CTQ Consultants Ltd

Project No.: 07068-20
File No.: 05-L-001-Design Objectives

COST

January 31, 2011

TIME

District of Peachland
5806 Beach Avenue
Peachland, BC V0H 1X7

Attention: Mr. Doug Allin, CPWI
Director of Operations

QUALITY

Dear Sir:

**Re: New Monaco Infrastructure Design Objectives**

**INTRODUCTION**

The primary purpose of this document is to summarize how the infrastructure and servicing requirements of the proposed New Monaco project will be met including:

- Key issues that affect servicing and infrastructure, including site constraints and sustainability objectives;
- Approaches and design criteria that will be used in infrastructure design for the development;
- Upgrades that will be required for off-site infrastructure.

The following Technical Studies were reviewed and respected when developing these design objectives:

- Golder Associates, Preliminary Geotechnical Hazard Assessment, Proposed New Monaco Resort, Peachland, BC, December 2007;
- Ecoscape Environmental Consultants Ltd. Preliminary Environmental Inventory Sensitivity Analysis Interim Report for the proposed New Monaco Development, Peachland, BC, December 2007 and April 2008;
- Urus Heritage Consulting, Archaeological Impact Assessment of New Monaco Resort in Peachland, BC, October 2010, and
- Opus Consultants. Terms of Reference for New Monaco Traffic Impact Study. October 2010. New Monaco traffic Study, December 2010.

New Monaco is a 125 acre property located on the northeastern limit of the District of Peachland's municipal boundary. The property is bounded by the Okanagan Connector to the north, Highway 97 to the south, the Connector/ Highway 97 Interchange to the east and rural parcels off the end of Walker Road to the west. The lands are currently developed with a single farm house and barn. The eastern portion of the property contains an orchard of fruit trees. The land generally slopes down towards Highway 97 and Okanagan Lake, but contains several pockets of level benches throughout the site, and especially within the eastern portion. This section of land has been made relatively isolated by being bounded by two highways, but still forms a contiguous part of the municipality.

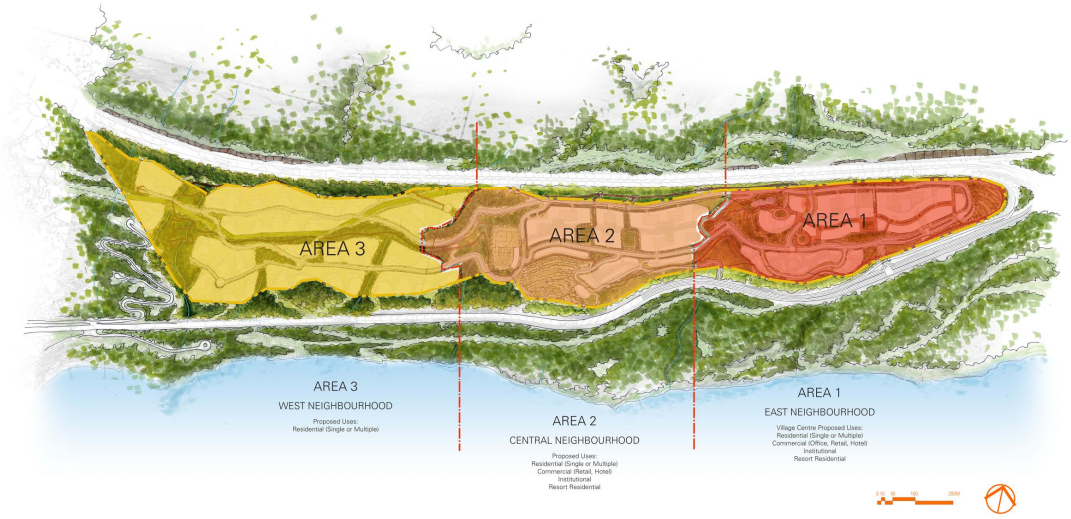
The current plan is for this development to be phased as shown on the follow diagrams. The phases are named: East Neigbourhood,(Area 1) Central Neighbourhood (Area 2) and West Neighbourhood (Area 3).

The building of New Monaco will take 10 to 20 years to be completed. Key factors that influence how much to build, when to build and what to build are;

- the adequacy of infrastructure and other services,
- the current construction and related costs,
- market demand,
- level of amenities and pre-occupation time required by anchor tenants

At this preliminary stage, New Monaco's phasing plan is based mainly on tenant types and the critical mass of residential uses needed to provide sufficient purchase power to sustain the early stage viability of the retail tenants. Based on this rationale, the earliest buildings to be developed will likely be senior and congregate care facilities due to their minimal requirement for retail services and infrastructure. A certain portion of multi-family residential is envisioned to be next, followed by a portion of retail and a portion of office commercial. Office commercial will likely require a certain amount of retail and services to be available prior to or simultaneously to their occupancy.

Under this scenario, the earliest phase starts in the westerly neighbourhood of the East Zone (Area 1) expanding both or either westward and/or eastward as required.




*Site Attributes (Folio Architecture)*

The vision of New Monaco, as outlined in the Area Structure Plan (ASP), is that of a leading community that is truly progressive and more sustainable; a development that will embody District of Peachland's sustainability goals. Achieving this vision will require that sustainability is considered at all levels. This document outlines the Design Objectives moving forward and indentifies design criteria we propose to use for the 2,600 – 2,800 Unit development (over a 12-15 year period.

Where these criteria differ from the District of Peachland Subdivision and Development Servicing Bylaw No.1956, we provide the rationale for this change for your review and approval.

The ASP speaks to the overall infrastructure systems being designed toward meeting the following goals:

1. In designing the community, work with the landscape to accommodate and respect natural constraints and opportunities, and foster environmental stewardship.
2. Prioritize infrastructure that offers public benefits for the community, and infrastructure that is "visible", contributing to a unique, high quality experience.
3. Strive for innovation, while respecting cost constraints and ensuring practicality.
4. Address greenhouse gas emissions, and work toward the concept of Net Zero energy and emissions;
5. Phasing infrastructure so that at each stage of the project, it is completed to the maximum extent possible.
6. Minimize construction impacts on the site and surrounding environment.
7. Utilize local materials as much as possible.

