and free flowing. No judgement by team members at this time. Ideas will be recorded on spreadsheet. Key question: How else can we achieve this function? Brainstorm Alternative Ideas around Value Target Functions. | VM Team |
| **10:00** | | **MORNING B R E A K** | |
| 10:15 | **CREATIVITY** | Brainstorming of Alternatives Ideas | VM Team |
| **12:00** | | **L U N C H** | |
| 1:00 | **EVALUATION** | Validate and Confirm Performance Criteria, Evaluate Ideas those are most suitable and applicable for enhancing performance for each segment of this project. Team scoring approach. Team scoring and discussion continues | VM Team |
| **3:00** | | **AFTERNOON BREAK** | |
| 3:15 | **EVALUATION** | Team scoring and discussion continues, Demonstrate business case template | VM Team |
| 5:30 | | Adjourn for the day | |
| **DAY 03 (PST)** | | | |
| 7:30 | | **COFFEE/ BREAKFAST/ NETWORKING TECHNOLOGY TEST** | |
| 8:00 | **MID POINT EVALUATION** | **Mid Point Review of Alternatives by Management: Fatal Flaw, No Go** | **Senior Management** |
| 9:00 - 5:30 | **DEVELOPMENT** | The ideas and group of ideas shall be developed on the basis of, what is existing, what value this idea will add, why it is important, impacts on capital cost, O&M cost, LCC, prepare sketches/ pictures within the write up.<br>Development Phase Continues (incl. cost estimates) with Morning, Lunch and Afternoon Breaks | VM Team |
| **DAY 04 (PST)** | | | |
| 7:30 | | **COFFEE/ BREAKFAST/ NETWORKING** | |
| 8:00 - 3:00 | **DEVELOPMENT** | Development Phase Continues (incl. cost estimates) with Breaks | VM Team |
| 3:15 - 5:30 | **DEVELOPMENT** | Compile Developed Business Cases for Presentation, Grouping of Ideas/ Options into themes | VM Team |
| **DAY 05 (PST)** | | | |
| 7:30 | | **COFFEE/ BREAKFAST/ NETWORKING** | |
| 8:00 - 10:00 | **PRESENTATION** | Compile Developed Business Cases for Presentation | VM Team |
| 10:00 | **RECOMMENDATION** | Present Preliminary VM Findings | VM Team |
| 11:30 | | Q&A | VM Team |
| 11:45 | | Next Steps | Mushtaq Rabbi |
| 12:00 | | VM Session Adjourned | |

# Appendix F

## Core Value Management Study Team

## VM Team Roster

| Team Member Name | Company | Role | Phone or Email |
|---|---|---|---|
| **Value Team** | | | |
| ART GROOT | CITY OF NANAIMO | FACILITY & PARKS OPS | art.groot@nanaimo.ca |
| BRANDON MILLER | CITY OF NANAIMO | FLEET OPERATIONS | brandon.miller@nanaimo.ca |
| DAVID EDMUNDS | GEC ARCHITECTURE | ARCHITECT | david.edmunds@gecarchitecture.com |
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| MIKE SQUIRE | CITY OF NANAIMO | WATER RESOURCES | mike.squire@nanaimo.ca |
| PETER LEJCAR | ASSOCIATED ENGG. | CIVIL ENGINEER | lejcarp@ae.ca |
| POUL ROSEN | CITY OF NANAIMO | ENGG. & PUBLIC WORKS | poul.rosen@nanaimo.ca |
| STACY MCGHEE | DISTRICT OF SAANICH | STRATEGIC FACILITIES PLANNING | stacy.mcghee@saanich.ca |
| STEVEN WIEBE | INNOTECH FLEET STRATEGIES | MUNICIPAL FLEET MANAGEMENT | swiebe@innotechfleet.com |
| TOBIN HWANG | COLLIERS PROJECT LEADERS | SAANICH PM | tobin.hwang@colliersprojectleaders.com |
| PING PANG | BTY GROUP | COST ANALYST | pingpang@bty.com |
| MUSHTAQ RABBI | MEMAR VALUE STRATEGIES INC. | CVS/ VM TEAM LEADER | mushtaq.rabbi@memarvalue.ca |

# Appendix G
## List of VM Study Participants

**NANAIMO OPERATIONS CENTRE (NOC) MASTER PLAN VM STUDY**
LIST OF PARTICIPANTS
2023 OCTOBER 23 - 27

| NAME | DISCIPLINE/ ROLE | ORGANIZATION | CONTACT INFO. | M | T | W | TH | F |
|---|---|---|---|---|---|---|---|---|
| Art Groot | Director, Facility & Parks Operations | City of Nanaimo | art.groot@nanaimo.ca | | | | | |
| Bill Sims | GM, Engineering & Public Works | City of Nanaimo | bill.sims@nanaimo.ca | | | | | |
| Brandon Miller | Manager, Fleet Operations | City of Nanaimo | brandon.miller@nanaimo.ca | | | | | |
| David Edmunds | Architect | GEC Architecture | david.edmunds@gecarchitecture.com | | | | | |
| David Myles | Manager, Utilities | City of Nanaimo | david.myles@nanaimo.ca | | | | | |
| Dragana Perusinovic | Consulting Architect | Kasian Arch. & Interior Design | dragana.perusinovic@kasian.com | | | | | |
| Jane Rushton | Manager, Purchasing & Stores | City of Nanaimo | jane.rushton@nanaimo.ca | | | | | |
| Jim Mann | Architect | HDR Architecture | james.mann@hdrinc.com | | | | | |
| John Elliot | Director, Public Works | City of Nanaimo | john.elliot@nanaimo.ca | | | | | |
| Laura Mercer | Director, Finance | City of Nanaimo | laura.mercer@nanaimo.ca | | | | | |
| Marcus van Zyl | Manager, Construction Projects | City of Nanaimo | marcus.vanzyl@nanaimo.ca | | | | | |
| Michael Lonsdale | Senior Project Manager | City of Nanaimo | michael.lonsdale@nanaimo.ca | | | | | |
| Mike Strain | City's Former PM, NOC | Capex Projects | mike@capexprojects.com | | | | | |
| Mike Squire | Manager, Water Resources | City of Nanaimo | mike.squire@nanaimo.ca | | | | | |
| Mushtaq Rabbi | CVS, VM Team Leader/ Facilitator | MEAMR Value Strategies Inc. | mushtaq.rabbi@memarvalue.ca | | | | | |
| Peter Lejcar | Civil Engineer | Associated Engineering | lejcarp@ae.ca | | | | | |
| Ping Pang | Cost Analyst | BTY Group | pingpang@bty.com | | | | | |
| Poul Rosen | Director, Engineering | City of Nanaimo | poul.rosen@nanaimo.ca | | | | | |
| Stacy McGhee | Manager, Strategic Facilities Planning | District of Saanich | stacy.mcghee@saanich.ca | | | | | |
| Steven Wiebe | Fleet Management | Innotech Fleet Strategies | swiebe@innotechfleet.com | | | | | |
| Tobin Hwang | Senior Project Manager (Saanich) | Colliers Project Leaders | tobin.hwang@colliersprojectleaders.com | | | | | |

