

# **Yukon Infrastructure Plan**

## **Inventory & Situational Analysis Report**

**Drinking Water**  
**Wastewater**  
**Solid Waste**

**DRAFT**

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## 1.0 INTRODUCTION

Like many areas across Canada, the existing infrastructure in Yukon communities is aging and needs to be replaced. In some instances, Yukon communities still lack basic infrastructure such as appropriate water distribution systems or proper sewage treatment facilities to meet health and safety and environmental regulations.

In 2008, the governments of Canada and Yukon signed a Framework Agreement and a Base-Funding Agreement under “Building Canada”, the Government of Canada’s new long-term infrastructure plan. Under these Agreements, the Yukon will receive \$182.9 million (\$26.13 million per year) from Canada over a seven year period ending in 2013-14 for priority infrastructure projects that are intended to help drive economic growth and productivity, achieve environmental goals, and build strong, competitive communities. A minimum of \$16 million will be made available under the Base-Funding Agreement for community based Public Infrastructure initiatives in the Yukon. In addition, First Nations and Yukon communities will receive \$60 million under the Building Canada Plan through the extension of the Gas Tax Fund between 2010 and 2014.

The Framework and Base Funding Agreements require the Yukon Government to develop a long term Yukon Infrastructure Plan. The plan will identify potential infrastructure gaps and significant infrastructure priorities and needs in the Yukon, including those within First Nation communities, municipalities, and unincorporated communities over the next 10 to 15 years. The Agreement also requires Yukon to submit Annual Capital Plans to Canada outlining the proposed projects to be undertaken in each year of program operation. The maximum federal contribution towards any approved projects is seventy-five percent (75%) with the remaining funds to be covered by Yukon and/or other participants.

The development of the Yukon Infrastructure Plan and the implementation of the Building Canada Base Funding will focus on five key areas - drinking water, wastewater, roads, solid waste management and green energy infrastructure. Particular emphasis will be placed on addressing issues and needs associated with existing development and existing infrastructure. By focusing on these areas, we can help to ensure that the base infrastructure for all Yukon communities is brought up to standard and will be available to support the needs of communities well into the future. There are fourteen other eligible categories supported by the program which may be considered as a secondary focus as the Yukon Infrastructure Plan is developed and implemented. Appendix A contains more information on the eligible spending categories under the two Agreements.

The Canada-Yukon Gas Tax Agreement (GTA) also requires the Yukon government to prepare an Integrated Community Sustainability Plan (ICSP) for unincorporated communities before funds can be accessed in these areas for eligible projects under the Gas Tax program. The eligible project categories under the GTA include the same items that will be examined under the Yukon Infrastructure Plan. The process of developing the ICSP and the Yukon Infrastructure Plan is also very similar in nature in terms of the information requirements, objectives, and consultation that must take place. Consequently it is the Yukon Government’s intention to carry out these two planning initiatives in a coordinated manner and as part of the development of one plan to avoid duplication of effort. Appendix A contains more information on the eligible spending categories under the GTA.

As an initial step in the planning process, the Yukon Government has prepared a draft Situational Analysis report which examines the current state of infrastructure in the territory and identifies known or potential infrastructure gaps and needs in relation to the five key categories noted above. The outcome of this review will be used to consult with all First Nation governments, Yukon Municipalities, Local Advisory Councils and the general public on the development of the Yukon Infrastructure Plan. Specifically the consultation process will focus on:

- Verifying that the current state of infrastructure in the Yukon, as described in the report, is accurate and complete.
- Identifying potential information gaps or areas requiring further assessment work in order to determine the state of infrastructure.
- Identifying what each First Nation government, municipality, Local Advisory Council and community views as the most significant infrastructure priorities over the next 10 to 15 years in relation to the five key eligible project categories.
- In unincorporated communities, identifying possible projects that could be funded under the Gas Tax program.

The results of the consultation process along with technical information obtained during the planning process will be used to develop the Yukon Infrastructure Plan which will act as a guide for prioritizing the infrastructure projects that are considered in each year of program operation.

## **Responsibility for Infrastructure**

Communities in the Yukon are classified as either incorporated (i.e. municipalities) or unincorporated (all other communities). Services, such as water supply and delivery, sewage collection and disposal, and solid waste management are provided from a variety of government agencies. The remaining sections of this document examine the existing state of infrastructure in the Yukon in relation to drinking water, wastewater, roads, solid waste management and green energy infrastructure. For each community and/or infrastructure type, the responsible agency is identified.

In the municipalities the responsibility for the development, operation and maintenance of the services identified in this report rests with the respective municipality. Through a Capital Funding Agreement, the Government of Yukon may provide capital funding assistance to a municipality, for projects that meet the criteria for Extraordinary Funding.

In the unincorporated areas the Yukon Government operates as the local government and provides services. The level of service provided varies from community to community based on local circumstances and considerations.

At present, the most common services provided by First Nations are water supply, water delivery and sewage education and garbage collection. First Nation communities receive funding from Indian and Northern Affairs Canada (INAC) for the delivery of services to those First Nation members that reside on Indian Reserves or on Land Set-Aside.

## 2.0 DRINKING WATER

The way in which Yukoners access drinking water can vary significantly depending on where they live. In larger Yukon communities and municipalities, water may be accessed through a municipal water supply and piped distribution system. By contrast, Yukoners living in rural areas may access drinking water through a trucked water delivery system; private wells; self haul from community wells or rivers; and from store-bought bottled water.

Managing drinking water in the Yukon is a cooperative effort between all levels of government, industry and stakeholders, including individual Yukoners. Within Yukon Government a number of departments play a role in the overall management of drinking water systems:

- Community Services, Community Development Branch currently manages seven community drinking water supplies and manages or contracts out four trucked water delivery operations
- Health and Social Services, Environmental Health Services Branch monitors and regulates Drinking Water Quality in the Yukon in accordance with the Yukon *Public Health and Safety Act* and its regulations.
- Environment, Water Resources Branch administers water-related policies, regulations and programs under the *Waters Act*.
- Highways and Public Works, Property Management Agency and Yukon Housing Corporation develops and operates water systems for Yukon Government-owned facilities in communities throughout the Yukon

The roles of other levels of government can vary in each community but generally:

- Indian and Northern Affairs Canada (INAC) provide a funding and advisory role to First Nation communities to ensure safe drinking water.
- Most First Nations, both self-governing and non-self-governing, manage all or part of their water supply and distribution (trucked, private wells) to their members. Some First Nations also provide public drinking water access points for self haul and trucked water services for rural Yukoners.
- Municipalities manage the water supply and distribution (piped, trucked) within municipal boundaries (this may include First Nation communities). Some municipalities also provide public drinking water access points for self haul and trucked water services for rural Yukoners.

It is estimated that there are approximately 2,000 private wells in the Yukon. Yukoners with private systems, i.e. wells and/ or water holding tanks are responsible for the operation and maintenance, testing and treatment of their individual systems.

Environmental Health Services Branch as the regulator of public water supply quality, will be completing assessments of all the public water supply and distribution systems in the Yukon. This will assist in determining where upgrades and improvements are needed to existing systems in incorporated and unincorporated communities.

## 2.1 Incorporated Communities:

<b>CARMACKS</b>	<b>Population:</b> 472	<b>System Provider:</b> Private Systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Ground water from individual wells in village core	
<b>Water Treatment System:</b>	n/a	
<b>Water Distribution System:</b>	There is no piped water distribution system in the village.	
<b>Year Constructed:</b>	n/a	
<b>Last Modified:</b>	n/a	

### Observations and Comments

With the exception of several homes on water delivery, the drinking water for homes and businesses in the community is provided by individual wells. According to the Village of Carmacks, individual wells have proven to be expensive to develop and have not always served as a safe and reliable water source. While the water quality is usually good, there have been a number of boil water advisories in the last several years.

The Yukon State of the Environment Report for 2005 indicates that in late 2005, a boil water advisory was implemented after 82 wells were tested and were found to contain *E-coli* bacteria. As an interim solution to addressing water quality problems, Carmacks has been using chlorine to treat problematic wells as they are identified.

In the past, concerns have also been raised about the possibility of cross-contamination of shallow wells by leakage from the sewage collection system or from the rise and fall of the water level of the Yukon River. Contamination of these wells from surface runoff was also raised as a concern. Although evidence of cross contamination from the sewage collection system has not been found, repairs completed to date on the existing sewage collection system have reduced the possibility of cross contamination resulting from leakage. The repairs have also reduced the infiltration which in turn has reduced the flow in the sewer mains, thereby improving the efficiency of the existing mechanical treatment plan.

The construction of a community well, filtration system and a community water distribution system for Carmacks has been identified by the Village of Carmacks as a priority for some time now. A water distribution system will ensure that all residents have access to safe and reliable drinking water. It has been noted that the Little Salmon/Carmacks First Nation is also investigating the feasibility of constructing a water distribution system and therefore they may be an opportunity to coordinate efforts.

Source: *Village of Carmacks, Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*  
*Department of Environment, Yukon State of the Environment Report, 2005*  
*The Association of Yukon Communities, Infrastructure Works: Building Yukon's Future Together, July 2002*

### Potential Projects:

The following potential projects have been identified by the Village of Carmacks in their Integrated Community Sustainability Plan:

<b>Project</b>	<b>Est. Cost</b>
➔ Community well, filtration system, community water distribution system	unknown

<b>DAWSON CITY</b>	<b>Population:</b> 1,923	<b>System Provider:</b> Town of Dawson City
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater is obtained from three drilled wells that are located along Front Street.	
<b>Water Treatment System:</b>	Chlorination	
<b>Water Distribution System:</b>	Piped	
<b>Year Constructed:</b>	1979	
<b>Last Modified:</b>	1995	

### Observations and Comments

Most of the community is supplied with water through a piped water distribution system which is fed by three infiltration wells. There are also local contractors who provide water delivery to the north-end of Downtown as well as the Dome area.

There is a fourth older well located in the YEC Diesel Generation compound which is used as an emergency backup supply. The town would like to replace this well to ensure full redundancy within the system.

The main water supply and distribution system in Dawson is considered to be in good condition. However, there are sections with dead ends and some connections to the main system have longer sections of pipe which require bleeding as a result. Approximately five years ago, conservation measures, including water meters and flow reducing bleeder devices were installed but have not been used.