## TRANSPORTATION

Achieving a connected road network through the site is a significant challenge due to the steep slope topographic conditions of the site. As such, roadway standards that respect the existing topography and environment will be considered in order to minimize impact to the natural environment yet plan for internal and external road network connectivity to Highway 97.

The site is currently accessed from Highway 97 in the northeastern sector of the property. The proposed main access to the development from Highway 97 is slightly south of the existing access.

### Off-Site Road Design

A detailed Traffic Impact Analysis has recently been completed by Opus International to address the relationship between the existing Highway 97 traffic volumes, combined with the traffic resulting from the development of the New Monaco site. The analysis demonstrated that the 3 access options proposed – a protected T for the early phase of the development, an at grade signalized intersection or a "hybrid" intersection with an underpass for eastbound traffic all perform satisfactorily when OPUS's recommendations for improvement are included. Ministry of Transportation and Infrastructure and District of Peachland are currently reviewing the results and recommendations from the Traffic Analysis.

The analysis was based on the development of a single primary access from Highway 97 to the site, located 300m from the eastern corner of the site.

Secondary access to the Peachland local residential street system is proposed at the western limit of the site, the details of which will be reviewed and approved by the District of Peachland.

**On-Site Road Design (see Figure R - 1)**

The overall site is proposed with an urban form for the roadways and infrastructure, with curb and gutter, piped storm drainage, and individual driveway access for each mixed use building and single family residential lots. Road and street design is also very important to achievement of the ASP goals. These include the need to accommodate public transit in the future; integrating and linking to pedestrian and cycling infrastructure that will strongly support alternative and active transportation modes throughout the development; and contribute to a high-quality street design and positive pedestrian experience.

The roadways located within public rights-of-way will generally conform to the District of Peachland Subdivision, Development and Servicing Bylaw No. 1956. Where alternative road standards are deemed preferable to achieve ASP and project goals, these will be developed to meet the District's objectives, and will be presented to the District of Peachland for review and approval during subsequent phases.

At this stage it is anticipated that the main spine road connecting Highway 97 access to the central portion of the site is proposed as an Urban Collector Roadway with an 18m right-of-way and 8.6m paved surface; all other public roadways will be developed as urban local roadways with an 18m right-of-way and 7.0m paved surface.

It is anticipated there will be strata roadways developed to service specific development areas within the site. The strata roadways will generally conform to District of Peachland local roadway standards.

The development of the internal roadway system is anticipated to proceed in phases, starting from the eastern portion of the site and extending as the build out of the development progresses to the western limit of the site. The road grades are based on a maximum grade of 12 %, with every effort being made to restrict grades of the collector road to 10% or less.

**WATER SUPPLY**

The Water Master Plan (WMP) April, 2007 encourages Smart Growth as highlighted in Section 3.3.4:

***"…the District of Peachland should strongly consider policies which direct development in a more compact, sustainable form in accordance with Smart Growth principles."***

The ASP calls for "effective and innovative water conservation and supply strategies to meet demands, while minimizing impacts on supplies and reducing water supply risks associated with the changing climate".

To ensure water needs for New Monaco will be sustainably met:

1. Water demand for the development will be minimized through implementation of aggressive water efficiency technology and conservation, including universal metering.

2. Demand for municipal potable water will be further reduced through the utilization of alternative, non-potable sources including harvested rainwater and treated wastewater or greywater for approved uses such as toilet flushing and irrigation.[1]
3. New Monaco will work with the District of Peachland to integrate the development into the Water Master plan.

To reduce water consumption relative to historical patterns, specific strategies to be applied include:

- Moving from spray irrigation to drip irrigation with smart controllers, utilising drought tolerant vegetation, and living soils are factors that will dramatically reduce irrigation demands. On average more than half of the residential water demand in the Okanagan is used for irrigation and landscaping (source - Kelowna Joint Water Committee).
- The BC Building Code has implemented a new plumbing fixture requirement with high-efficiency toilets being required for all residential construction by October 2011. On average, high-efficiency toilets use 20% less water than the currently required low flow - 6 litres per flush models (source – BC Building Code), and 60% less than "legacy" conventional toilets (12 litres per flush).
- New Monaco is targeting further reductions in consumption through encouraging building fixtures that go beyond the requirements of the BC Code, as well as water efficient appliances.

In terms of determining demand for municipal water supply, we propose an alternative approach to the District's Bylaw requirements by adopting lower demand assumptions, based on the ASP goals noted above, planned water conservation initiatives, and actual water conservation results in the local area. It is important to note that this development will constructed in phases and our design assumptions will be closely monitored and measured. These results will then form a quantifiable basis for moving forward to the design of future phases and will show the actual impacts of the innovative design philosophies that are an integral part of the underlying objectives being implemented in New Monaco. During the detailed design stage of phase 1 we will work with the District to quantify flows that will trigger system improvements. This will involve implementing a metering program along with additional validation that further meets the design objectives.

For future planning purposes the WMP assumes a residential water demand of 675 l/cap/d, which represents a 25% decrease compared with historical water consumption in Peachland, but still roughly equal to the average residential consumption across BC communities. It is assumed that this 25% decrease will result from water conservation efforts, including metering. Peachland has recently implemented a water meter program and the initial results are showing significant reductions in water demands.

The City of Kelowna's water conservation measures have been very successful and have resulted in residential water demand decreasing from 1,000 litres per capita per day (l/cap/d) in 1996, to 444 l/cap/d in 2009 (source – Don Degen, City of Kelowna, Utilities Operations Manager),.

[1] Note that on-site treatment of wastewater or greywater will require technical and economic feasibility studies to be undertaken and regulatory issues to be addressed.