# Appendix H
## Information Phase Slides

CITY OF NANAIMO

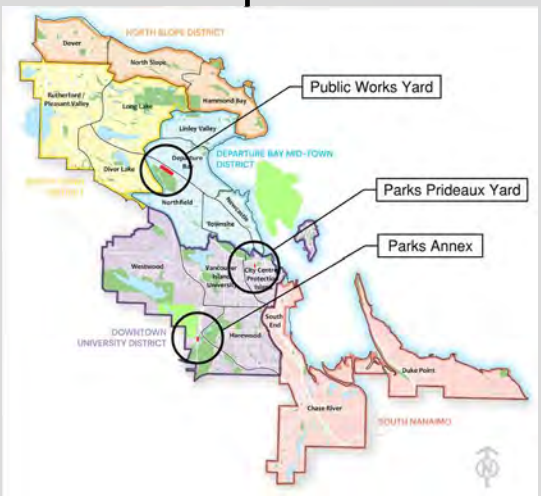
# Project History and Background


Mike Strain P.Eng Senior Project Manager, Capex Projects

1

CITY OF NANAIMO

# Site Overview Map




Mike Strain P.Eng Senior Project Manager, Capex Projects

2

## Public Works Yard – 1960's


Mike Strain P.Eng Senior Project Manager, Capex Projects

3

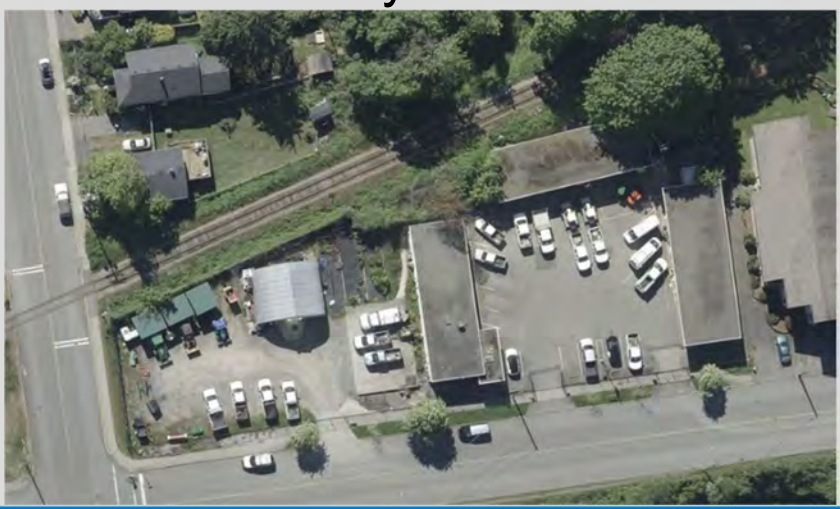
## Public Works Yard Today

4

## Parks Yard – 1960's

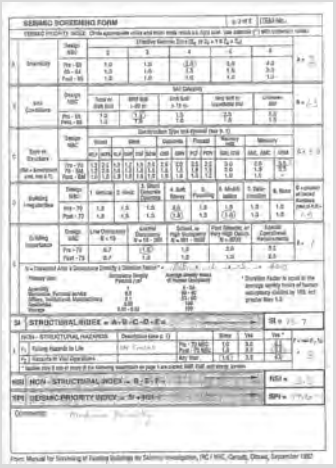

5

## Parks Yard Today



6

# NOC Project History


SEISMIC SCREENING FORM


Seismic Assessment and High Level Costing Model

7

# NOC Project History

2019 2020 2021 2022 2023

- **Operational Space Needs Review and Redevelopment Options**
- **Initial Class D Cost Estimate**
- **Public Works Yard Condition Assessment**

8

## NOC Project History


- Operational Space Needs Review and Redevelopment Options
- Initial Class D Cost Estimate
- Public Works Yard Condition Assessment

- **Operational Space Needs Review Part 2 Phased Redevelopment Options**
- **Phased Class D Cost Estimate**
- **Internal Team Assembled to Review**
- **Block Plans & Functional Prog**

9

## NOC Project History


- Operational Space Needs Review and Redevelopment Options
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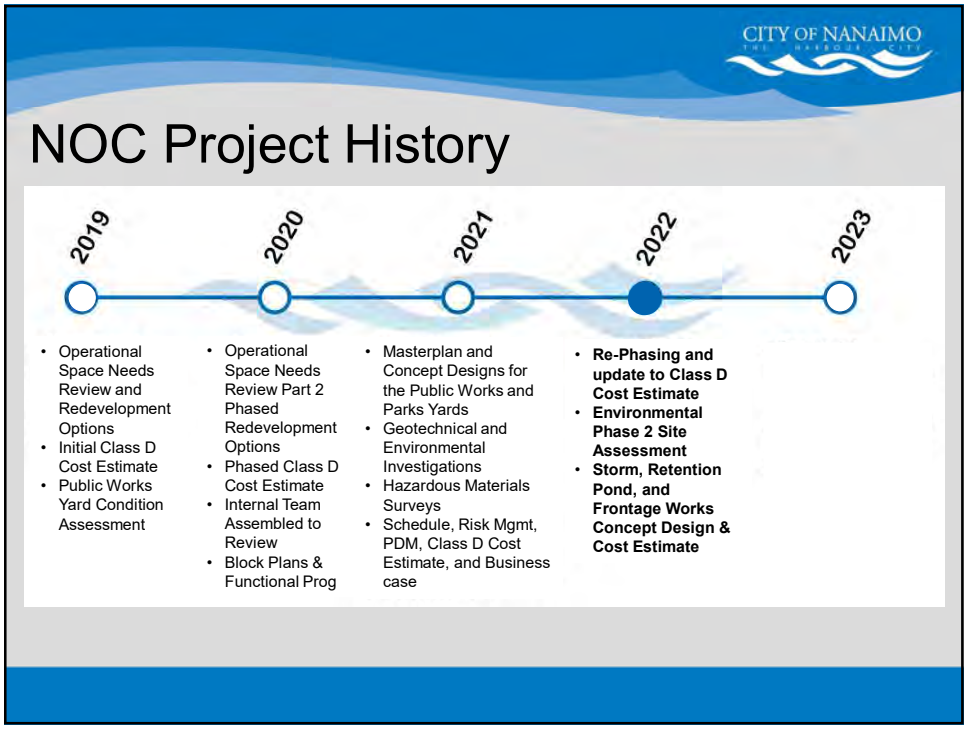
- **Masterplan and Concept Designs for the Public Works and Parks Yards**
- **Geotechnical and Environmental Investigations**
- **Hazardous Materials Surveys**
- **Schedule, Risk Mgmt, PDM, Class D Cost Estimate, and Business Case**