Dawson's potable water chlorination system is approximately 30 years old now and will need upgrades in the near future to meet the new Canadian Guidelines for Drinking Water Quality for well water or ground water that is under the direct influence of surface water (GUDI). The three (3) infiltration wells that currently serve as the community's water supply require a remote monitoring program to record well water levels and flow.

Source: *The City of Dawson and the Tr'ondek Hwech'in First Nation, Integrated Community Sustainability Plan, 2008*  
*Department of Community Services, Infrastructure Status Report, 2002*

### Potential Projects:

The following proposed projects have been identified by the Department of Community Services:

<b>Project</b>	<b>Est. Cost</b>
➡ Upgrades to Potable Water Chlorination System	unknown
➡ Remote monitoring for Infiltration Wells	unknown
➡ Decomission & replace 4 <sup>th</sup> Well for full redundancy	unknown

<b>FARO</b>	<b>Population:</b> 395	<b>System Provider:</b> Town of Faro
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater from three shallow groundwater wells located on the lower bench close to the Pelly River.	
<b>Water Treatment System:</b>	Chlorination	
<b>Water Distribution System:</b>	Faro has a piped water distribution system. Some sections of system have been valved off and decommissioned where there is no housing occupancy.	
<b>Year Constructed:</b>	1960s	
<b>Last Modified:</b>	unknown	

### Observations and Comments

The wellheads are well protected within the pumphouses and are elevated above the surrounding ground. The area has been subject to flooding and icing from jamming of the nearby creek, however, it appeared the problem has been eliminated by creating a berm alongside the creek. With low population levels, some sections of the town water mains have dead ends. A backup generator station is provided at Pumphouse 2H.

According to *Town of Faro, Integrated Community Sustainability Plan*, Faro's water infrastructure is deteriorating and there are persistent leaks occur across the system. The water and sewer infrastructure is still composed of old pipes made of asbestos/concrete, iron/steel, and fossil fuel based polyethylene. Lead used in some of the solder found across the system presents health and other sustainability risks.

Faro has only one supply line from its water source. A failure in this line would be a catastrophic event for the community. The town has received Gas Tax funding to install high-efficiency pumps to reduce electrical consumption. Buildings and homes have controlled bleeding. Low-flow toilets and showerheads have been installed in some buildings. There have been system improvements including pipe replacement.

The upgrading and replacement of existing water and sewer mains was identified as high priority item in *Infrastructure Works: Building Yukon's Future Together* prepared by the Associations of Yukon Communities, July 2002 (estimated at 4M). Sections of the water distribution and collection system should be closed before proceeding with any upgrades.

Source: *Town of Faro, Integrated Community Sustainability Plan, 2007*  
*Department of Community Services, Infrastructure Status Report, 2002*  
*The Association of Yukon Communities, Infrastructure Works: Building Yukon's Future Together, July 2002*

### Current Projects:

#### Project

➡ Replace well pump motor in Well-House #1 with variable frequency drive (VFD) motor

#### Est. Cost

\$35,105.20 (Gas Tax)



## Potential Projects:

The following proposed projects were identified in the Town of Faro Integrated Community Sustainability Plan:

Project	Est. Cost
➡ Upgrade and replace distribution & collection system	unknown
➡ Improve system design & build redundancy into water system	unknown
➡ Protection of Water Source and Supply	unknown

HAINES JUNCTION	Population: 848	System Provider: Village of Haines Junction
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b>  <b>Year Constructed:</b> <b>Last Modified:</b>	Water is obtained from Well No. 3 and Well No. 5. Chlorination Piped. The Village of Haines Junction also provides water to the adjoining CAFN community through a looped circulation system. CAFN owns and operates a water truck delivery service to some residences in and around Haines Junction, as well as Canyon Creek. 1970s 1996	

## Observations and Comments

The core of Haines Junction is serviced by a distribution system and fed by two well sites - well #3 & well #5. Well site #3 is located near the Dezdeash River and provides two thirds of the water in the system and has the capacity to supply 100% of the town's demand. It provides water at 7 degrees Celsius, and although it has artesian characteristics, well #3 operates off a pump.

Well #5 operates completely on the artesian flow and offers significant potential for geothermal as it has a temperature of around 17 degrees. While the pressure has remained relatively constant, the volume produced by the well has dropped recently likely due to a physical barrier in the system. Regardless of the cause, the vulnerability of relying on the artesian properties of the well are apparent. The high temperature of both sources decreases freezing risk and offers opportunity for alternative energy usage.

Wells No.1 and 2, located near the Dezdeash River, are not used due to hardness and siltation problems. Well No. 4 located near Pumphouse No. 2 on the Willow Acres Road on the north side of the Village has been used in the past but has siltation problems and is not in service.

Drinking water in the community will soon require more intensive treatment as a result of the new Canadian Guidelines for Drinking Water Quality around arsenic content. In January 2009, funding was approved under *Building Canada* to work towards a solution to this issue. Water from each well is currently treated separately, and well #3 pumps directly into the distribution system. The most economical response to the arsenic issue may be to feed both well sites into a common treatment plant prior to distribution. The water tower is the most likely treatment site.

The Champagne and Aishihik First Nations delivers water to its citizens living on settlement land through its Public Works department. Residents who do not get their water from the Village water distribution network or CAFN delivery access their water on an ad hoc basis through a carded water distribution system at the water tower

The artesian flow of well #5 is unable to meet the full demand of the community should well #3 break down. Building redundancy into the system will ensure the integrity of the water supply.

It is recognized that the capacity of existing pumps at well #3 & well #5 may be unable to meet the needs of local fire crews in the case of a forest fire. The Village has received approval under the Municipal Rural Infrastructure Fund for a project designed to improved pumping capacity at well #3 and install a pump and testing station at well #5. Work is expected to proceed in the Summer of 2009.

### Plans for Modification and Expansion

Water treatment system for arsenic: New regulations for levels of arsenic in community drinking water will require the Village of Haines Junction to introduce new filtration technology to the water system by 2011. This will positively affect the community by increasing the safety of public drinking water. In January 2009, funding was approved under *Building Canada* to design and construct an upgraded water treatment plant capable of treating surface water and to meet current and future regulations.

Tie well #3 and #5 together at water tower: Well #3 currently feeds directly into the distribution system for some homes. The required new water treatment system noted above will likely require that all community water be brought to a central location for treatment prior to distribution. The logical location for this is at the existing water tower.

Source: *Village of Haines Junction, Integrated Community Sustainability Plan, 2007*  
*The Association of Yukon Communities, Infrastructure Works: Building Yukon's Future Together, July 2002*

### Current Projects:

Project	Est. Cost
➔ Improve pumping capacity at well #3 and install a pump and testing station at well #5	\$ (MRIF)
➔ Water treatment system for arsenic	1.125 Million (Building Canada)

### Potential Projects:

The following proposed projects were identified in the Village of Haines Junction, Integrated Community Sustainability Plan:

Project	Est. Cost
➔ Tie well #3 and #5 together at water tower	unknown

The following proposed projects were identified in the Association of Yukon Communities report *Infrastructure Works: Building Yukon's Future Together, July 2002*:

Project	Est. Cost
➔ Construct an additional water reservoir	250k in 2002
➔ Extend water and sewer services north along the Alaska highway	1.5M in 2002

➔ Upgrade existing water mains to meet fire demand	500k in 2002
➔ Installation of back up chlorinators at the water plant	150k in 2002
➔ Replace service lines to reduce the need to operate water bleeders	150k in 2002

<b>MAYO</b>	<b>Population:</b> 466	<b>System Provider:</b> Village of Mayo
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Water is obtained from a cold-water well within the water pumphouse compound. Two warm wells provide heat to prevent freezing in the winter.	
<b>Water Treatment System:</b>	Chlorination is tested daily.	
<b>Water Distribution System:</b>	Piped water is circulated by a looped distribution system and reheated as required at the pumphouse using water from the warm wells and a heat exchange system.	
<b>Year Constructed:</b>	1960s	
<b>Last Modified:</b>	1999	

### Observations and Comments

Most of the houses located in the Village of Mayo are supplied with water through piped water maintained by the Village of Mayo. NND purchases bulk water from the Village of Mayo for delivery to houses without piped water, including those houses in the C-6 subdivision, with an NND owned water truck.

The Village has a program of water main replacement and has considered the elimination of bleeders to conserve water. In 2002, it was reported that the pumphouse and storage facilities were functioning well. It was also noted at the time that there was little residue build-up in the reservoir despite the fact that it had not been cleaned in the 12 years since it was constructed.

Improvements in existing water infrastructure are required in certain areas of the Village. The poor state of some segments of these basic municipal services threaten the supply of clean water and the removal of wastewater for some residents. In particular, Water distribution system upgrades are required on the west side of 4<sup>th</sup> Avenue, the NND residential area and 1<sup>st</sup> Avenue (ISCP). Repair and upgrading of existing 4<sup>th</sup> Avenue water main was also listed as a priority in *Infrastructure Works: Building Yukon's Future Together* prepared by the Associations of Yukon Communities, July 2002 (estimated at 700k).

Replacing all dead end water mains is considered too expensive so bleeders will continue to be used on those dead end mains that remain in service.

The Na-Cho Nyak Dun are interested in developing a community water supply well, water treatment facility, piped distribution and fire protection system for the C-6 subdivision. This includes the construction of small diameter domestic water distribution loop to existing C6 housing area, approximately 2000m of mainline and 3000m of services for 60 units, plus pumping, heating and circulation to be added to a central services building. The proposed central services building would house the water treatment equipment and water storage for domestic and fire protection purposes. The services building would also house fire pumps and a standby generator which would provide services to all core building developments. In the interim, a truck fill point will be provided for trucked water distribution to existing and proposed housing units.