Though the Kelowna residential demand is lower than that assumed in the WMP, it is important to note that in both cases, reductions in demand due to conservation are resulting from changes to existing buildings, facilities and uses, and behaviour change, as new development accounts for a relatively small percentage of overall demand each year. In contrast, New Monaco is all new development, and thus water efficiency and conservation measures, including meeting and exceeding the water conservation requirements of the BC Building Code, will be embedded in all buildings, facilities, landscaping and small scale agriculture. Much of the residential development is also multi-family residential and mixed use, which tends to reduce per capita demand for landscape irrigation compared with single detached housing. The scale and density of the development will also increase the viability of alternative approaches such as on-site wastewater reclamation that can further reduce per-capita municipal water demand.

Based on the substantial conservation practices at New Monaco, a target for a further reduction of 30 % from the Kelowna MDD would not be unreasonable. This would set New Monaco's target at 310 l/ca/day. Therefore to be conservative, we propose an average daily demand of 400 l/cap/day. Using a multiplier of 3 equates to a Maximum Day Demand (MDD) of 1,200 l/cap/day. This is the MDD design flow outlined in the Master Municipal Construction Document (MMCD) Design Guideline Manual. While there is small agricultural use in the development there will be no demand on the municipal water system as all irrigation water will be from re-use. The water features on the site while initially may be filled with municipal water but they will be maintained using water re-use strategies. The types of commercial uses planned for New Monaco and the overlaying principles of the development leads to a commercial use that has substantially reduced demands than the demand identified in the water master plan which uses a blended number based on the use of a book store and that of a car wash. We have calculated a demand of 4,320 l/day/unit based on projected population using a square foot calculation. We are proposing that development is based on available flow rates agreed to and if they are exceeded either the development is revised or improvements are made by the development.

The following table identifies the estimated land use and MDD's for each unit. When compared to the demands for general land use they are very similar. 86 l/s compared to 90 l/s.

| Proposed Land Use | Area or Unit | Demand | MDD l/d |
|---|---|---|---|
| Retail | 105,000 sq.ft | 3.33 l/sq.ft | 350,000 |
| Office | 150,000 sq.ft | 4.44 l/sq/ft | 666,000 |
| Hotel | 100 units | 1,500 l/unit | 150,000 |
| Single Family Residential | 40 units | 3,600 l/unit | 144,000 |
| Townhouse/Apts | 2,292 units | 2,400 l/unit | 5,500,000 |
| Vacation Homes | 168 units | 1,200 l/unit | 201,000 |
| Seniors / Congregate Care | 300 units | 1,500 l/unit | 450,000 |
| Total MDD Demand | | | (86 l/s) use 90 l/s |

General retail will include clothing, grocery, office supplies, banks, drug store, beauty services and restaurants; based on 70% being low water users such as clothing, office supplies, 30% being restaurants and beauty parlours etc.

Office commercial will include technology, professional, wellness, extended education, childcare, medical laboratory, medical and dental offices (no emergency care or hospital).

The table below shows the existing demands in the Water Master Plan and our proposed demands per development unit for New Monaco.

| Unit Description | Equivalent Capita/DU | WMP Demand-MDD (L/day/Unit) | MDD Demands for New Monaco (L/day/Unit) |
|---|---|---|---|
| Commercial Development (Typ) | 3 | 10,800 | 4,320 |
| Multi-Family Residential | 2 | 6,300 | 2,400 |
| Single Family Residential | 3 | 7,800 | 3,600 |

Based on the population projection and uses, the following are the proposed MDD and PH water demands for New Monaco:

| Unit Description | Number of Units | Unit Demand-MDD (L/day/Unit) | Proposed New Monaco Demands (l/s) |
|---|---|---|---|
| Multi-Family Residential | 2760 | 2,400 | 76 (l/s) |
| Commercial Development (Typ) | 250 | 4,320 | 12 (l/s) |
| Single Family Residential | 40 | 3,600 | 2 (l/s) |
| Total MDD Demands | | | 90 (l/s) |
| Total Peak Hour Demands (PH) | | | 180 (l/s) * |

** A multiplier of 2 was used from MDD to PH due to the nature of the development.*

The site currently has a water license from the Cousins Road reservoir that provides for 300 USGPM (19 l/s) MDD. We plan to utilise this existing water license in this development which would effectively reduce the proposed MDD of 90 l/s (see table above) down to 71 l/s required for full build-out.

Based on the reduced MDD of 1,200 l/c/d/ the impact on the District's water system is approximately equivalent to a **1,200 unit development**.

**Water Distribution and Storage. (see Figure W - 1)**

The water supply connection for the development will be from the Cousins Road Reservoir, an upgrade of the reservoir will be required at some point to supply the increased demands of New Monaco as it continues to develop. We recommend that a metre be set up to monitor the flow for the early stages and that a trigger point be agreed between both parties at which point an upgrade would be required.

The Subdivision and Servicing Bylaw indicates that reservoir capacity at build-out shall be calculated by the following formula:

Total Storage Volume = A + B + C

Where: A = Fire Storage (from Fire Underwriters Survey Guide)
B = Equalization Storage (25% of Maximum Day Demand)
C = Emergency Storage (25% of A + B)

Based on a fire flow of 150 l/s the total storage volume required is:

Total Storage Volume = (150 x 60 x 120) + (0.25 x 7,776,000) + (0.25 x 3,024,000)
= 3,780,000 L (3,780 $m^3$)

It is our understanding that there is currently approximately 1,290 $m^3$ of storage available.

The bylaw goes on to say: "Subject to the results of a detailed engineering analysis, and approval of the local authority, the requirement for emergency storage (C) may be reduced or eliminated based on consideration of the following:

- Dependability of water source
- Reliability of supply system
- Presence of more than one supply source
- Whether the reservoir is part of a large system
- Presence of other reservoir(s) in system
- Availability of standby power"

This could reduce the ultimate required storage by approximately 760 $m^3$, bringing the required storage down to 3,020 $m^3$ less the existing fire storage estimated at 540 $m^3$, leaving an additional 2,480 $m^3$ of capacity to be added on a phased basis.