10


CITY OF NANAIMO
NOC Project History
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2020
2021
2022
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• Initial Class D Cost Estimate
• Public Works Yard Condition Assessment
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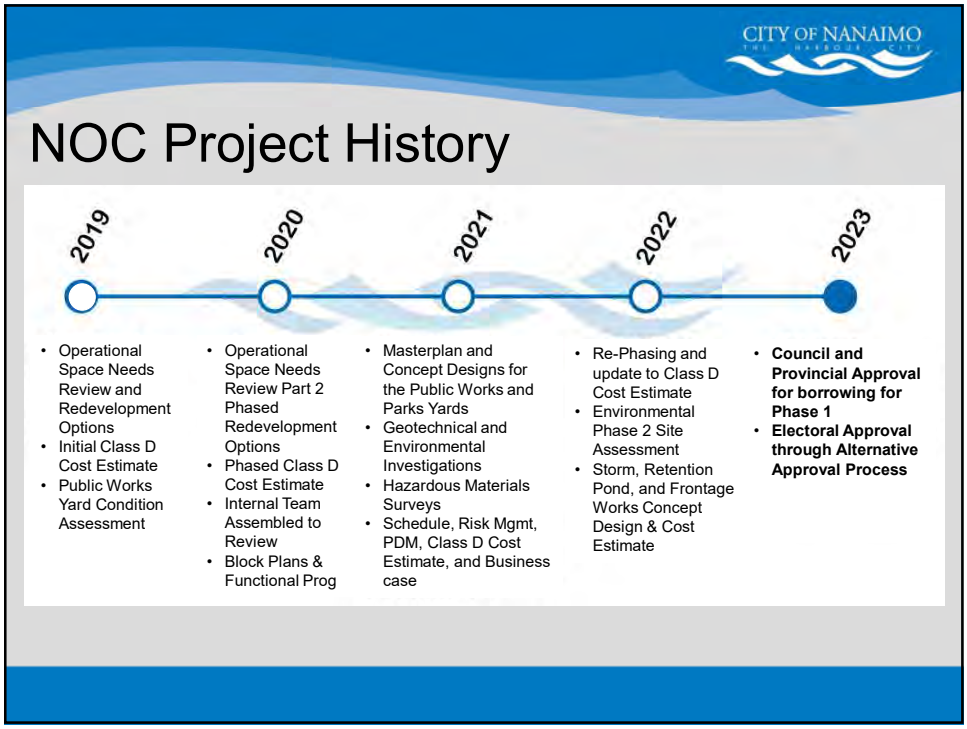
• Schedule, Risk Mgmt, PDM, Class D Cost Estimate, and Business case
• Re-Phasing and update to Class D Cost Estimate
• Environmental Phase 2 Site Assessment
• Storm, Retention Pond, and Frontage Works Concept Design & Cost Estimate

11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• Environmental Phase 2 Site Assessment
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• Council and Provincial Approval for borrowing for Phase 1
• Electoral Approval through Alternative Approval Process

12

CITY OF NANAIMO
THE HARBOUR CITY

# Nanaimo Operations Center Project Introduction

October 23, 2023

1

## Nanaimo Operations Centre

**Mission Statement**

To address the long-standing and increasingly unsustainable health, safety, environmental and operational shortcomings of the site in a fiscally responsible manner.

2

# City Operations Overview

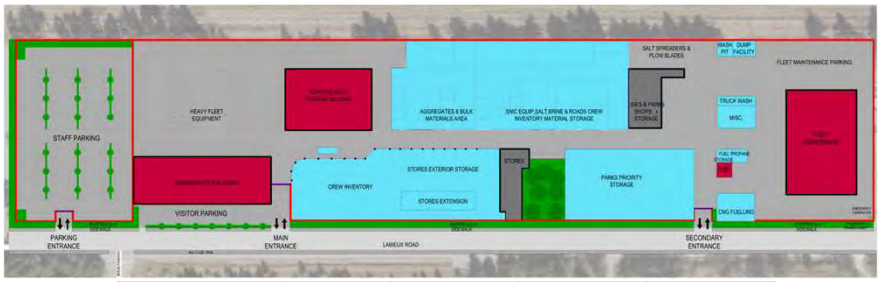
## Current Public Works Yard Services

| | | | |
|---|---|---|---|
| Capital Projects | Roads | Water | Drainage |
| Sanitation | Fleet | Purchasing & Stores | Sanitary Sewers |

3

# City Operations Overview

## Future Nanaimo Operations Centre Services




| | | | | |
|---|---|---|---|---|
| Capital Projects | Roads | Water | Drainage | Facilities Operations |
| Sanitation | Fleet | Purchasing & Stores | Sanitary Sewers | Park Operations |

4

# City Operations Overview

## Current Operations Facility Challenges

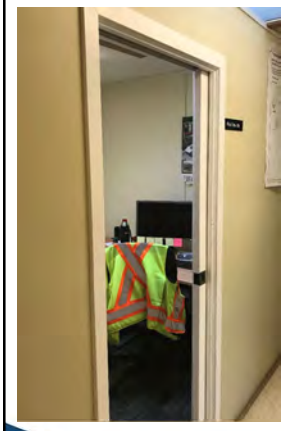


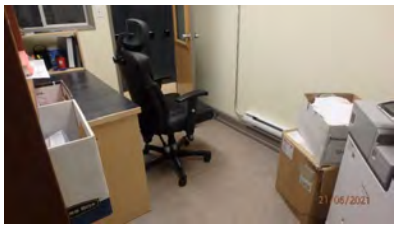
Inadequately Sized Maintenance Facilities

5

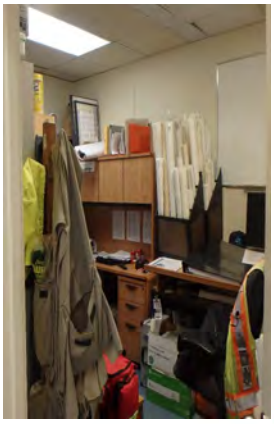
# City Operations Overview

## Current Operations Facility Challenges





Closets and Storage Spaces Repurposed into Workspaces



6

# City Operations Overview

## Current Operations Facility Challenges


Inaccessible First Aid Room

7

# NOC Project Expectations

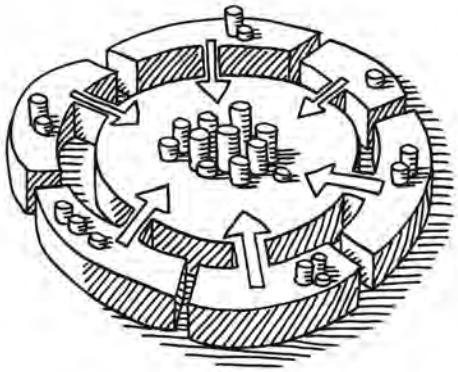
A straightforward workspace that draws a lot of value out of the limited resources available; uncomplicated and durable.

SIMPLE ≠ EASY

8

## NOC Project Expectations

A project which is managed with a view to the future, with lifecycle costing including maintenance, operational activity, and construction costs considered and balanced.



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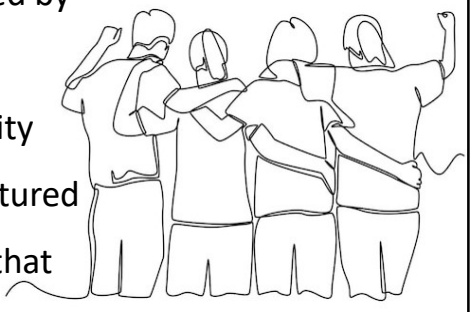
## NOC Project Expectations

Eliminating existing gender and mobility inequalities experienced by the City's workforce in existing facilities and ensuring community connections continue to be nurtured by providing accessible spaces that are welcoming and inclusive to all.