Source: *Na-Cho Nyak Dun, Integrated Community Sustainability Plan, 2008*  
*Village of Mayo, Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*

**Current Projects:**

Project	Est. Cost
➤ Na-Cho Nyak Dun: Geo-exchange heating system and central water supply for new Government House, subdivision (Phase One)	\$2,495,000 (\$535,000 Gas Tax)

**Potential Projects:**

The following proposed projects were identified in the Na-Cho Nyak Dun, Integrated Community Sustainability Plan, 2008:

Project	Est. Cost
➤ Community Water Supply Well/Water Treatment Facility/Piped Distribution system for C-6 subdivision	Unknown
➤ Fire Protection Water Tanks & Distribution System	Unknown
➤ Truck fill point	Unknown

The following proposed projects were identified in the Village of Mayo, Integrated Community Sustainability Plan, 2006:

Project	Est. Cost
➤ Water distribution system upgrades - west side of 4 <sup>th</sup> Avenue	700k in 2002
➤ Water distribution system upgrades - NND residential area	unknown
➤ Water distribution system upgrades - 1 <sup>st</sup> Avenue	unknown

TESLIN	Population: 458	System Provider: Village of Teslin
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater from a community well. Lake intake provides an alternate source of water. Some individual wells in village core.	
<b>Water Treatment System:</b>	Chlorination	
<b>Water Distribution System:</b>	Trucked water delivery. Some individual wells in village core.	
<b>Year Constructed:</b>	1989	
<b>Last Modified:</b>	unknown	

**Observations and Comments**

The Village of Teslin delivers water by truck from the Community well to the Airport, Smarchville, and the main village. There are 31 homes on individual wells.

According to information obtained from Indian and Northern Affairs Canada, approximately 50% of the Teslin Tlingit Council (TTC) members gather water from Ten Mile Creek or Teslin Lake as they prefer this over the taste of chlorinated trucked water. The lake source is more likely to contain bacteria, viruses and protozoa, and can have varying physical and chemical characteristics, making it less reliable as a raw water source than the well. The treatment facilities may not be adequate for virus or protozoa inactivation. As such, when used in a backup emergency situation, chlorine levels and retention times need to be balanced to ensure that a safe water supply is made available to consumers.

Some private wells are contaminated and the delivery truck occasionally runs into contamination issues. Teslin has started to address some of the issues in the water system. Older home water tanks are being removed, efforts are being made to introduce water conservation measures into government owned buildings and new national standards for drinking water quality will ensure that community drinking water remains clean.

Currently the community of Teslin is reliant on a single source for their water supply. To provide redundancy and ensure uninterrupted water for residents, a secondary source is desired. Depending on the source of the back up supply, additional filtration may be required.

Drinking water in the community will soon require more intensive treatment as a result of the new Canadian Guidelines for Drinking Water Quality around arsenic content. A new filtration system will be required to meet the new guidelines that come into effect in 2011. In January 2009, funding was approved under *Building Canada* to address this issue.

The recreation complex is currently suffering from less than ideal water quality. The existing water supply in the recreation centre is from a dedicated well, and new equipment within the building is required to enable the switch to the higher quality municipal water supply.

The village's well provides reliable, safe drinking water. Protecting the wellhead has a two-fold benefit. In terms of human need, wellhead protection will help ensure the potability of the community's drinking water. In addition, protecting the wellhead at this stage will help reduce unexpected costs related to maintaining or replacing infrastructure, which could be left vulnerable without this pre-emptive investment.

The TTC are reviewing the possibility of creating 160 new residences with piped water and sewer in the Airport West subdivision.

Source: *Indian and Northern Affairs Canada, First Nation Water and Wastewater System Inventory, 2002*  
*Department of Community Services, Infrastructure Status Report, 2002*  
*Teslin Tlingit Council & Village of Teslin, Integrated Community Sustainability Plan*

### Current Projects:

#### Project

#### Est. Cost

➡ Filtration system to satisfy new national drinking water standards

1.125 Million (Building Canada)

➡ Recreation Centre water supply – install water tank in new outbuilding with backup generator, connected to existing infrastructure to provide clean, safe drinking water

\$40,366.67 (Gas Tax)

### Potential Projects:

The following proposed projects were identified in the Teslin Tlingit Council & Village of Teslin Integrated Community Sustainability Plan:

#### Project

#### Est. Cost

➡ Secondary water supply (& filtration if necessary)

Unknown

➡ Wellhead protection

Unknown

<b>WATSON LAKE</b>	<b>Population:</b> 1594	<b>System Provider:</b> Town of Watson Lake
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater, two wells.	
<b>Water Treatment System:</b>	Chlorination. The system is also flushed at least twice a year.	
<b>Water Distribution System:</b>	Piped The piped distribution system serves approximately 1,000 people. The Liard First Nation owns their own water hauling service, which delivers water to the residents who live outside the existing infrastructure reach. Other Watson Lake residents pick up bulk water at the town's truck fill station. Portions of the town not served by water mains use the bulk water service or have individual wells.	
<b>Year Constructed:</b>	1970s	
<b>Last Modified:</b>	There have been two expansions since the water and sewer systems were installed in the 1970s.	

### Observations and Comments

The total water supply for the Town currently comes from 2 active ground water wells (1 & 1A) located in the vicinity of 1<sup>st</sup> Wye Lake and 6<sup>th</sup> Street. Water is pretreated at a pumphouse with chlorine injection and then pumped to an elevated underground storage reservoir located on the north side of the townsite, above the Campbell subdivision. From there it is distributed by gravity to homes and businesses within the service area.

There are a number of issues associated with the Town's water supply and distribution system:

#### Water Quality & Supply

As noted above, wells 1 and 1A are currently providing the total water supply for the Town. A third well (#2) was drilled in 1993 and was brought into service in 1995 with a pumping capacity upgrade. However, this was later abandoned due to poor water quality and the potential for contamination from surrounding development. A 4<sup>th</sup> well (#3) was drilled in the Summer of 2006 in vicinity of the existing wells, but has not been placed into production due to high turbidity, iron and manganese levels. The well is connected to the system by pipe but has no pump or power at this time.

Iron and manganese are two chemical parameters in the Town's water supply that tend to be slightly above the aesthetic limits as per the Guidelines for Canadian Drinking Water Quality. Aesthetic Objectives do not reflect public health issues, but rather taste, odour, staining, and washing related issues with the users. In addition, iron and manganese has an affect on the operation and maintenance of the entire system. For example, in December of 2008 the pump for Well 1A failed due to a build up of iron and manganese. It has been recommended that a filtration system be installed for the water in order to alleviate or dramatically decrease the iron and manganese content. If installed, Wells 3 & 4 could become operational. The filtration system would also decrease sediment build up in the pipes and help to prevent premature failure of water pumps.

#### Wellhead Protection

It is assumed that both wells 1 & 1A do not have proper casing seals to prevent surface contamination of the aquifer. In addition, the areas around the wellheads are not protected from public access. Water is being drawn from a relatively shallow, highly permeable aquifer zone and, as such, may tend to be at a higher risk of contamination from potential surface or subsurface sources. Although there is no obvious development or activities near the well sites at this time, it would be prudent to provide protection to the areas around the wellheads with the use of fencing. Well #3 does have a casing seal to prevent surface contamination from entering the well.

### Water Pumphouse

The water pumphouse serving the Town was built in 1976, and designed for a community population of approximately 750. Ongoing work has been undertaken on the pumphouse as part of general facility maintenance on the pumps and the electrical systems. In 2004, an assessment of the condition of the water pumphouse was carried out and a number of deficiencies were identified. Although some of these issues have since been addressed, the pumphouse still requires a backup power supply and there is a need to replace the process piping outside the pumphouse as a result of problems with corrosion. In addition, the existing holding tank needs to be replaced with a larger one to improve chlorine contact time. The chlorine retention tank is manufactured from concrete and is beginning to show signs of crumbling both inside and outside the tank.

### Water Reservoir

The existing reservoir has a working capacity of approximately 1.138 million litres or 250,000 gallons and needs to be enlarged as it does not have the capacity to supply enough water to adequately extinguish a large structure fire (ICSP). Even with the existing wells in production during a fire, the total production and storage falls short of the fire storage requirements.

### Water Distribution System

There are two water mains and approx 40 feeder lines to unused lots, which freeze seasonally. It has been noted that the looping of these lines and installing valve stops at the vacant lots would help to alleviate the recurring freezing and subsequent massive water leakage into the ground.

There are still homes within the core of the residential area that do not have water or sewer available to them. This forces them to depend on aging wells and septic systems.

The Town of Watson Lake is currently completing a feasibility study for the phased replacement of its water and sewer pipes. The Town is also contemplating the extension of some services to adjacent areas east and west of the main core of Town.

Source: *Town of Watson Lake, Integrated Community Sustainability Plan, 2007*  
*Earth Tech(Canada) Inc, Watson Lake Pumphouse Preliminary Design Report, 2004*  
*Quest Engineering Group, Infrastructure Assessment Report, Town of Watson Lake, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*

## **Potential Projects:**

The following proposed projects have been identified by the Town of Watson Lake in their Integrated Community Sustainability Plan and other related documents:

<b>Project</b>	<b>Est. Cost</b>
➡ Pump house rehabilitation and expansion	\$750,000
➡ Water Treatment (including filtration system for water supply)	\$250,000
➡ Installation of Emergency Power Generation	\$325,000(Nov 2006)
➡ Construct New Water Storage Reservoir	\$1.354 M (Nov 2006)
➡ Upgrade water distribution & collection system	unknown
➡ Extend water and sewer services to areas not presently served	unknown
➡ Wellhead protection (Casing Seals for Wells 1 & 1A)	\$75,000 (Nov 2006) 125k in AYC 2002 Report

<b>WHITEHORSE</b>	<b>Population:</b> 25,403	<b>System Provider:</b> City of Whitehorse
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Mixture groundwater and lake intake	
<b>Water Treatment System:</b>	Chlorination	
<b>Water Distribution System:</b>	piped	
<b>Year Constructed:</b>	1960s	
<b>Last Modified:</b>	1999	

### Observations and Comments

The City of Whitehorse’s domestic water supplied is provided by a piped distribution system that draws water from Schwatka Lake and 5 ground water wells from an aquifer in the Riverdale neighbourhood. Currently, approximately 50% of the City’s water supply is made of ground water used primarily in the winter and spring, when the surface water is very cold or is dirty due to spring runoff conditions. The groundwater is used in the winter to warm the water supply and avoid the high costs of heating with fuel, and in the spring when high surface water turbidity can affect effective chlorination of the potable water supply.