From the reservoir, a large diameter main will be required to be installed heading east for approximately 800 metres depending on final routing through third party lands and/or future road right-of-way. The watermain then must pass through the New Monaco site for another 1,940m to the east. It is proposed that the watermain will follow a proposed road alignment. The large diameter main will then split into two smaller diameter mains sized to ensure that required flows will be available to all services and hydrants.

**SANITARY SEWER (see Figure San - 1)**

The ASP states that "…there is a commitment to pursue additional options that will contribute to sustainable water use – in particular providing an alternative source of non-potable water for the community." The following strategies will be explored throughout the detailed design phase of the project:

- To turn wastewater into a water and energy resource where feasible;
- To keep costs of managing wastewater minimized where possible;
- To demonstrate ecological stewardship visibly through how wastewater is managed;
- Treat and reuse wastewater for appropriate uses and where feasible at a localized scale (i.e. parcel or building scale), such as: toilet flushing; landscape irrigation and water features that do not involve public contact;

- Recover heat from wastewater where feasible, to reduce external energy demand and associated greenhouse gas emissions, and;
- Explore ways of foregrounding/making visible some wastewater infrastructure to add community amenity and provide examples of the stewardship ethic of the project. (e.g. consider technology like a small solar aquatics facility (using water plants to treat wastewater) to treat some wastewater for irrigation).

For a connection to the District system, a new gravity sanitary sewer main will need to be installed within the Highway 97 right of way.

The existing system has a section of 200mm diameter main on Buchanan (approximately 180 m in length with a very low slope (0.36%) and is shallow (less than 1.0m cover). This main may require twinning to provide sufficient capacity for the ultimate development.

We have not investigated the capacity of the existing submerged forcemain from Peachland to the Central Okanagan Regional District Wastewater Treatment Plant but provide the following design flows for New Monaco to be inputted to the District's Sanitary Model for analysis.

We recommend that a metre be set up to monitor the flow for the early stages and that a trigger point be agreed between both parties at which point an upgrade would be required. According to the District of Peachland Subdivision Bylaw 1956 and based on a population of 6,500 at full build-out, the design flow is calculated as follows:

- Population 6,500
- Per-capita Flow 350 l/ca/day
- A peaking factor using 70% of the Harmon Equation must be applied to the average flow.

  $$PF = 1 + \frac{14}{4 + \sqrt{P}}$$

  Where: PF = Peaking factor
  P = Population in thousands
- Harmon Peak Factor 3.137
- Reduction Factor for Peak = 70%
- Actual Peak Factor = 2.196
- Infiltration 1,000 l/ha/day *

* We have proposed to reduce the infiltration amount based on a few factors. The site is on a hillside with no shallow groundwater, a significant portion of the site is below the sanitary system so does not have any influence on it and the fact that PVC sewer systems today are air tight and we are not seeing the infiltration of the past. The manholes are all pre-benched with gaskets at the connections and the manhole rises have gaskets as well.

Therefore, for the New Monaco Development:

- Average day design flow = 26.3 l/s
- Peak Hour design flow = PF x Av + Infiltration
  = 58.4 l/s

Utilization of the per-capita flow of 350 l/ca/day as per the Bylaw requirements would likely be conservative, as wastewater hydraulic flows are expected to be reduced significantly as a result of water conservation (in particular due to water-efficient toilets, fixtures and appliances). Both hydraulic flows and loading to the sanitary sewer and wastewater treatment plant would also be reduced by any on-site wastewater or greywater treatment and reuse. Our target flow rate for New Monaco is 200 l/ca/day which is a reduction of 40 %.

**STORMWATER MANAGEMENT (see Figure St - 1)**

As a new community, New Monaco recognises that all water is valuable and that there is a significant responsibility to ensure that water is used carefully, and not wasted and as such, will treat stormwater as a resource and will manage post-development water flows to match pre-development flows. There are existing water courses that transit the site and we propose not to impact these negatively in any way. Where there are existing commitments to water flow we will honour them.

The following are objectives stated in the ASP that will guide project stormwater planning and design:

- Development will create no net change to pre-development hydrographs;
- Stormwater management strategies should be incorporated into building and site designs to respond to existing climatic and site conditions and to ensure that pre-development flows are maintained during and after development;
- A stormwater management strategy will be developed to incorporate a range of source controls which can be used in combination to meet the objective of matching pre-development conditions, and;

Strategies for stormwater management will include a combination of the following source control strategies, based on site and parcel conditions, technical and economic viability:

- Minimize impervious surfaces wherever possible ;
- Collect and store roof runoff for re-use in approved applications;
- Infiltration of stormwater from roads, parking areas, and trails;
- Parks and open space areas will be designed to accommodate stormwater management requirements, and to enhance ecological functions and productivity;
- Treatment of stormwater runoff where needed to ensure water quality objectives are met;

- Where road grades allow it is anticipated that bioswales and other ecological facilities will be implemented. On steeper grades more traditional systems of catch basins and piping networks will be utilised to convey the stormwater run-off to Retention/Detention facilities prior to infiltration and/or release.
- Any areas of the existing system showing signs of erosion through the site will be mitigated through development of the new systems.
- Discharge points to the existing system will be designed to minimise the impact and to control the flows to pre-development levels.

The District of Peachland Subdivision, Development and Servicing Bylaw No. 1956 outlines the requirements for Stormwater Management, which states "Stormwater management involves the planning and design necessary to mitigate the hydrological impacts of land development or land use changes. Adverse hydrological impacts include such things as increased peak stormwater flows, erosion, sedimentation, flooding, reduced surface infiltration, reduced minimum groundwater levels and stream flows, water quality deterioration and degradation of aquatic and wildlife habitats."