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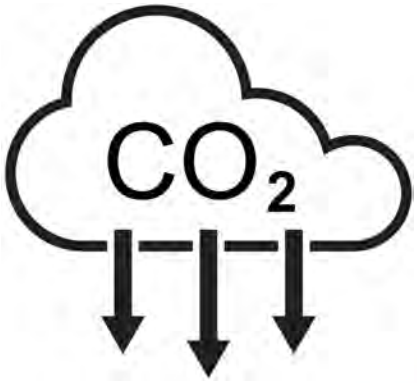
## NOC Project Expectations

Addressing existing environmental issues and enhancing the City's ability to reach its environmental stewardship as well as energy and GHG reduction goals in the future.




11

## NOC Project Expectations

To be able to proceed with the projects currently being voted on within the AAP; alterations and optimizations to these projects are welcome but we must be able to proceed with all of them following a successful conclusion to the AAP.

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CITY OF NANAIMO
Nanaimo Operations Center
VALUE ENGINEERING WORKSHOP , OCT 23 2023

## AGENDA:

- Introduction
- Site Overview
- Review of Master Plan
- Review of Phasing
- Review of Concept Design
- Questions

# Introduction

## 2021 MASTER PLAN AND CONCEPTUAL DESIGN

- The City of Nanaimo underwent an Operational Space Needs Review / Redevelopment Options, prepared by Resource Planning Group Inc (RPG) in July 2019.
- A preferred option was costed. Subsequently to reduce overall project costs the City's Steering Committee reviewed strategies to reduce program areas and re-use existing strcutres where possible.
- Kasian Architecture, Interior Design and Planning Ltd was engaged by the city of Nanaimo in April 2021 to review and refine the 2019 RPG program and develop a master plan and conceptual design for the Engineering and Public Works Yard at 2020 Labieux Road (Nanaimo Operations Center).
- Through close colaboration with the Project Steering Committee and departmental representatives, site reviews and analysis, and reviews of existing documentation, Kasian prepared the following:
  - Verification and refinement of program for the Nanaimo Operations Center
  - Master Plan
  - Implementation phasing strategy for the Master Plan
  - Conceptual Deisgn for three new facilities and Conceptual Renovation Strategies for two existing facilities

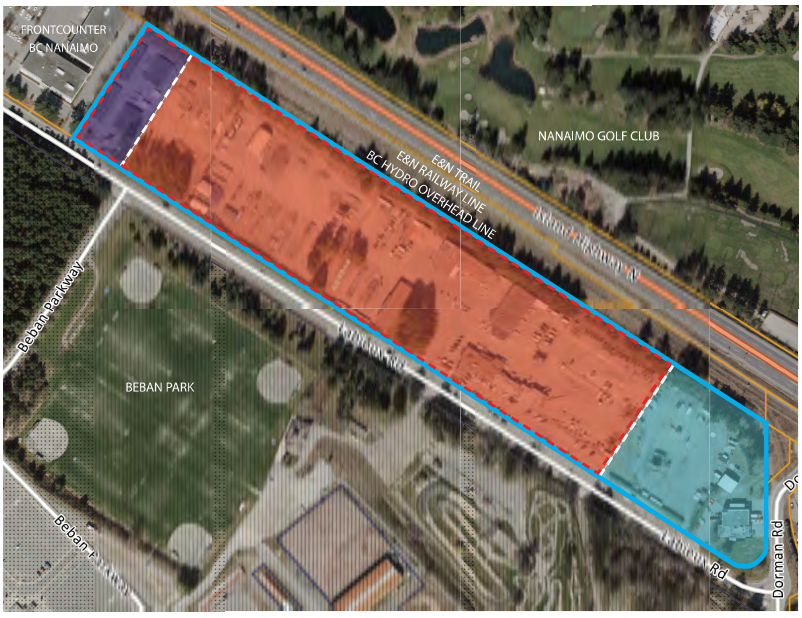
## NANAIMO OPERATIONS CENTRE VISION

Through a phased approach, the works yard will be re-configured and renewed to meet the complex array of industrial and workspace requirements. It will be transformed into a resilient Operations Centre that provides the right mix of facilities to best support the City's capability to meet Nanaimo's community service standards and respond to changing needs over time.

Planning Objectives:

- Improved Resiliency
- Improved Safety
- Operational Efficiency
- Environmental Sustainability
- Renewed and Right-Sized Facilities
- Good Governance and Accountability
  - Improving service to expanding community by designing efficient, practical, modest facilities to support operations