After chlorination, the water is supplied to the city through the distribution system through five service areas consisting of a 5 reservoirs. The water system services an area of approximately 800 hectares from the neighbourhoods of Riverdale in the south to Crestview in the north. The water supply is pumped to the community from the main pumping station – Selkirk Pumping Station, which also distributes water to the downtown core and the neighbourhoods of Riverdale and Marwell. The Selkirk Water Pump house is over 50 years old and cannot meet maximum day water demands, new building and safety codes particularly for earthquake protection, and energy efficiency. The pipes and equipment are also old and are in constant need of repair. Water to the upper escarpment areas is supplied through the 2 Mile Hill Booster Station, which unlike Selkirk is a modern facility, sized to accommodate future population demands. Commercial and industrial areas, that obtain potable water supply are metered, while residential properties, with the exception of multi-family complexes which are also metered, are not metered, paying instead a flat monthly rate for water.

The rural areas of the City are not serviced from the City of Whitehorse water distribution system, but rely on private wells or on trucked water supplied by private businesses that draw water from the City’s distribution system.

The Kulan, MacDonald, and portions of Marwell Industrial areas although located within the urban district of the City of Whitehorse, are not serviced with water and sewer mains.

Two existing reservoirs in the older neighbourhoods are undersized and cannot meet the current Fire Underwriter’s Association standards, and the maximum day demand requirements. Future population grow in those areas are also compromised.

The City of Whitehorse is a high water demand city as compared to other Canadian Cities. The reasons for this include bleeding of water services and mains for protection from freezing weather, lack of metering, low cost to consumer for supply, low conservation efforts and water leakage.

Currently, Whitehorse has an abundant, very good quality water supply that is not costly to supply as the only treatment currently being done by the City is chlorination. Generally, the Schwatka Lake water supply is of good quality. However, there can be some seasonal turbidity, coliform concentrations in raw (not treated) water and evidence of *Giardia* from time to time. No



*cryptosporidium* cysts have been found in the tests. The groundwater supply is excellent with low to moderate hardness, and no evidence of bacterial contamination.

The distribution system is extensive and expensive to maintain. Due to climate change and glacier melting, the City of Whitehorse, in 50 to 70 years, may not have the same amounts of water at the same times that we currently enjoy. In 2004 and 2005, the City investigated the feasibility of expanding its groundwater supply to totally eliminate the need to use surface water from Schwatka Lake. Preliminary tests showed that adequate ground water supplies are available to meet the current and long term needs of the City (SOER 2005).

Source: *City of Whitehorse, Integrated Community Sustainability Plan, 2007*  
*Department of Environment, Yukon State of the Environment Report, 2005*

### Current Projects:

Project	Est. Cost
➡ Selkirk Well Development – on Selkirk aquifer in Riverdale	\$3,450,000 (Gas Tax)
➡ Treated Water Sampling Stations – Arkell, Granger, Logan	\$25,000 (Gas Tax)

### Potential Projects:

The following proposed projects have been identified by the City of Whitehorse in their Integrated Community Sustainability Plan:

Project	Est. Cost
➡ Ground Temperature Monitoring Stations	\$50,000
➡ Truck Fill Station at Fire Hall	\$200,000
➡ City Wide Water Meters	\$3,000,000
➡ Porter Creek Reservoir Upgrade	\$4,000,000
➡ Valleyview Reservoir Upgrade	\$4,100,000
➡ Heat Trace Assessment City Wide	\$100,000
➡ Selkirk Pump House Improvements	\$6,600,000
➡ Permanent Water Sampling Station	\$75,000
➡ Infrastructure Renewal Projects involving upgrades to water distribution system:	Unknown
• Hillcrest Reconstruction, Phase 1	
• Hillcrest Reconstruction, Phase 2	
• Downtown Reconstruction)	
• Black Street, 4th to 8th Avenue	
• Ogilvie , 2nd to 8th Avenue	
• Strickland, Alexander, Hanson, Hawkins	
• 6th Avenue, 400 Blocks of Cook & Wheeler	
• Marwell Upgrading	
• Gold, Gypsum, Silver, Industrial Dyke work	
• Tlingit road, Tungsten, Galena	

## 2.2 Unincorporated Communities:

<b>BEAVER CREEK</b> (including White River First Nation)	<b>Population:</b> 97	<b>System Provider:</b> Private wells/INAC provides funding for the communal wells (5 connections or more) to First Nation homes
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Groundwater. Two community water treatment plants and individual wells. Chlorination systems for both water treatment plants. Shallow groundwater wells piped to FN houses and low flow piped system to some houses 2008 2008	

### Observations and Comments

Beaver Creek's water supply primarily comes from private wells, which are drilled to a depth of 25 to 60 metres.

A well head protection plan was completed for the community in 2008.

The new water treatment plants include low flow water service to the community members and include chlorination of the groundwater. Water treatment is up to current national standards including redundancy on key system components (eg. Back up well and chlorination units).

Source: *Department of Community Services, Infrastructure Status Report, 2002*  
*Indian and Northern Affairs Canada, Water and Wastewater Assessments(2002-2005)*

<b>BRAEBURN</b>	<b>Population:</b> 15	<b>System Provider:</b> Private wells
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Groundwater or surface water or private water delivery unknown none unknown unknown	

### Observations and Comments

None.

<b>CARCROSS</b>	<b>Population:</b> 436	<b>System Provider:</b> Government of Yukon
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Surface water source (lake intake from Bennett Lake); some private wells. Automatic chlorination followed by 10 micron and a 1-micron multi-media cartridge filter. Government of Yukon's Department of Community Services operates a trucked water delivery under contract. Water use records are kept. '89 – '90 1992 — giardia filtration; 1997 — outdoor truck fill	

## Observations and Comments

Most of the community uses trucked water delivery service although private wells remain in use. The trucked water delivery system is reported to be operating at maximum capacity, due to the large number of customers that installed small tanks, which require frequent water deliveries.

The water system is 30 years old and needs to be upgraded to become compliant with the Canadian Drinking Water Regulations. In January 2009, funding was approved under *Building Canada* to design and construct an upgraded water treatment plant capable of treating surface water and to meet current and future regulations.

The construction of a water treatment plant and a piped water distribution system was also listed as a priority in the *Infrastructure Works: Building Yukon's Future Together* report prepared by the Associations of Yukon Communities, July 2002 (estimated at 5M).

Source: *Department of Community Services, Infrastructure Status Report, 2002*  
 Associations of Yukon Communities, *Infrastructure Works: Building Yukon's Future Together, 2002*

### Current Projects:

#### Project

➡ Design and construction of an upgraded water treatment plant capable of treating surface water and to meet current and future regulations

#### Est. Cost

\$1.5 M (Building Canada)

### Potential Projects:

The following proposed projects were identified in the Association of Yukon Communities report *Infrastructure Works: Building Yukon's Future Together*, July 2002:

#### Project

➡ Construction of a water treatment plant and a piped water distribution system

#### Est. Cost

\$5M

The following proposed projects were identified in the *Department of Community Services, Infrastructure Status Report, 2002*:

#### Project

➡ Back-up well system

#### Est. Cost

unknown

<b>DEEP CREEK</b>	<b>Population:</b> 100	<b>System Provider:</b> Private services
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	private wells; or surface water intakes; or water delivery.	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	none	
<b>Year Constructed:</b>	none	
<b>Last Modified:</b>	none	

## Observations and Comments

Water supply comes from private wells.

INAC also provides some trucked water delivery service to First Nation homes in the Lake Laberge area. In 2005, the Ta'an Kwäch'än Council constructed a well with the intention of building their own truck fill station.

Source: *Department of Community Services, Infrastructure Status Report, 2002*  
*Indian and Northern Affairs Canada, Water and Wastewater Assessments(2002-2005)*

<b>DESTRUCTION BAY</b>	<b>Population:</b> 48	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	groundwater from individual wells	
<b>Water Treatment System:</b>	n/a	
<b>Water Distribution System:</b>	n/a	
<b>Year Constructed:</b>	n/a	
<b>Last Modified:</b>	n/a	

### Observations and Comments

None.

<b>GOLDEN HORN</b>	<b>Population:</b> 279	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	individual wells	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	unknown	
<b>Year Constructed:</b>	unknown	
<b>Last Modified:</b>	unknown	

### Observations and Comments

None

<b>GRIZZLY VALLEY</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	individual wells	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	unknown	
<b>Year Constructed:</b>	unknown	
<b>Last Modified:</b>	unknown	

### Observations and Comments

None.

<b>HOTSPRINGS ROAD</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	individual wells	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	unknown	
<b>Year Constructed:</b>	unknown	
<b>Last Modified:</b>	unknown	

### Observations and Comments

The Firehall has a low yielding well (less than 5 gpm).

<b>IBEX VALLEY</b>	<b>Population:</b> 315	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	individual wells	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	unknown	
<b>Year Constructed:</b>	unknown	
<b>Last Modified:</b>	unknown	

### Observations and Comments

The Firehall has a low yielding well (less than 5 gpm).

<b>JOHNSON'S CROSSING</b>	<b>Population:</b> 25	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	individual wells	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	unknown	
<b>Year Constructed:</b>	unknown	
<b>Last Modified:</b>	unknown	

### Observations and Comments

None.

<b>KENO CITY</b>	<b>Population:</b> 15	<b>System Provider:</b> Government of Yukon
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater from deep well	
<b>Water Treatment System:</b>	Manual chlorination with 5 micron sediment filter.	
<b>Water Distribution System:</b>	Water is delivered to local residents using the water delivery truck. Elsa residents haul water from this system for personal use.	
<b>Year Constructed:</b>	1987	
<b>Last Modified:</b>	2000 water truck replaced and new pump installed in 2001.	

### Observations and Comments

Well water is provided to the residents and a public wash facility via a trucked delivery service. The Government of Yukon provides the operation and maintenance cost of the water truck, and building. The operation of the truck is done under contract with the community club. The limited number of clients (between 14 and 20 depending on the season) makes maintaining a residual level of chlorine difficult.

### Potential Projects:

The following proposed projects were identified in the *Department of Community Services, Infrastructure Status Report, 2002*:

Project	Est. Cost
➡ Options to resolve the chlorination issue	\$30,000

MARSH LAKE	Population:	System Provider: Government of Yukon
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater supply at firehall located in Judas Creek	
<b>Water Treatment System:</b>	Automatic chlorinator	
<b>Water Distribution System:</b>	self serve overhead 3" fill or 1/2" tap	
<b>Year Constructed:</b>	1992	
<b>Last Modified:</b>	A chlorination system was added in 00/01	

### Observations and Comments

#### Judas Creek

Residents fill their own tanks or hire private water delivery services. This well is equipped with an automatic chlorinating system. A system of chlorine monitoring is required. Better well head protection is required, including fencing and locking the well head box.