Through the design process, the Stormwater Management Plan will be developed to meet or exceed the requirements of the servicing Bylaw 1956, and the stormwater management objectives outlined above. This will involve coordination with the landscape, space planning and other professional team members.
For runoff analysis, the Bylaw states that storm drainage systems shall be designed to accommodate the post-Development flows using the Rational Method or an approved hydrologic/hydraulic computer model. For this project, we will be guided by the British Columbia Water Balance Model and for physical modeling of pre- and post-development flows we will be utilizing StormNET. The document "Stormwater Planning – A Guidebook for British Columbia" will also be used as a design reference.

**Summary**

## KEY CONCLUSIONS

### Transportation:

#### Off-Site:

The analysis demonstrated that the 3 access options proposed – a protected T for the early phase of the development, an at grade signalized intersection or a "hybrid" intersection with an underpass for eastbound traffic all perform satisfactorily when OPUS's recommendations for improvement are included.

#### On-Site:

The development of the internal roadway system is anticipated to proceed in phases, starting from the eastern portion of the site and extending as the build out of the development progresses to the western limit of the site. The road grades are based on a maximum grade of 12 %, with every effort being made to restrict grades of the collector road to 10% or less.

**Water:**

| Unit Description | Equivalent Capita/DU | WMP Demand-MDD (L/day/Unit) | MDD Demands for New Monaco (L/day/Unit) |
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| Total MDD Demands | | | 90 (l/s) |
| Total Peak Hour Demands (PH) | | | 180 (l/s) * |

Fire flow = 150 l/s

**Sanitary Sewer:**

- Infiltration 1,000 l/ha/day *
- Average day design flow = 26.3 l/s
- Peak Hour design flow = PF x Av + Infiltration
  = 58.4 l/s

**Storm Sewer:**

Through the design process, the Stormwater Management Plan will be developed to meet or exceed the requirements of the servicing Bylaw 1956.

For this project, we will be guided by the British Columbia Water Balance Model and for physical modeling of pre- and post-development flows we will be utilizing StormNET.

It is important to note that as this development will span a number of years and our design assumptions will be closely monitored and measured. These results will then form a quantifiable basis for moving forward to the design of future phases and will show the actual impacts of the innovative design philosophies that are an integral part of the underlying objectives being implemented in New Monaco.

In advance, we thank you for your review of these servicing objectives and we look forward to working with you on this exciting development.

Sincerely,

**CTQ CONSULTANTS LTD.**
Per:

Matt Cameron, P.Eng.
Managing Partner

MHC:lt

Attachment




Water Regulations

Plug a Leak

Outdoor Water Conservation

Indoor Water Conservation

Irrigation System Efficiency

Landscape Water Efficiency

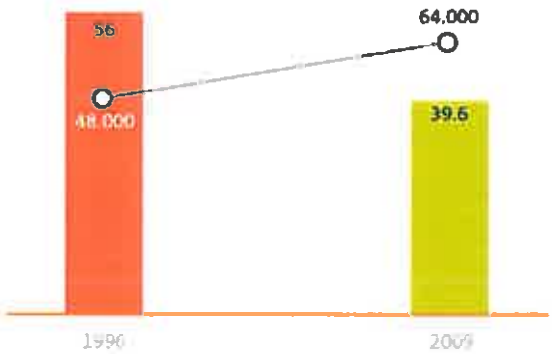
**Water Use Statistics**

Water Sustainability Action Plan

# Water Use Statistics

Per-capita water use in Kelowna has been dropping steadily ever since water meters were installed in 1996, and a user-pay rate was implemented in 1998.

Total water use in Kelowna has increased by just two per cent since 1995, despite a 30 per cent increase in population over the same period.




*Water consumption is measured in cubic metres (m3)*
*One cubic metre = 1,000 litres = 220 gallons*

Improvements are being made, but much still needs to be done. When the water conservation program began in 1996, Kelowna residents were among the highest water users in North America. Now, Kelowna is no longer even classified among the highest water users in British Columbia.

**Info Line**
250 868-3339

Have an online service request?

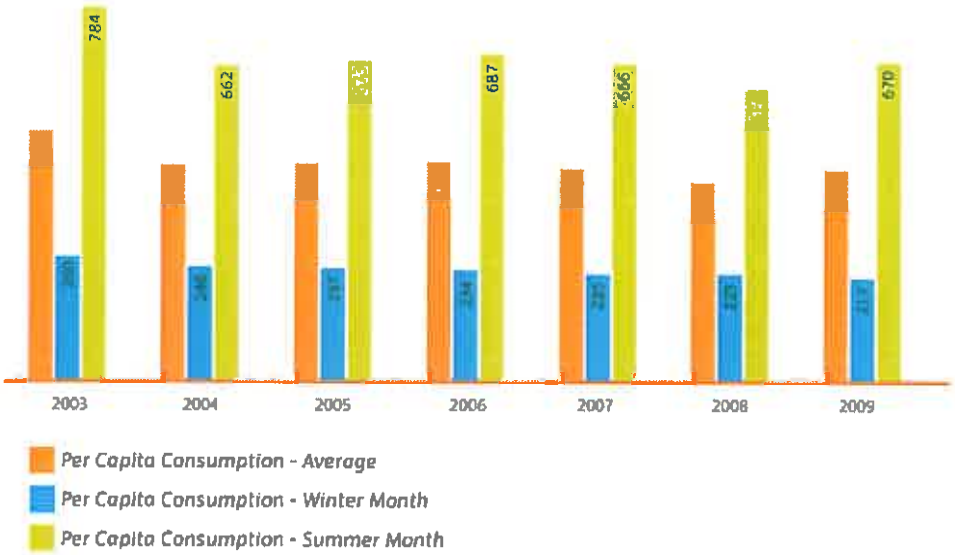
Water Provider Map

**Related Links**
- BC Living Water Smart
- Black Mountain Irrigation
- City of Kelowna Water Utility
- Environment Canada
- Glenmore Ellison Improvement District
- Kelowna Joint Water Committee
- Rutland Water Works
- South East Kelowna Irrigation