# Site Overview

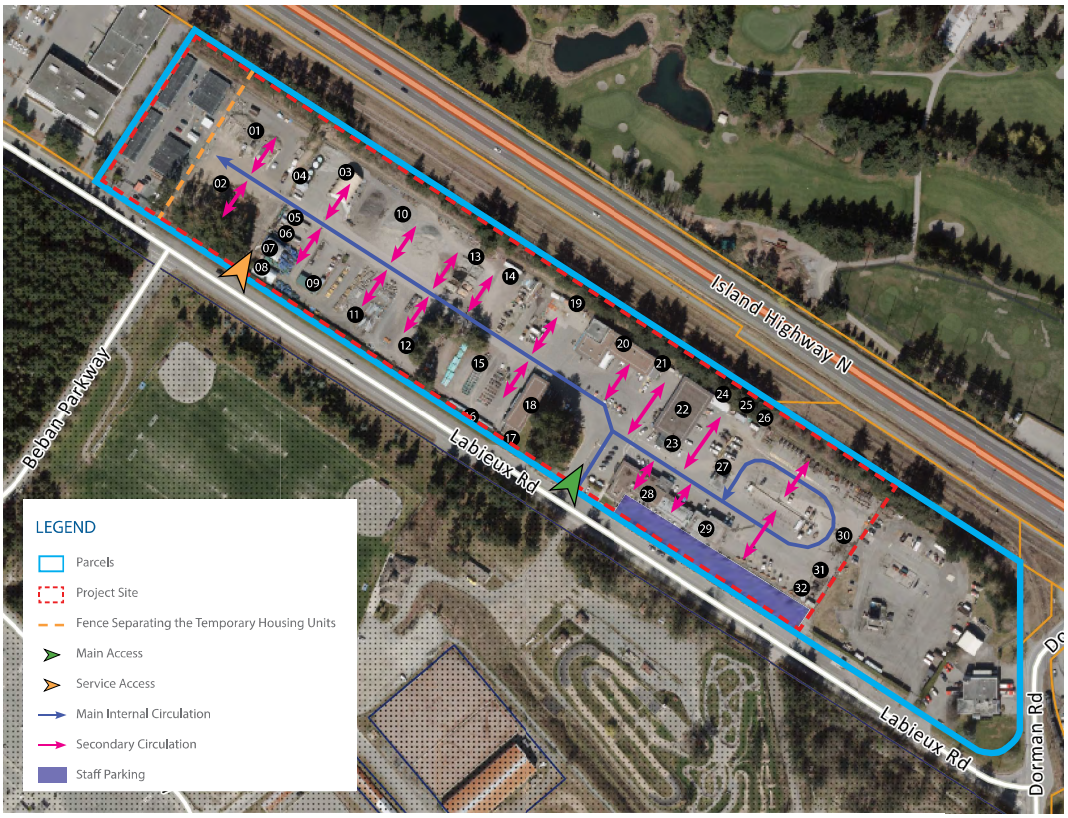



# Site Overview

## EXISTING SITE COMPONENTS

### LEGEND

01 Aggregates & Disposal Vac Truck / Hydro
02 Excavator Dump Area
03 Salt Shed
04 Brine Shed
05 Sea-Can, Sewer
06 Sea-Can, Drainage
07 Sanitation Bin Storage
08 Tub Storage
09 Roads Storage
10 Sand & Soil
11 Outdoor Storage
12 Recycling/Refuse
13 Landscape Material & Aggregates
14 Water Storage
15 Propane Station
16 Storage Racking
17 Bike Storage
18 Stores
19 Sea-Can, Shop storage
20 The Shop
21 Lunch Room
22 Truck Barn
23 Dept. Operations Centre / Meeting Room
24 Signs and Lines Storage
25 Construction Supervisor Off.
26 Sea-Can, Construction
27 Fuel Pumps
28 Admin and Operations
29 Casting Shed
30 Vehicle Wash Station
31 Wash Ramp
32 Sea-Can, South End



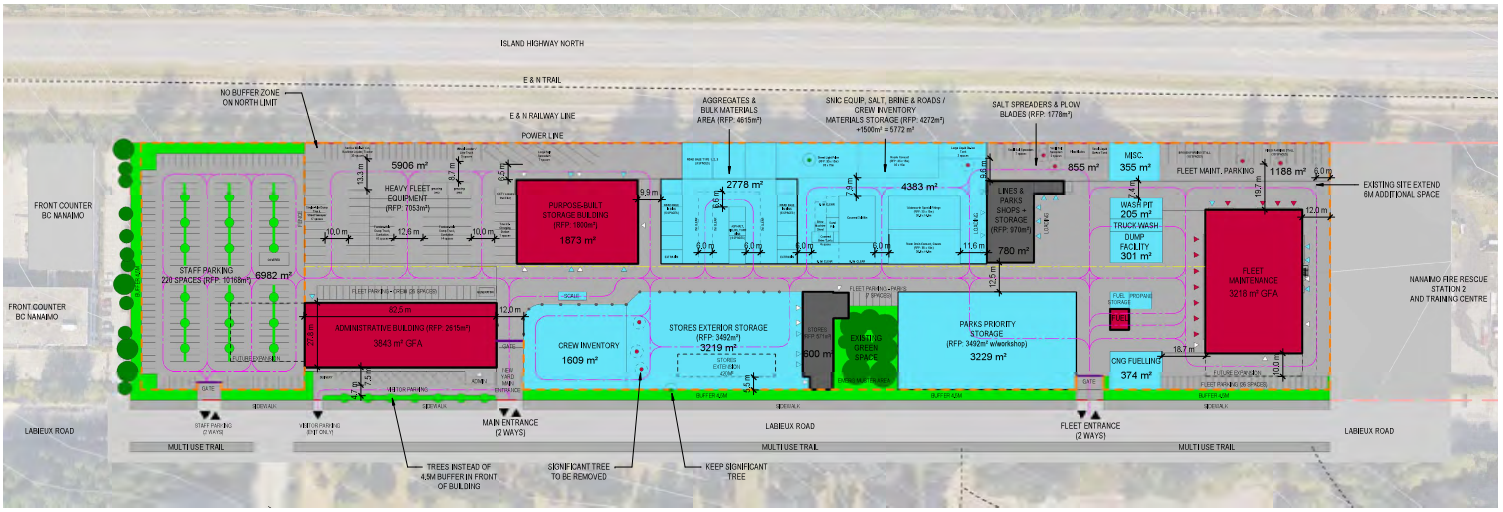

# Master Plan

## KEY PLANNING OBJECTIVES

- Separation of administrative/public activities from secure industrial operations, with restricted access to industrial zone
- Improving adjacencies and critical workflows
- Consideration for pedestrian, material and vehicular circulation
- Ensuring that phased implementation will maintain uninterrupted operations

## KEY ADJACENCIES

- Administration Building to Staff Parking
- Administration Building to Purpose-Built Storage Bulding
- Stores Building to Exterior Stores and Aggregates
- Location of Fleet Maintenance Building away from other uses to contain circulation and prevent noise transfer




PROGRAM LEGEND

- EXISTING BUILDING
- PROPOSED BUILDING
- EXISTING GREEN SPACE
- PROPOSED GREEN SPACE
- UNCOVERED AREA
- PARKING AREA
- PROPERTY LINE
- SECURITY FENCE
- FLEET CIRCULATION
- PEDESTRIAN CIRCULATION
- SETBACK
- REMOVABLE BOLLARDS
- SIGNIFICANT TREE TO BE REMOVED
- SIGNIFICANT TREE TO REMAIN
- SITE ACCESS
- HEAVY OVERHEAD DOOR
- OVERHEAD DOOR
- PEDESTRIAN ACCESS

# Phasing

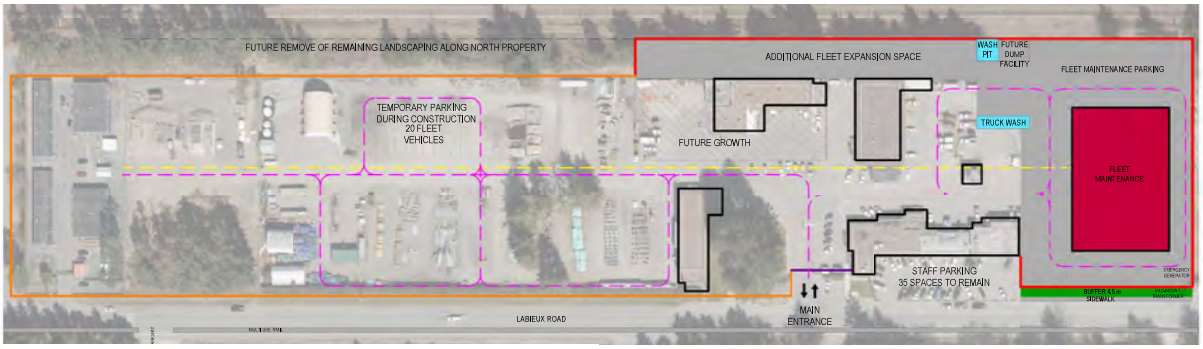
## KEY PLANNING OBJECTIVES

- Continuous operation of the site during and after each phase
- Flexibility so that phasing plan can be modified to respond to funding availability and fiscal planning
- Phases are divided and organized so that site areas are redeveloped only once and functions are relocated to their final location wherever possible
- Exception to above is the establishment of temporary parking in Phase 1 to create adequate space for construction activity elsewhere

## KEY CONSIDERATIONS

- Relocation of temporary housing
- Alternative options if temporary housing remains on site
- Conversion of fire training tower to natural gas and associated underground work in vicinity of Fleet Maintenance Building location

# Phasing




- PRIOR TO COMMENCEMENT OF PHASE 1 THE CITY OF NANAIMO INTENDS TO CONVERT THE ADJACENT FIRE TRAINING TOWER TO NATURAL GAS.