#### Army Beach

A public consultation process undertaken in 2005 determined the need for a second water supply point at the north end of Marsh Lake, for approximately 350 residents. Residents of this area consider the distance to the existing delivery point excessive.

In January 2009, funding was approved under *Building Canada* to design and construct a water treatment plant at the north end of Marsh Lake that would be capable of supplying drinking water for local residents as well as commercial water delivery businesses. The plant will require an underground intake line and treatment building capable of providing safe potable water for local residents who haul their own water as well as local water delivery companies.

### Current Projects:

Project	Est. Cost
➡ Design and construction of water treatment plant at north end of Marsh Lake (Army Beach)	\$2,500,000 (Building Canada)

### Potential Projects:

The following proposed projects have been identified by the Department of Community Services (2009):

Project	Est. Cost
➡ Improvements to existing Judas Creek system: well head protection, installation of backflow prevention on public water lines, remote chlorine monitoring (SCADA)	\$250,000

<b>MENDENHALL</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>		

### Observations and Comments

In June of 2005, the Yukon Government issued a “do not use” order for the community well at Mendenhall subdivision after traces of uranium came in higher than acceptable levels. The well remains closed.

Community Services has completed initial water sampling program this past summer to determine the extent of the uranium concentration. The department is reviewing the data to determine available options and the best way to proceed.

### Costs

Unknown

<b>MT. LORNE</b>	<b>Population:</b> 379	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Groundwater from private wells or private sector water delivery n/a n/a n/a n/a	

### Observations and Comments

None.

<b>OLD CROW</b>	<b>Population:</b> 251	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Groundwater from Public Well. A second Well services 5 houses and Land Claims Office. There are 21 houses serviced by 11 other individual wells. Automatic Chlorination that is paced to the submersible pump. Water is distributed to Old Crow residents using the water delivery truck owned and operated by YG. Water is trucked to 111 homes and 14 community buildings. 1982 A new pump installed in 1998. Pumphouse improvements carried out in 2001.	

### Observations and Comments

Concern has been raised by VGFN that reliance on one well is not safe and it has been suggested that the community should have a back up water source.

The present water supply building has an outside fill port for filling the water truck for delivery. An indoor truck fill point has been identified as a desirable feature due to the extreme cold weather and icy conditions created by the spillage from the truck as it is filled. This would also allow for the installation

of a larger storage tank and reduce the fill time required hence increasing the time available for delivery of water. It would also provide a supply of water for emergency purposes.

Indian and Northern Affairs Canada funded upgrades to VG individual house water tanks and septic holding tanks in 2005-06.

**Potential Projects:**

The following proposed projects were identified by the *Department of Community Services (2009)*:

<b>Project</b>	<b>Est. Cost</b>
➡ Complete assessment for chlorination system upgrades, new tank(s) and building including emergency supply, SCADA off-site monitoring	\$ 1.5 Million

<b>ROCK CREEK</b>	<b>Population: 20</b>	<b>System Provider: Government of Yukon</b>
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater from community well.	
<b>Water Treatment System:</b>	Automatic Chlorination.	
<b>Water Distribution System:</b>	Self serve overhead 3" fill on 1/2" tap.	
<b>Year Constructed:</b>	1992	
<b>Last Modified:</b>	none	

**Observations and Comments**

The separation distance between the well and septic system is less than the sixty (60) metres as set out in Environmental Health’s new standard. Backflow prevention required on the overhead fill line and the hose bib. A system of chlorine monitoring is required.

**Potential Projects:**

The following proposed projects have been identified by the *Department of Community Services(2009)*:

<b>Project</b>	<b>Est. Cost</b>
➡ Improvements to existing water supply system: well head protection, installation of backflow prevention on public water lines, remote chlorine monitoring (SCADA), evaluate well location and need for GUDI filtration.	\$1 Million

<b>ROSS RIVER</b>	<b>Population: 369</b>	<b>System Provider: Government of Yukon</b>
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater from Community Well	
<b>Water Treatment System:</b>	Automatic Chlorination	
<b>Water Distribution System:</b>	Trucked water delivery carried out under contract by Community Services.	
<b>Year Constructed:</b>	1986	
<b>Last Modified:</b>	System upgrading including 2001 overhead tank, stand, new pump and water supply piping installed to reduce fill time.	



## Observations and Comments

There is one well serving the community of Ross River. This has been raised as a concern from a safety perspective. The water source is a deep well located next to the fire hall in the centre of the community.

Water is delivered to most of the community residents, and its businesses and institutions by a private contractor who uses a truck owned by the Yukon government. The truck delivery is approaching its maximum capacity in terms of deliveries that can be made in a day. Future growth in the community may require additional resources either for a second delivery vehicle or establishing a limited piped distribution system or increasing the size of tanks in new installations or when replacing old tanks. A limited piped system could serve the high water users in close proximity to the water supply building/fire hall thus increasing the time the truck is available to deliver water to the rest of the community. The Yukon Government has plans to establish a piped system to service the hotel, school and health center during the Summer of 2009. The establishment of a piped water service for the entire community was listed as priority in the Ross River Dena Council's Integrated Community Sustainability Plan (ICSP).

Iron and manganese are two chemical parameters in Ross River's water supply that tend to be slightly elevated but do not reflect public health issues. The Ross River Dena Council's ICSP indicated that *"Although the water from the community well is tested regularly and passes the minimum required standards, there is an ongoing concern that the water source is highly vulnerable to contamination. The quality of the water is also viewed as being unacceptably poor"*.

Drinking water in the community will soon require more intensive treatment as a result of the new Canadian Guidelines for Drinking Water Quality around arsenic content. In January 2009, funding was approved under *Building Canada* to design and construct an upgraded water treatment plant capable of treating surface water and to meet current and future regulations. The current facility is not capable of housing the required plant and delivery vehicle to meet this objective.

In the past year, two fuel spills are suspected to have occurred at the well house facility. The return line on the fuel tank used to heat the facility broke, however officials have been unable to determine where the fuel may have gone or how much fuel may have been lost.

Source: Ross River Dena Council, *Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*

### Current Projects:

#### Project

➡ Water treatment plant and delivery system (storage & building expansion)

#### Est. Cost

\$1,500,000 (Building Canada)

### Potential Projects:

The following proposed projects were identified in the Ross River Dena Council's Integrated Community Sustainability Plan:

#### Project

➡ Piped Water Distribution System

#### Est. Cost

unknown

<b>SILVER CITY</b>	<b>Population:</b> 15	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	private wells unknown unknown unknown unknown	

**Observations and Comments**

None

<b>STEWART CROSSING</b>	<b>Population:</b> 30	<b>System Provider:</b> Private systems
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	private wells unknown none unknown unknown	

**Observations and Comments**

None

<b>TAGISH (Taku/California Beach)</b>	<b>Population:</b>	<b>System Provider:</b> Government of Yukon
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Groundwater from Community Well Automatic chlorination and Iron filtration. Self-haul by residents. 1990/91 2000/01 added automatic chlorinator	

**Observations and Comments**

Backflow prevention is required on outside fill lines. A system of chlorine monitoring is required.

**Potential Projects:**

The following proposed projects have been identified by the Department of Community Services (2009):

**Project**

- Additional storage needed for water tank, installation of backflow prevention on public water lines, remote chlorine monitoring (SCADA).

**Est. Cost~**

\$500,000

<b>WEST DAWSON/SUNNYDALE</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private Services
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater or surface water or private water delivery	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	none	
<b>Year Constructed:</b>	unknown	
<b>Last Modified:</b>	unknown	

### Observations and Comments

Many residents of the Sunnydale area access surface water from Swede Creek.

## 2.3 First Nation Communities:

Most First Nation communities obtain their water services from the adjacent incorporated or unincorporated community, however there are some areas where the system is owned and operated by the First Nation. These are generally in areas where no Territorial services are provided.

### Carcross/Tagish First Nation:

The First Nation have a well and water storage building from which they operate a trucked water delivery service to the community of Tagish.

<b>SQUANGA LAKE</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private wells installed by Carcross Tagish First Nation
<b>Water Supply Systems:</b>		
<b>Water Source:</b>	Groundwater and some incidental use of water from Squanga Lake	
<b>Water Treatment System:</b>	unknown	
<b>Water Distribution System:</b>	n/a	
<b>Year Constructed:</b>	1998	
<b>Last Modified:</b>	1998	

### Observations and Comments

A boiling water advisory is in affect for all surface water taken from Squanga Lake.

A hydrogeological assessment of the Squanga well was completed by INAC in 2003/04. In the following year, funding was allocated to address a manganese problem associated with the individual wells. A water storage tank cleaning program was initiated and some tanks were upgraded.

Five homes access water through a trucked water delivery service provided by CTFN.

Source: *Indian and Northern Affairs Canada, Water and Wastewater Assessments(2002-2005)*

<b>TAGISH (Bridge/ Campground Area)</b>	<b>Population:</b>	<b>System Provider:</b> Carcross Tagish First Nation
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	groundwater from shallow well chlorination trucked water delivery to local residents. 1993-94 2000 – new building for housing truck and chlorination system	

**Observations and Comments**

The Carcross/Tagish First Nation provides a trucked water delivery service to the community of Tagish.

A Well Head Protection Plan was initiated in 2002/03 and needs to be completed. In the same year an attempt was made to redevelop the Tagish Well since it had filled in with sediment. It was determined that a backup well was required and this was drilled in the same year (Well #2). A third well (Well #3) was developed in 2004/05 and a backup generator was installed for the Tagish facility. Both Well #2 & Well #3 have high manganese and therefore a manganese filter has been installed.

The CTFN Tagish water treatment plant is ranked by INAC as a ‘high risk’ system due to the 2006 revision to maximum allowable arsenic limits. The system is targeted for funding of feasibility and design in 2009 and will include a water source protection plan preparation. Depending on when the final design is completed the construction phase is planned for 2010.