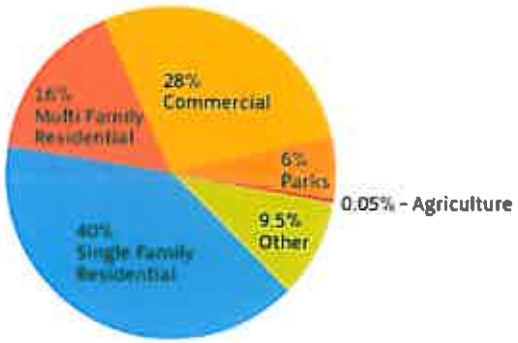
**Downloads**
- Article - Healthy Neighbourhoods

## The City of Kelowna's Single Family Residential Per Capita Consumption

*Consumption ($m^3$)*




## How Water is Used in the Kelowna Water Utility Service Area



# New Plumbing Fixture Requirements in the BC Building Code

## Overview


The Province is taking another step toward increased water efficiency through new high-efficiency toilet (HET) and urinal (HEU) requirements in the BC Building Code. **Effective October 3, 2011,** HETs or dual-flush toilets will be required in new residential buildings or when renovations involving plumbing fixtures occur. Whenever urinals are installed, HEUs will be required.

Toilets and urinals represent 30 to 40 per cent of domestic water use in households and in commercial and institutional buildings. Installation of more efficient models results in significant water savings. While the BC Building Code currently requires toilets with a 6-litre flush volume, high-efficiency toilets, which have a flush volume of 4.8 litres or less, are now available.

## High-Efficiency Toilets

High-efficiency toilets (HETs) have a maximum flush volume of 4.8 litres. Dual-flush toilets are classified as HETs because the ratio of reduced flushes (up to 4.1 litres) to full flushes (up to 6 litres) results in an effective flush volume that is less than 4.8 litres. On average, high-efficiency toilets use at least 20 per cent less water than the 6-litre models that are currently required in B.C.

Effective October 3, 2011, HETs or dual-flush toilets will be required in new residential buildings or when renovations involving plumbing fixtures occur. The requirement for toilets with a maximum flush cycle of 6 litres in industrial, commercial and institutional buildings will remain unchanged.

Text of new Code requirement

While some early low-consumption toilets did not perform well, in recent testing by Veritec Consulting and Koeller and Company, all of the high-efficiency models (over 100) demonstrated good to excellent flushing performance.

According to several recent research reports, HETs have no difficulty meeting the waste transport requirements typical of residential drainline installations. However, when HETs are installed in industrial, commercial and institutional buildings, there are concerns about the drainline carry of a 4.8 litre flush volume. Until further research on drainline transport issues becomes available, the BC Building Code's HET requirement will be limited to residential buildings.

Availability of HETs is still somewhat limited, but costs are comparable to quality 6-litre models. The requirement for HETs will not become effective until October 3, 2011, giving suppliers time to reduce existing inventory and bring in new HET stock.

## High-Efficiency Urinals

A high-efficiency urinal (HEU) is a fixture with a flush volume of 1.9 litres or less. HEUs use approximately one-third of the amount of water used to flush the average urinal. Based on average usage, a single HEU can save close to 18,000 litres of water per year.

Whenever urinals are installed, HEUs will be required.

Text of new Code requirement

While a performance testing protocol similar to that for toilets has not yet been developed for HEUs, flushing HEUs must meet the same performance standards as other flushing urinals sold in North America. Because the flush volume of a urinal can often be set at either 3.8 litres or 1.9 litres through the flushometer valve, the cost and availability of HEUs is the same as that of higher-volume urinals.

## Implementation

The new requirements will come into effect on **October 3, 2011,** to address implementation issues and to better coordinate with the next edition of the Building Code.

## More Information

For additional information see our Questions and Answers page.

BUSINESSDAY

# South Africa: Reduce Demand for Water, Country Warned

Jocelyn Newmarch 3 August 2010



Johannesburg — WHILE SA faced water supply constraints and suffered from rainfall that was less than half the world average, it was not alone in having to manage water supply issues, experts said last week.

Although SA faced a supply deficit of 6% by 2013 and 11% by 2019, it was 10 years too late to implement purely supply-side solutions, said Don Degen, utilities operations manager for the city of Kelowna, in Canada.

SA needed to formulate strategies to reduce demand for water.

However, he said, SA had struggled to implement the demand management plans it had already tried to institute.

He was speaking at the Sustainable Water conference held recently in Pretoria.

Six of the issues SA was grappling with were also important concerns for North America, Mr Degen said: a mismatch between supply and demand, a failure to achieve demand reduction targets, decaying infrastructure, deteriorating water quality, the loss of essential skills, and undervaluing water.

With 20% of the world's available freshwater resources, and just 0,5% of the world's population, Canada had had a false sense of security with regard to water resources, Mr Degen said.

In 1996, Kelowna city, with average per-capita water consumption of 1000l a day in peak periods - the highest demand in the world - was forced to implement demand-side management.

By last year, the average consumption per resident had been reduced to 444l of water a day, and despite a 35% increase in the population, only 2% more water was being delivered to Kelowna.

"Understanding where the water was used helped us to set priorities and achievable goals," he said. Kelowna had invested in public education and customer engagement to find out why people used so much water and how demand could be reduced.

Up to 80% of water in the summer was being used for garden irrigation. Low water rates meant there was little incentive to conserve water.

The city legislated the use of low-flow plumbing fixtures in new developments and raised the cost of water, discouraging excessive consumption. But Mr Degen said one-on-one interaction with consumers had been the most significant part of Kelowna's success.