### PHASE 1 - FLEET MAINTENANCE AREA

- TEMPORARY HOUSING TO REMAIN
- RELOCATE AGGREGATES OFF SITE TO ACCOMMODATE TEMPORARY 20 FLEET VEHICLES PARKING STALLS DURING CONSTRUCTION
- RELOCATE 38 STAFF PARKING STALLS OFF-SITE
- REMOVE PORTION OF LANDSCAPING ALONG NORTHEAST PROPERTY LINE, EXTENT AS SHOWN; ADD NEW FENCE AND TIE INTO EXISTING AS SHOWN
- RELOCATE WASH PIT AND TRUCK WASH
- BUILD FLEET MAINTENANCE BUILDING
- FOLLOWING COMPLETION OF PHASE 1, EXISTING FLEET MAINTENANCE BUILDING AND SITE AREAS VACATED BY FLEET TO ACT AS GROWTH SPACE FOR INTERIOR STORAGE, ADMINISTRATION GROWTH AND EXTERIOR STORAGE/PARKING UNTIL BEGINNING OF NEXT PHASE OF WORK

- PRIOR TO COMMENCEMENT OF PHASE 1 THE CITY OF NANAIMO INTENDS TO CONVERT THE ADJACENT FIRE TRAINING TOWER TO NATURAL GAS.

### PHASE 1 - FLEET MAINTENANCE AREA OPTION:

- RELOCATE TEMPORARY HOUSING
- RELOCATE 38 STAFF PARKING STALLS AND 20 HEAVY FLEET VEHICLE PARKING TO TEMPORARY AREA
- REMOVE PORTION OF LANDSCAPING ALONG NORTHEAST PROPERTY LINE, EXTENT AS SHOWN; ADD NEW FENCE AND TIE INTO EXISTING AS SHOWN
- RELOCATE WASH PIT AND TRUCK WASH
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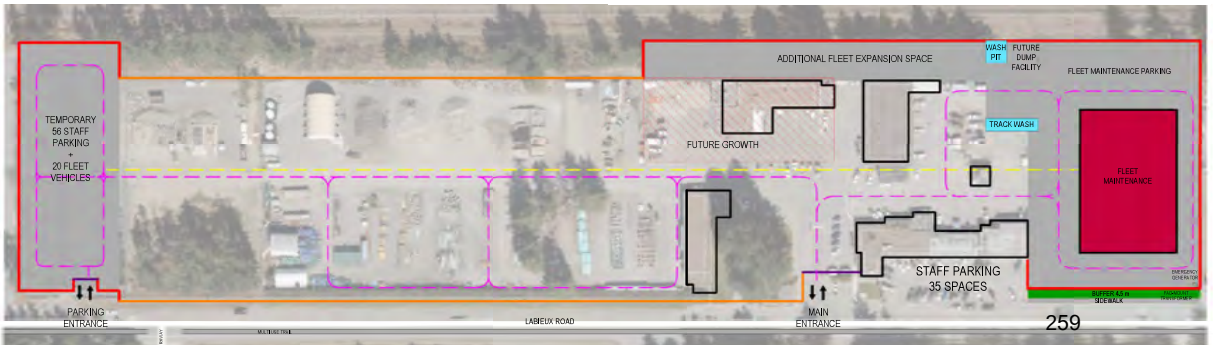
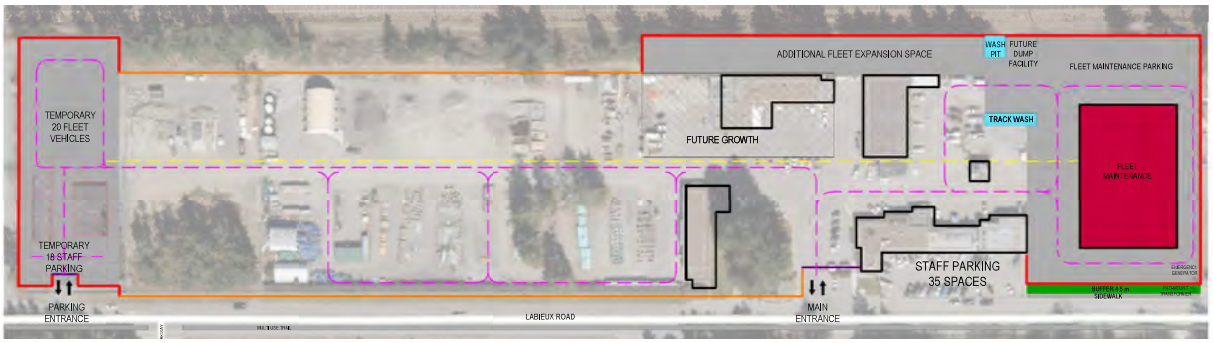


# Phasing




**ADDITIONAL GROWTH SPACE OPTION:**

- RELOCATE TEMPORARY HOUSING, BUT KEEP HALF OF THE MODULAR UNITS ON SITE FOR ADMINISTRATIVE GROWTH
- RELOCATE 28 STAFF PARKING STALLS OFF-SITE, OPTIONS INCLUDE BEBAN PARK, NANAIMO FIRE RESCUE STATION 2, STREET PARKING OR A COMBINATION OF THE THREE
- RELOCATE 20 HEAVY FLEET VEHICLE PARKING TO TEMPORARY AREA ADJACENT MODULAR UNITS
- REMOVE PORTION OF LANDSCAPING ALONG NORTHEAST PROPERTY LINE, EXTENT AS SHOWN, ADD NEW FENCE AND TIE INTO EXISTING AS SHOWN
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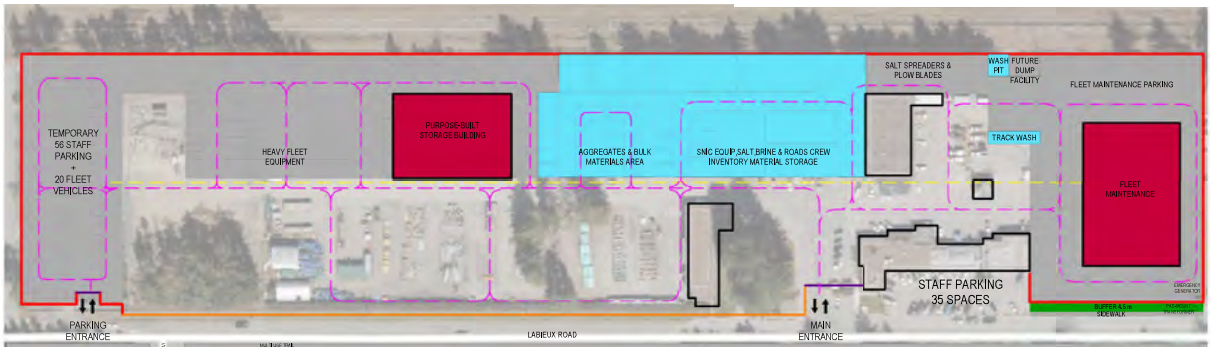
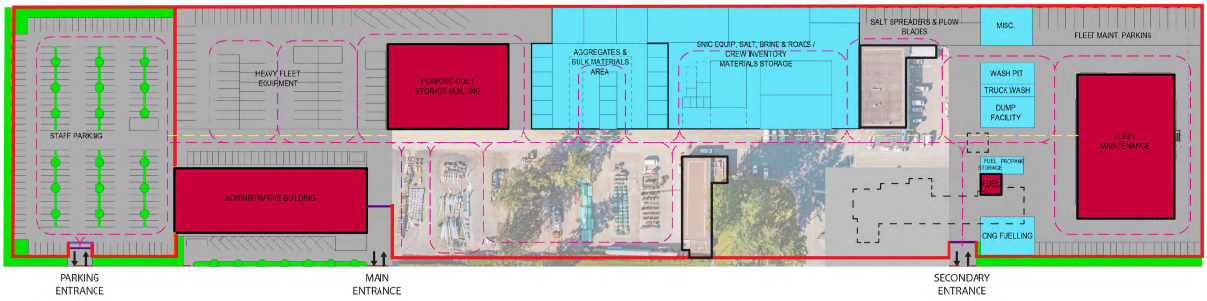
**PHASE 2 - PURPOSE-BUILT STORAGE BUILDING, AGGREGATES AREA AND HEAVY FLEET EQUIPMENT**