Source: *Department of Community Services, Infrastructure Status Report, 2002  
Indian and Northern Affairs Canada, Water and Wastewater Assessments(2002-2005)*

**Current Projects:**

<b>Project</b>	<b>Est. Cost</b>
➡ Upgrades to bring the Tagish water treatment plant up to current national standards including the treatment for arsenic	1.125 Million (Building Canada)

**Potential Projects:**

The following proposed projects have been identified by the Carcross/Tagish First Nation:

<b>Project</b>	<b>Est. Cost</b>
➡ The First Nation is interested in partnering with the Yukon Government to establish a piped water distribution system.	\$3,000,000

**CHAMPAGNE & AISHIHIK FIRST NATION**

**Water Supply Systems:**

The First Nation provides the service in the communities of Champagne, Canyon Creek and the Takhini River Subdivision. A trucked water delivery service from a well and water storage building is provided in the Takhini River Subdivision.

In general, most residences in Champagne have individual wells, however trucked water delivery service is provided from Takhini River Subdivision to those without wells.

Trucked water delivery from Haines Junction is provided in Canyon Creek.

<b>CANYON CREEK</b>	<b>Population:</b> 25	<b>System Provider:</b> Champagne Aishihik First Nation
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Surface water/seepage from river to underground reservoir none Trucked water delivery from community well or Haines Junction or Takhini Subdivision mid 80s mid 80s	

### Observations and Comments

According to information obtained from INAC, the community well was serving six homes. In 2001 this was discontinued and the Community is now served by the Village of Haines Junction.

<b>CHAMPAGNE</b>	<b>Population:</b> 20	<b>System Provider:</b> Champagne Aishihik First Nation
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	groundwater from individual wells none private wells unknown unknown	

### Observations and Comments

Prior to Fall 2006, water was supplied to homes and the community centre from individual wells. Water testing carried out in 2006 revealed that the levels of Gross Alpha Radionuclides in several wells was slightly higher than the acceptable levels set out in the Canadian Guidelines for Drinking Water Quality. As a result, the Champagne and Aishihik First Nations issued an advisory recommending that no water be used for drinking, cooking, showering or tooth-brushing.

Further testing of the wells in the area determined that there were traces of engine coolant, paint thinner, anti-freeze and prescription drugs in the well water. The additional testing also determined that the alpha radiation was occurring naturally. It is suspected that the individual septic bed seepage was entering the wells.

The wells have since been decommissioned and water tanks have been installed in their place. Water is now delivered to the community from the Takhini water treatment plan.

<b>TAKHINI SUBDIVISION</b>	<b>Population:</b>	<b>System Provider:</b> Champagne Aishihik First Nation
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	groundwater from Community well. chlorination Trucked water delivery to area residents. mid 90s mid 90s	

### Observations and Comments

The Community well, truck fill and water treatment plan serves Takhini Subdivision and Champagne.

The separation distance between the well and adjacent communal septic tank and disposal system was not in compliance with regulatory guidelines. In the Summer of 2002, the septic field was relocated to address this issue.

A back-up well was drilled in 2003 but is not operational yet. Well head protection is being implemented for the back-up well.

Funding was secured for a filtration system in 2003/04. The filtration equipment and a new building were installed in 2004/05.

There is currently no stand-by metering pump or spill containment. Disinfection is not in an independent "chlorine room". The appreciation of contact time disinfection concept in relationship to the trucked water delivery time is lacking.

The Takhini water treatment plant requires a number of upgrades including arsenic treatment, a back up well and water source protection plan. INAC is working with CAFN in 2009 to complete an assessment of the system to identify work required to bring the system up to national standards. Construction phase for upgrades is planned for 2010.

Source: *Indian and Northern Affairs Canada, Water and Wastewater Assessment reports(2002-2005)*

### Current Projects:

The following proposed projects have been identified by INAC:

Project	Est. Cost
➡ Water treatment for arsenic	Unknown
➡ Back up well	Unknown

## KLUANE FIRST NATION

### Water Supply Systems:

The First Nation has a well and water storage building from which they operate a trucked water delivery service in the community of Burwash.

BURWASH LANDING	Population: 105	System Provider: Kluane First Nation
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	groundwater from community well Chlorination Trucked water delivery from groundwater supply 2000 2000	

### Observations and Comments

In addition to the community well there are three other wells which serve the Kluane First Nation administration building, health building, laundromat, and the community hockey rink.

In 2003, Chlorine injection point was moved to a pre-water holding tank location. Current injection point is just before truck fill and after the water holding tanks. New injection point will be located before holding tanks so there is sufficient chlorine contact time. An above ground storage tank and chlorine tank was installed to provide secondary containment

In 2004/5, a feasibility study was completed by EBA to identify short term & long term improvements for community wells.

Source: *Indian and Northern Affairs Canada, Water and Wastewater Assessments(2002-2005)*

## SELKIRK FIRST NATION

The First Nation has a well and water storage building from which they operate a trucked water delivery service in the community of Pelly Crossing.

<b>PELLY CROSSING</b>	<b>Population:</b> 323	<b>System Provider:</b> Selkirk First Nation
<b>Water Supply Systems:</b> <b>Water Source:</b> <b>Water Treatment System:</b> <b>Water Distribution System:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Groundwater from Public Water supply or individual wells Automatic chlorination but not in service Trucked water delivery with some individual wells 1995	

### Observations and Comments

Most Pelly Crossing residents have individual household wells and others are on household delivery from a community well located off the Pelly Farm Road. In the Town Centre, there are 49 individual wells plus individual wells for the admin building, school, youth centre, college, fire hall, staff house, general store and curling rink (INAC). Water for the Willow Creek Subdivision comes from the trucked/water treatment plant which also serves 23 homes with water holding tanks in the Jon Ra Subdivision.

The water quality of individual wells in the town site varies. Concerns have been identified with periodic high bacteria levels, and poor taste due to high manganese and iron levels. The Integrated Community Sustainability Plan completed by the Selkirk First Nations indicates that “residents have experienced skin rashes that may be due to these high mineral levels. The high bacteria levels are due to cross-contamination from inadequate household septic fields and pit privies”.

The Selkirk First Nation has received approval under the Municipal Rural Infrastructure Fund to install a low flow pressure piped water distribution system to service the main village/town site. The project was initiated in 2007 and included the construction of a pump house, directional drilling under the Pelly River and installation of underground piping. The piped water distribution system will be commissioned in 2009.

### Plans for Modification and Expansion

The Selkirk First Nation would like to expand the piped distribution system that will be constructed for the town site to the Jon Ra and Willow Creek subdivisions.

Source: *Indian and Northern Affairs Canada, Water and Wastewater Assessments(2002-2005)*  
*Selkirk First Nation, Pelly Crossing, Integrated Community Sustainability Plan, 2007*

### Current Projects:

Project	Est. Cost
➔ Installation of low flow low flow pressure piped water distribution system to service the main village/town site	5 Million (\$233,820 Gas Tax)

### Potential Projects:

The following proposed projects have been identified by the Selkirk First Nation in their Integrated Community Sustainability Plan:

<b>Project</b>	<b>Est. Cost</b>
➡ Expansion of low-flow piped water system to Jon Ra and Willow Creek subdivisions	

**LIARD FIRST NATION**

In Upper Liard the First Nation provides water from a series of cluster wells and individual wells. In addition to a series of cluster wells and individual wells a trucked water delivery service is provided to the residents of Two and Two and Half-Mile subdivisions. The water for the water delivery services is purchased from the Town of Watson Lake.

<b>UPPER LIARD</b>	<b>Population: 100</b>	<b>System Provider: Liard First Nation</b>
<b>Water Supply Systems:</b>	groundwater from individual wells	
<b>Water Source:</b>	none	
<b>Water Treatment System:</b>	private shared wells	
<b>Water Distribution System:</b>	1998	
<b>Year Constructed:</b>	1998	
<b>Last Modified:</b>		

**Observations and Comments**

Individual ground water wells are the primary source of drinking water for the community. LFN has been introducing the use of a “cluster well” where a common well provides water to two or more buildings (usually five). This allows LFN to provide maintenance and operation of the wells.

Water quality from these wells varied and a number of concerns were identified including periodic high bacteria levels and poor taste due to high levels of manganese and iron. The high bacteria levels were of particular concern and were linked to inadequate cleaning of water holding tanks for individual residences. To date, all residences in Upper Liard have been converted to individual and cluster well systems. All new residential construction will be supplied with cluster well systems Water treatment systems at each cluster well or individual residences will improve water quality.

**Plans for Modification and Expansion**

The latest capital plan completed by the Liard First Nation includes provisions for 5 new cluster wells complete with water treatment facilities and 25 individual water treatment systems for water supplies where water quality is currently a problem.

Source: *LiardFirst Nation, Integrated Community Sustainability Plan, 2007*

<b>Current Projects:</b>	
<b>Project</b>	<b>Est. Cost</b>
➡ Albert Creek Subdivision – training of FN members in water quality monitoring related to possible contamination from nearby landfills	\$87,000 (Gas Tax)

**Potential Projects:**

The following proposed projects have been identified by the Liard First Nation:

<b>Project</b>	<b>Est. Cost</b>
➡ 5 new cluster wells complete with water treatment facilities	Unknown
➡ 25 individual water treatment systems	Unknown



### 3.0 WASTEWATER

In the Yukon, the method of wastewater and sewage disposal varies significantly by community. In smaller communities and rural areas, individual septic systems or holding systems are often used. Holding systems are pumped out and sewage is trucked to central lagoons or infiltration pits. In larger Yukon communities and municipalities, often a piped collection system is used to carry effluent to a multi-cell lagoon to be treated.

The level of wastewater treatment between communities also varies significantly. The different levels of treatment for wastewater is described below:

- Preliminary treatment – involves the removal of large solid material before sewage receives further treatment or is released into the environment
- Primary treatment – involves the removal of inorganic material such as grit and debris through settling and oils and greases by skimming.
- Secondary treatment – involves biological treatment following primary treatment which reduces the amount of suspended solids and biochemical oxygen demand (BOD) by breaking down the organic material present in the sewage.
- Tertiary treatment - usually involves the removal of pollutants that secondary treatment cannot remove such as nutrients like nitrogen and phosphorous.

The Yukon State of the Environment Report for 2005 states: *“While many of the treatment facilities in the Yukon operate like a primary facility, our longterm storage capacity allows for treatment equivalent to secondary or, in some cases, tertiary treatment facilities”.*

#### 3.1 Incorporated Communities:

<b>CARMACKS</b>	<b>Population:</b> 472	<b>System Provider:</b> Village of Carmacks
<b>Sewage Treatment:</b>		
<b>Level of Treatment:</b>	Primary	
<b>Year Constructed:</b>	1970s	
<b>Last Modified:</b>	n/a	

#### Observations and Comments

The present primary mechanical treatment plant is old and effectively worn out. Significant efforts have been made by the Village to maintain the system. This includes repairing the existing sewer mains where necessary to prevent the leakage of groundwater into the lines, which reduces the load on the treatment plant.