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NEW MONACO

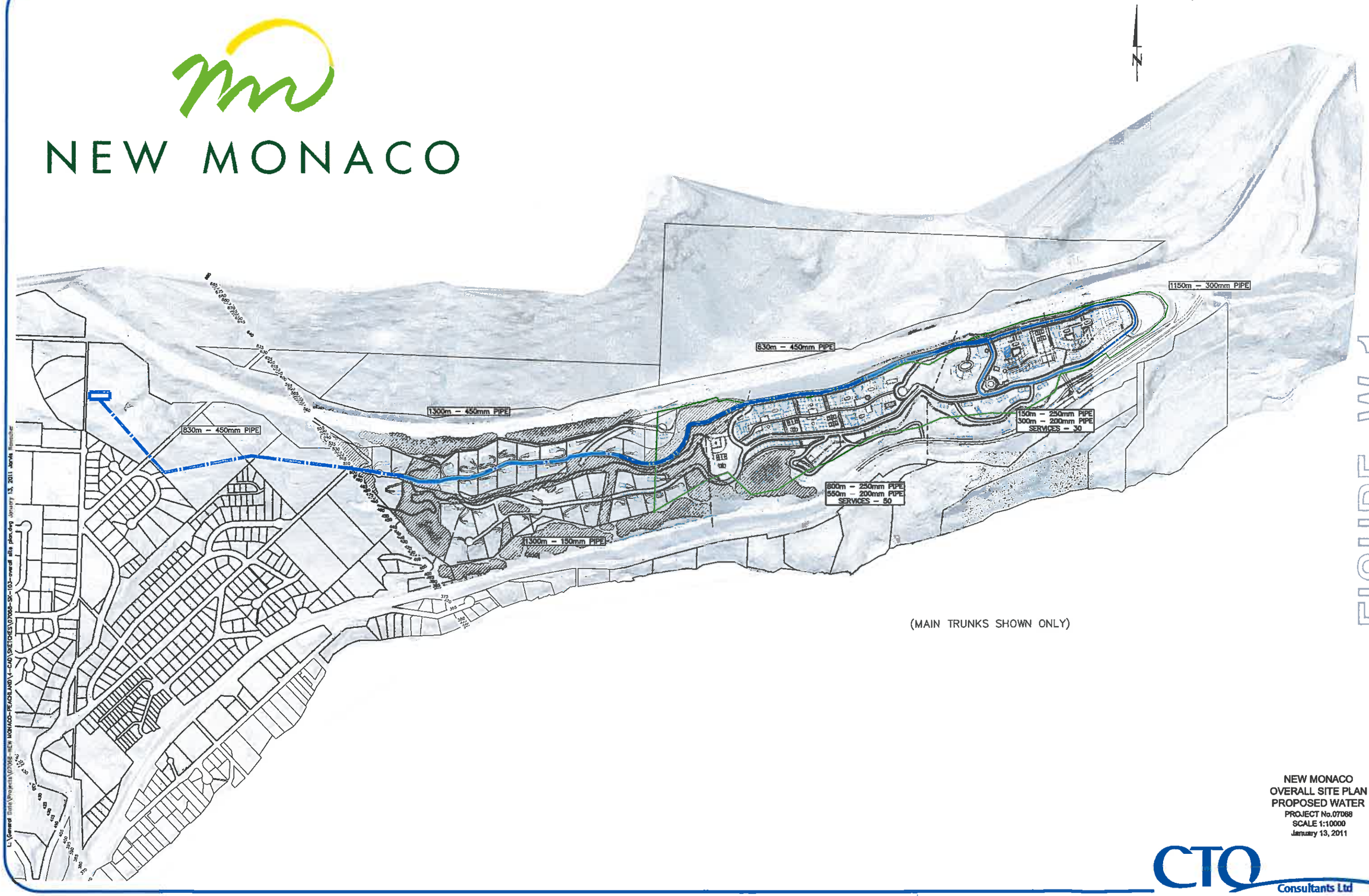


FIGURE W-1

NEW MONACO
OVERALL SITE PLAN
PROPOSED WATER
PROJECT No.07068
SCALE 1:10000
January 13, 2011

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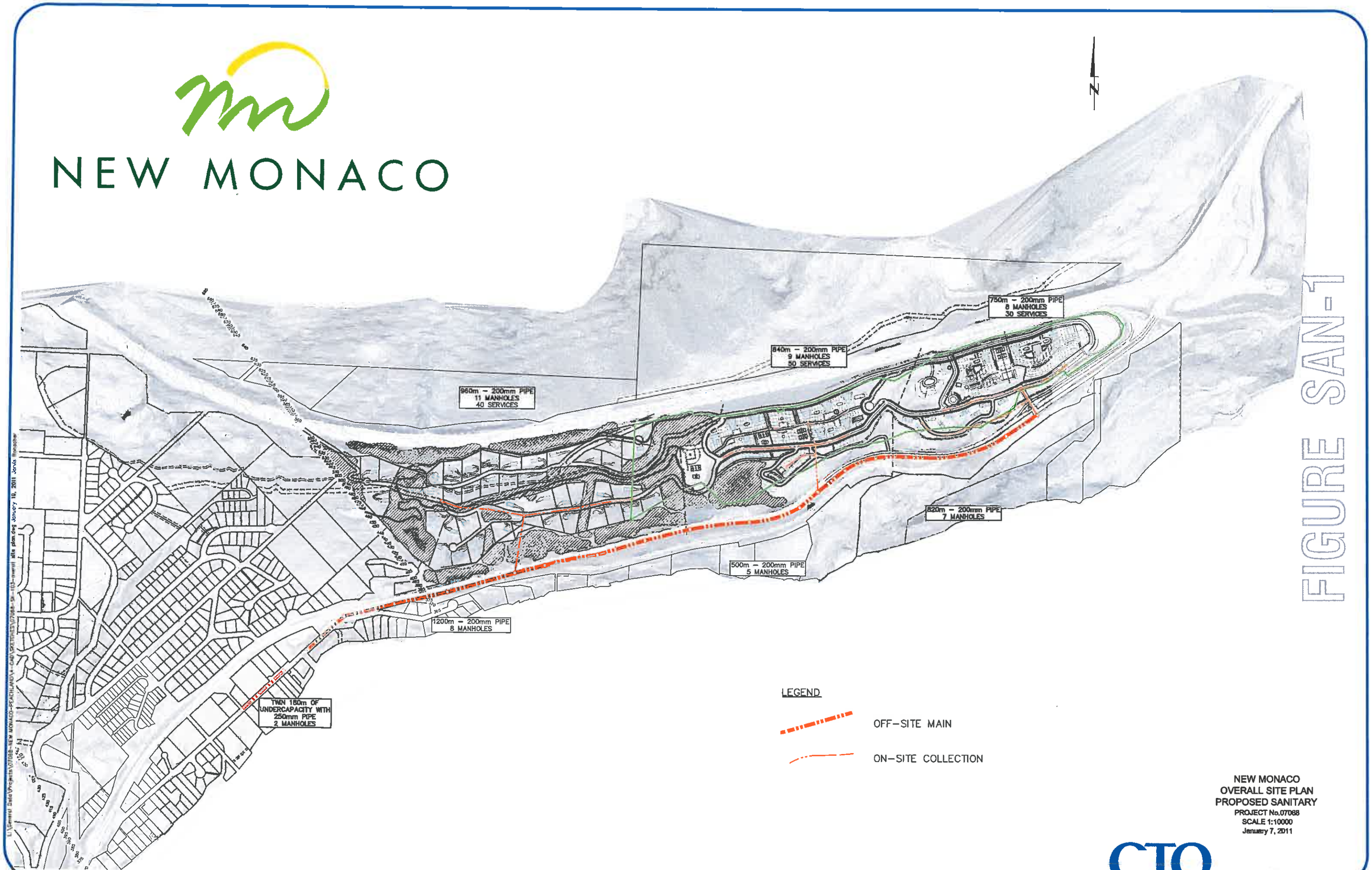