- REMOVE REMAINING LANDSCAPING ALONG NORTHEAST PROPERTY LINE, ADD NEW FENCE AND ADDITIONAL PARKING
- RELOCATE AGGREGATES OFF SITE
- BUILD PURPOSE BUILT STORAGE BUILDING
- RELOCATE SEA CAN STORAGE TO PURPOSE BUILT STORAGE BUILDING
- DEMOLISH EXISTING FLEET MAINTENANCE BUILDING
- RELOCATE SALT STORAGE STRUCTURE
- RELOCATE AGGREGATES
- RELOCATE SNIC EQUIPMENT
- COMPLETE HEAVY FLEET EQUIPMENT AREA




# Phasing

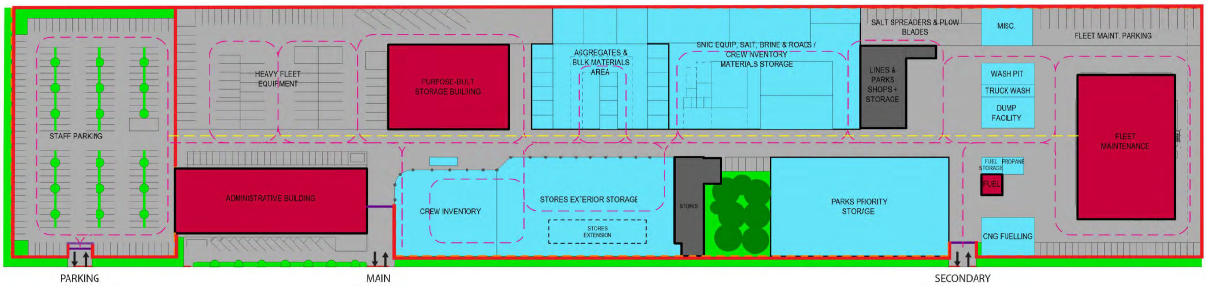



**PHASE 3 - ADMINISTRATION BUILDING AND STAFF PARKING**

- RELOCATE DUMP FACILITY
- CONSTRUCTION OF NEW ADMINISTRATION BUILDING
- ESTABLISHMENT OF NEW MAIN ENTRANCE
- DEMOLITION OF EXISTING ADMINISTRATION BUILDING
- RELOCATION OF FUELING STATION
- ADDITION OF CNG FUELING STATION
- ESTABLISHMENT OF SECONDARY ENTRANCE

**PHASE 4 - PARKS AND STORES**

- RENOVATION OF LINES AND PARKS SHOPS AND STORAGE BUILDING
- RENOVATION OF STORES BUILDING
- STORES EXTERIOR STORAGE AND CREW INVENTORY AREAS
- PARKS PRIORITY STORAGE