Yukon Government is currently providing the Village with financial and advisory support with the development of a new facility. Two systems were considered; an aerated lagoon system or a new mechanical treatment facility. Based on the outcome of a public consultation process completed in 2007, the Village of Carmacks has indicated its support for proceeding with the development of a mechanical treatment facility.

While a new wastewater treatment plant is being built, improvements in existing water and sewer infrastructure are required in certain areas of the Village. The Village has estimated the cost of replacing the existing sewer mains at \$3.2 million. In addition, the current wastewater collection system only services a portion of the community. Most of the lots, including those in the industrial and country residential sections of town and Little Salmon/Carmacks First Nation lots, have individual septic fields.

**Current Projects:**

<b>Project</b>	<b>Est. Cost</b>
➡ New mechanical treatment facility	5.5 M (Building Canada)

**Potential Projects:**

The following potential projects have been identified by the Village of Carmacks in their Integrated Community Sustainability Plan:

<b>Project</b>	<b>Est. Cost</b>
➡ Replacement of existing sewer mains	3.2 M (2002)

Source: *Village of Carmacks, Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*

<b>DAWSON CITY</b>	<b>Population:</b> 1,923	<b>System Provider:</b> City of Dawson
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	Primary	
<b>Year Constructed:</b>	1970s	
<b>Last Modified:</b>	n/a	

**Observations and Comments**

Treatment System

The present treatment system is a mechanical screening plant which provides only primary treatment. Specifically, the only treatment that is done is to screen out larger sewage debris. In August 2000, the City of Dawson was charged under Section 36(3) the federal Fisheries Act for depositing a deleterious substance into the Yukon River. The municipality is mandated by a Court Order to install a secondary treatment system for its waste water. The completion deadline set by the Court is December 31, 2011.

The current system will be replaced by a new secondary treatment facility which will be built on or close to the site of the existing screening plant. The secondary treatment facility will tie in to the existing wastewater collection system and existing forcemain to the outfall in the Yukon River. The plant will be self-contained and will be owned and operated by the City of Dawson once the commissioning phase is complete. Treatment levels achieved by the new plant will satisfy all effluent standards imposed by regulators.

Collection System

According to the City of Dawson and the Tr’ondek Hwech’in First Nation, Integrated Community Sustainability Plan, the main sewage collection system is in poor condition and the lift stations are in need of replacement. The truck collection system which services the north end of town and the Dredge Pond Subdivision is working well.

Source: *The City of Dawson and the Tr'ondek Hwech'in First Nation, Integrated Community Sustainability Plan, 2008*  
*Department of Community Services, Infrastructure Status Report, 2002*

<b>Current Projects:</b>	
<b>Project</b>	<b>Est. Cost</b>
➔ Wastewater Treatment Facility	\$20 M (Building Canada)

<b>Potential Projects:</b>	
The following potential projects have been identified in the City of Dawson and the Tr'ondek Hwech'in First Nation, Integrated Community Sustainability Plan	
<b>Project</b>	<b>Est. Cost</b>
➔ Upgrades to main sewage collection system, especially the forcemain from the screening plant to the Yukon River.	unknown

<b>Potential Projects:</b>	
The following potential projects have been identified by the Yukon Government	
➔ Upgrades to local landfill (Quigley) to ensure it is suitable to receive solid waste from a wastewater treatment facility	unknown
➔ Provide a "septage receiving" facility in Dawson to ensure that educted, trucked waste only has to travel a short distance before proper disposal.	unknown
➔ Study and innovate for ways to address Dawson's unique water use issues (e.g. bleeders, recirc pumps, water meters, education about water use, pilot projects for water conservation)	unknown

<b>FARO</b>	<b>Population:</b> 395	<b>System Provider:</b> Town of Faro
<b>Sewage Treatment:</b>	Advanced Secondary Treatment	
<b>Level of Sewage Treatment:</b>	1970s	
<b>Year Constructed:</b>	n/a	
<b>Last Modified:</b>	n/a	

### Observations and Comments

The present treatment facility is a multi-celled lagoon system providing secondary treatment. The lagoon discharges to the Pelly River. Due to low population levels and volumes, discharge of effluent to the Pelly River has not occurred in the past 15 years.

The Town of Faro Integrated Community Sustainability Plan describes the sewage collection and disposal system as being in poor condition. The water and sewer infrastructure is still composed of old pipes made of asbestos/concrete, iron/steel, and fossil fuel based polyethylene (PE).

The upgrading and replacement of existing water and sewer mains in Faro was identified as high priority item in *Infrastructure Works: Building Yukon's Future Together* prepared by the Associations of Yukon Communities, July 2002 (estimated at 4M).

It would be necessary to determine where service is required or should be reduced before proceeding with any upgrades.

### Potential Projects:

The following proposed projects were identified in the Town of Faro Integrated Community Sustainability Plan:

Project	Est. Cost
➔ Upgrade and replace collection system	unknown

Source: *Town of Faro, Integrated Community Sustainability Plan, 2007*  
*Department of Community Services, Infrastructure Status Report, 2002*  
*The Association of Yukon Communities, Infrastructure Works: Building Yukon's Future Together, July 2002*

HAINES JUNCTION	Population: 848	System Provider: Village of Haines Junction
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	Advanced Secondary Treatment	
<b>Year Constructed:</b>	1983	
<b>Last Modified:</b>	n/a	

### Observations and Comments

Throughout the core of the community, wastewater is collected through a traditional underground collection system to a lift station, which is equipped to act as an overflow lagoon in the event of a power interruption. The Champagne and Aishihik First Nations also have a lift station which ties into the main municipal system. The collection pipes are approximately 30 years old and are generally in good condition according to the *Village of Haines Junction, Integrated Community Sustainability Plan*. The lift stations pump to a 3-cell lagoon which provides advanced secondary treatment. The lagoon is discharged approximately every 6 years. Because the discharge eventually runs into wetlands within the borders of Kluane National Park, there is a higher than normal standard applied to the effluent before it is released. The capacity is sufficient for the foreseeable future.

Most buildings outside of the core, developed area, have their own septic fields although several residential and commercial buildings are on pump-out systems.

### Plans for Modification and Expansion

No plans to upgrade the current system.

Source: *Village of Haines Junction, Integrated Community Sustainability Plan, 2007*  
*The Association of Yukon Communities, Infrastructure Works: Building Yukon's Future Together, July 2002*

### Costs:

<b>MAYO</b>	<b>Population:</b> 466	<b>System Provider:</b> Village of Mayo
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	Advanced Secondary Treatment	
<b>Year Constructed:</b>	1990	
<b>Last Modified:</b>	1999	

### Observations and Comments

The present treatment facility is a multi-celled lagoon system located to the west of the Village of Mayo and provides advanced secondary treatment. The lagoon discharges to the Mayo River. There has never been a discharge to the Mayo River. The facility was developed in the early 1990s.

Most homes and buildings in the Village of Mayo area are serviced by wastewater sewer pipes. Existing sewer and wastewater pipes require regular maintenance and repair. Some lines were built as early as 1975 and are more susceptible to damage. *Na-Cho Nyak Dun, Integrated Community Sustainability Plan indicates that with shifting soils due to permafrost melting in the NND Village area, it is likely that the problem will increase.*

According to the *Village of Mayo, Integrated Community Sustainability Plan*, expenses associated with the increased maintenance and repair of older sections of the wastewater collection system are impacting the ability of the municipality to provide other services to Mayo residents. In particular, sewer system upgrades are needed in the area along the west side of 4<sup>th</sup> Avenue, the NND residential area and 1<sup>st</sup> Avenue.

There are some homes and buildings in the Village and all the new C-6 subdivision developments that rely on on-site in-ground septic systems. For the C-6 subdivision, the *Na-Cho Nyak Dun* has considered individual septic systems and the option of tying into the existing Village of Mayo sewage lagoon. The costs associated with the later option appear to be quite high given the size of the lots and how spread out they are. The NND would prefer to construct a gravity sewer which would include a gravity forcemain to the lagoon, siphon flush tank at C-6 and collection from Government House, Central Services and C6 housing.

Source: *Na-Cho Nyak Dun, Integrated Community Sustainability Plan, 2008*  
*Village of Mayo, Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*  
*The Association of Yukon Communities, Infrastructure Works: Building Yukon's Future Together, July 2002*

### Potential Projects:

The following proposed projects were identified in the *Na-Cho Nyak Dun, Integrated Community Sustainability Plan, 2008*:

<b>Project</b>	<b>Est. Cost</b>
➤ Gravity Sewer including gravity forcemain to lagoon, siphon flush tank at C-6 and collection from Government House, Central Services and C6 housing	unknown

The following proposed projects were identified in the *Village of Mayo, Integrated Community Sustainability Plan, 2006*:

<b>Project</b>	<b>Est. Cost</b>
➔ Sewer system upgrades - west side of 4 <sup>th</sup> Avenue	unknown
➔ Sewer system upgrades - NND residential area	unknown
➔ Sewer system upgrades - 1 <sup>st</sup> Avenue	unknown

<b>TESLIN</b>	<b>Population:</b> 458	<b>System Provider:</b> Village of Teslin
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	n/a	
<b>Year Constructed:</b>	1990	
<b>Last Modified:</b>	1995	

### Observations and Comments

The present treatment facility is a multi-celled lagoon system providing secondary treatment, which discharges to a wetland adjacent to Fox Creek. Delivery to the facility was previously done by trucked education from four lift-station/holding tanks. The Village has since constructed a force main to the sewage lagoons with Municipal Rural Infrastructure Funds provided in 2006 & 2007 and has eliminated all unnecessary lift stations in the wastewater collection system. Sewage is now piped from homes to the new force main sewer which delivers effluent to the lagoon.

The Teslin Tlingit Council and Village of Teslin, Integrated Community Sustainability Plan notes that the installation of an aeration system in the wastewater lagoon would allow the introduction of air to promote microbial action to biotreat the pollutants in the wastewater. It may be possible to power the aeration system with wind energy.