FIGURE SAN-1

NEW MONACO
OVERALL SITE PLAN
PROPOSED SANITARY
PROJECT No.07068
SCALE 1:10000
January 7, 2011

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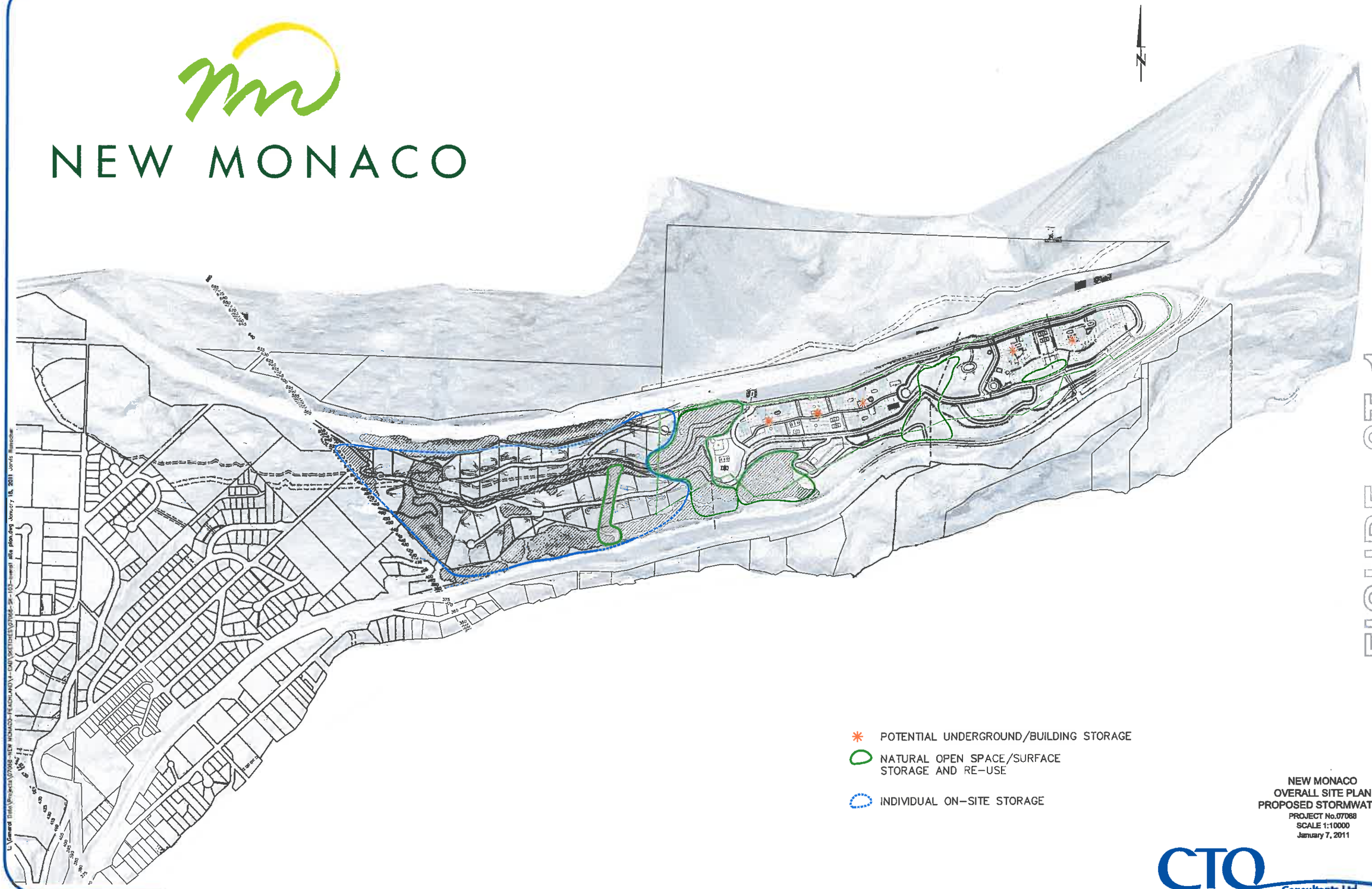


FIGURE ST-1

NEW MONACO
OVERALL SITE PLAN
PROPOSED STORMWATER
PROJECT No.07068
SCALE 1:10000
January 7, 2011

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