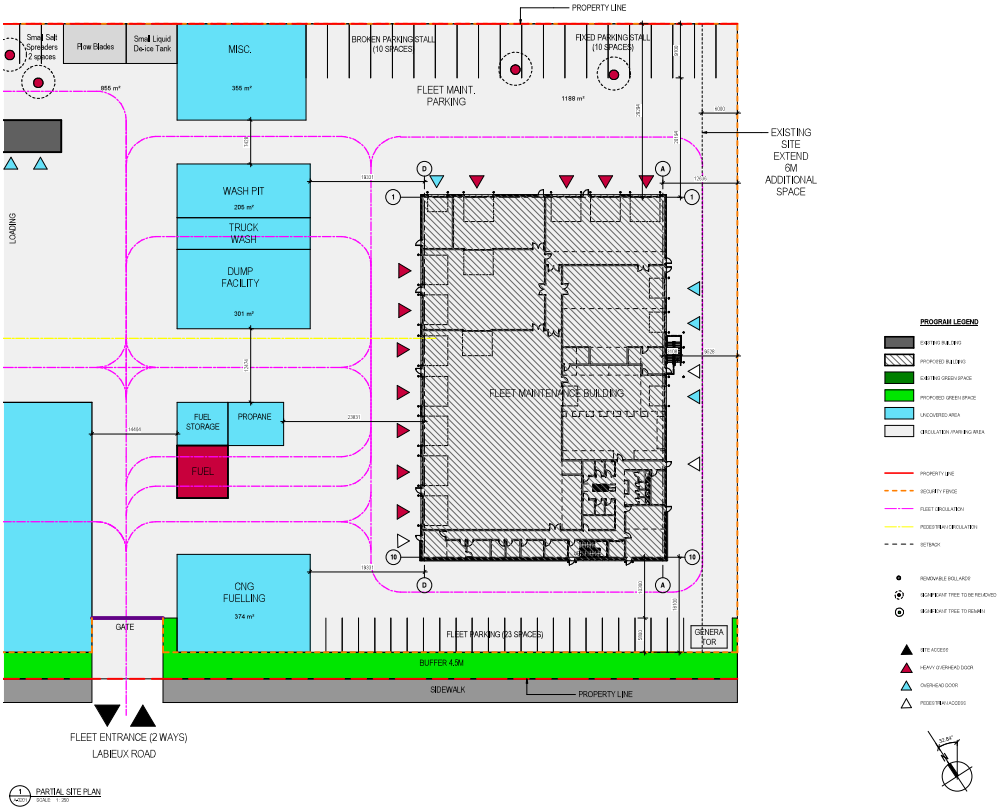


# Conceptual Design

## FLEET MAINTENANCE BUILDING

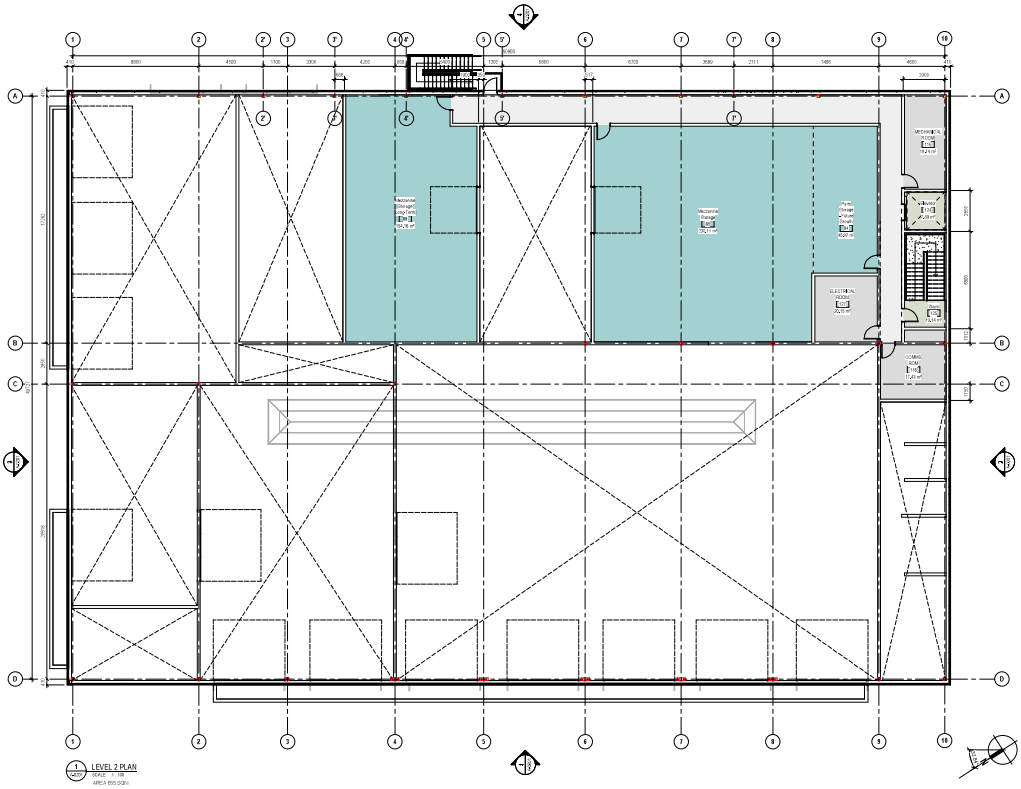
- To prevent noise transfer to other work areas and to reduce vehicular circulation associated with fleet maintenance, the proposed building is located adjacent the southeast property line
- Efficient, functional, industrial building
- Colour contrast is used to mark building entrances, both pedestrian and vehicular
- Comprised of:
    - Vehicle repair bays supporting maintenance of all fleet vehicles including small and heavy fleet as well as CNG vehicles
    - Equipment / tool / material storage
    - Administrative area
- Post-disaster
- LEED Gold shadow (or equivalent) minimum required sustainability standard
- Workspaces are located along south face of building for maximum access to natural light
- Clerestory glazing and skylight to provide daylight into vehicle bays and storage areas
- Passive shading strategies proposed throughout to reduce direct sunlight
- Cladding: prefinished industrial metal panel

# Conceptual Design



# Conceptual Design


# Conceptual Design



# Conceptual Design

## ADMINISTRATION BUILDING

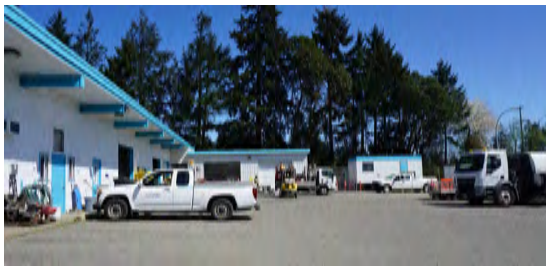
- Public face of the Nanaimo Perations Center along Labieux Road
- Public areas have opportunity to highlight the rich coal mining history of the City of Nanaimo in establishing a public face to the NOC
- Future planning should consider public interface along Labieux as this will be the primary interface with the surrounding community and public
- Adjacent to staff parking, heavy fleet parking, purpose-built storage building and main site access point
- Post-disaster (supports EOC requirements)

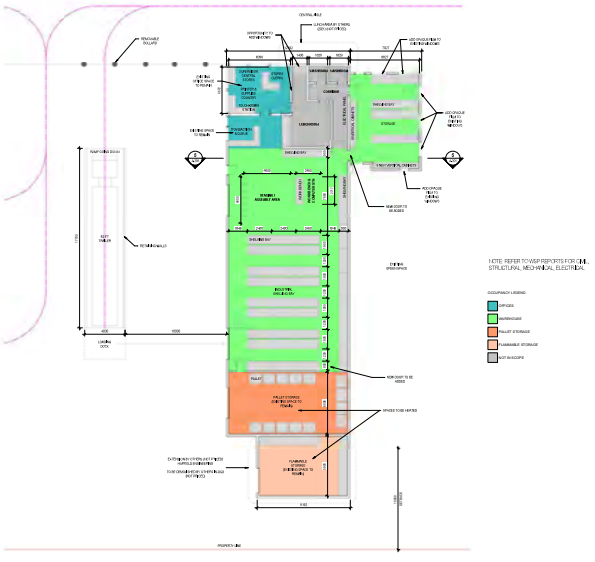
## PURPOSE-BUILT STORAGE BUILDING

- Through programming, industrial storage functions were identified in yard areas and the Administration Building
- Design Team proposed construction of a Purpose-Built Storage Building to provide necessary interior storage space in suitable facility
- Critical adjacency to Administration Building to provide ready crew access to materials
- Pre-engineered industrial building

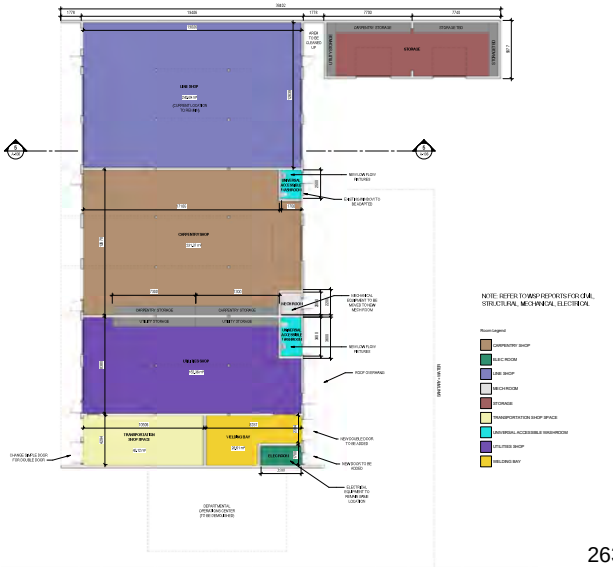
# Conceptual Design

## TRUCK BARN - RENOVATION CONCEPT





## STORES WAREHOUSE - RENOVATION CONCEPT



# Appendix I

## Moments from the VM Session

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