Source: *Department of Community Services, Infrastructure Status Report, 2002*  
*Teslin Tlingit Council and Village of Teslin, Integrated Community Sustainability Plan*

### Current Projects:

<b>Project</b>	<b>Est. Cost</b>
➔ Sewage Lagoon Fencing	\$3,200 (Gas Tax)
➔ Water Closet Replacement – install low flow toilets and waterless urinals in Recreation Centre	\$16,250 (Gas Tax)

### Potential Projects:

The following proposed projects were identified in the Teslin Tlingit Council & Village of Teslin Integrated Community Sustainability Plan:

<b>Project</b>	<b>Est. Cost</b>
➔ Sewage Lagoon Aeration	Unknown

<b>WATSON LAKE</b>	<b>Population:</b> 1,594	<b>System Provider:</b> Town of Watson Lake
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	Advanced Secondary Treatment	
<b>Year Constructed:</b>	1970s	

## Observations and Comments

Sewage treatment and storage is provided by anaerobic lagoons, and a long term exfiltration storage cell. Sewage is collected in an underground piped collection system, which directs flow to two existing lift stations (wet wells). Effluent is lifted by forcemain to the south end of the community, where it again flows by gravity to the long term storage cell. The storage cell works as an exfiltration pond, and has never been discharged. Lots are serviced with single gravity services to each lot.

According to an infrastructure assessment report completed for the Town in 2006, the existing anaerobic lagoons can meet the current piped system treatment requirements, and can service additional development up to a population of approximately 1900. The storage lagoon should be able to meet the future development requirements for a population of approximately 3000. The older lift station is used as an emergency backup to the new lift station. The report indicates that the newer lift station is currently operating at capacity and that pump upgrades will be required to accommodate future development.

There are a number of issues identified with the Town's wastewater and collection system:

### Wet well

Town officials have reported significant problems associated with the newer wet well. The lift station was originally designed to handle a capacity of 160,000 gallons/day and there are periods now where it operates at 190,000 gallons/day. Town officials have advised that the elevation of the bottom of the wet well is higher than the lowest manhole and gravity main and therefore there is about a 300-400m section of sewer line that is being used as storage and can not drain. During periods of heavy rainfall or runoff, water in the sanitary sewer backs up and overflows around the nearest manhole to the wet well. Town officials have indicated that on at least one other occasion, sewage backed up into a resident's property.

It is recognized that the installation of a larger wet well or more efficient set of pumps may help to address the problem over the short term. However, it is suspected that the problems may be associated with steadily increasing infiltration/inflow into the sewer collection system over the past years as a result of damaged pipes, etc. The Town will be undertaking a comprehensive analysis of its water and wastewater system to determine the best course of action for correcting the problems over the long term.

It has been noted that there is no emergency standby power supply for either lift station.

### Sewage Collection System

The majority of the sewage systems were constructed in the 1970s and are in need of rehabilitation and/or replacement. There are still homes within the core of the residential area that do not have water or sewer available to them. This forces them to depend on aging wells and septic systems.

Source: *Town of Watson Lake, Integrated Community Sustainability Plan, 2007*  
*Quest Engineering Group, Infrastructure Assessment Report, Town of Watson Lake, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*  
*Colum McCreedy(CAO)&Allan Pucket (Public Works Supervisory),Town of Watson Lake*

## Potential Projects:

The following proposed projects have been identified by the Town of Watson Lake in their Integrated Community Sustainability Plan and other documents:

Project	Est. Cost
➔ Undertaken corrective actions to address wet well issue as determined through comprehensive assessment (TBD)	
➔ Provide standby power for existing lift stations	
➔ expansion of the present collection system to adjacent areas	
➔ Upgrade lift station, forcemain and gravity outfall as required for long term expansion	

<b>WHITEHORSE</b>	<b>Population:</b> 25,403	<b>System Provider:</b> City of Whitehorse
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	Tertiary Treatment	
<b>Year Constructed:</b>	1996	
<b>Last Modified:</b>	n/a	

### Observations and Comments

The City of Whitehorse wastewater system consists of three independent sanitary sewer systems and two lagoons. The three systems are:

1. Marwell Lift Contributing Area
2. Porter Creek Sewerage System
3. Crestview Sewerage System.

Consistent with the water distribution system, the City of Whitehorse sanitary sewer system services the urban area of the City from Riverdale to Crestview. The rural areas remain non-serviced relying on in-ground private disposal systems and there is a minimal trucked sewage disposal.

The Marwell area is the largest system and services the urban areas from Riverdale and all area south of Porter Creek, including Downtown, Hillcrest, Takhini and Hillcrest expansion areas of McIntyre, Granger, Logan, Arkell and Copper Ridge. The system services approximately 15,000 people and has a capacity of 27,900. This system uses gravity and lift stations to transport the sewage across the Yukon River, past the old Whitehorse lagoons which are no longer in use (except as an emergency back-up), and onto the Livingston Trail Environmental Facility. Eighty percent of the City’s sewage crosses the river through a buried underground force main built over 30 years ago.

The Livingston Trail Environmental Treatment Facility is a simple three cell lagoon system using primary and secondary treatment cells, followed by long term storage. Discharge occurs annually, and rather than discharging directly into the River, the treated effluent is disposed into a local lake, hydraulically connected to the River. The long term use of this lake is showing signs of failure, as the quantity of flow able to be discharged is less than when it started 10 years ago. A new outfall pipe directly to the River has been approved by the Yukon Water Board and may soon be required to avoid possible failure of the treatment system. Size of the lagoon has been based on lowering the per capita water use, similar to the Canadian Standard of 500 litres per capita per day.

The Porter Creek sewage system collects from four lift stations spread throughout the Porter Creek area and takes it to the Porter Creek gravity force main, located at the northeast corner of the Porter Creek neighbourhood. The system services approximately 4,100 people and has ultimate build out capacity to



service 13,300 people. The sewage flows down the escarpment, under the Yukon River, and to the Livingston Trail Environmental Facility. The old Porter Creek lagoons are no longer in use, and this former lagoon area is proposed for remediation and restoration to make way for future residential developments in the lower bench area.

The Crestview Sewage system collects the sewerage from the Crestview neighbourhood only, and is treated at the Crestview Lagoons built over 30 years ago. This system serves approximately 800 people with no plans for expansion. However, there maybe opportunities to close the Crestview Lagoons and transport the sewage through a new development in the lower bench area and to the Livingston Trail Facility, then reclaiming the lagoon area for a new land use.

The City of Whitehorse will defer capital costs associated with sewage disposal if the demand side is more sustainable.

### Current Projects:

Project	Est. Cost
➡ Livingston Trail Sewage Outfall Pipe to Pot Hole Lake	\$5,850,000 (Gas Tax)
➡ Sewage Lagoon Monitoring Wells	\$90,000 (Gas Tax)

### Potential Projects:

The following proposed projects have been identified by the City of Whitehorse in their Integrated Community Sustainability Plan:

Project	Est. Cost
➡ Pump House and Small Lift Station Upgrade	\$440,000
➡ Infrastructure Renewal Projects involving upgrades to sewer collection system: <ul style="list-style-type: none"> <li>• Hillcrest Reconstruction, Phase 1</li> <li>• Hillcrest Reconstruction, Phase 2</li> <li>• Downtown Reconstruction)</li> <li>• Black Street, 4th to 8th Avenue</li> <li>• Ogilvie , 2nd to 8th Avenue</li> <li>• Strickland, Alexander, Hanson, Hawkins</li> <li>• 6th Avenue, 400 Blocks of Cook &amp; Wheeler</li> <li>• Marwell Upgrading</li> <li>• Gold, Gypsum, Silver, Industrial Dyke work</li> <li>• Tlingit road, Tungsten, Galena</li> </ul>	Unknown

## 3.2 Unincorporated Communities:

<b>BEAVER CREEK</b>	<b>Population:</b> 97	<b>System Provider:</b> Government of Yukon
<b>Sewage Treatment:</b>		
<b>Level of Sewage Treatment:</b>	Primary	
<b>Year Constructed:</b>	n/a	
<b>Last Modified:</b>	n/a	

### Observations and Comments

The present facility is an infiltration pit that serves as a disposal site for the sewage educator service that operates in the community. The hotel and visitor centre, which are only open in the summer months, are on sewage holding tanks, while the remaining residences are on individual in-ground disposal systems. The Kluane First Nation provides sewage education services on an as-required basis. Minor repairs to the discharge culvert and installation of a new discharge bib is planned for 2002.

### Plans for Modification and Expansion

Clearing of overgrown weeds and willows required. Discharge culvert has washed out, new discharge bib required. Fencing and signage required.

#### Costs:

unknown

<b>BRAEBURN</b>	<b>Population:</b> 15	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems n/a n/a	

### Observations and Comments

none

<b>BURWASH LANDING</b>	<b>Population:</b> 105	<b>System Provider:</b> Kluane First Nation
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Advanced Secondary Treatment 2005	

### Observations and Comments

Previously, the community of Burwash Landing, consisting primarily of members of the Kluane First Nation, trucked their sewage to the lagoon facility at Destruction Bay. The facility at Destruction Bay was initially constructed in 1968 by the Federal Department of Public Works and was built to serve the government highway maintenance camp and grader station at Destruction Bay. A new lagoon had been requested by the Kluane First Nation for a number of years as a result of dissatisfaction with location of the old lagoon in Destruction Bay. Consequently in 2005, a new multi-celled lagoon system was developed to serve the Community.

### Plans for Modification and Expansion

Upgrades are needed to the new lagoon system to address winter operational conditions.

### Potential Projects:

The following proposed projects have been identified by Community Services:

<b>Project</b>	<b>Est. Cost</b>
➡ Winter upgrades to lagoon system	\$500,000

<b>CANYON CREEK</b>	<b>Population:</b> 25	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site Septic Systems	

**Observations and Comments**

None.

<b>CARCROSS</b>	<b>Population:</b> 436	<b>System Provider:</b> Government of Yukon
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary	

**Observations and Comments**

The Carcross/Tagish First Nation provides a waste water disposal service for Carcross residents. Sewage is trucked to a new three celled lined lagoon system located north of the townsite. The facility discharges to the ground on a yearly basis. Since the new facility became operational, the old lagoon has been decommissioned.

Community Services has identified the need for sludge drying beds at the lagoon.

The Carcross/Tagish First Nations Integrated Community Sustainability Plan suggests that the First Nation is interested in having a piped sewer system for the community which would be connected to the new sewage lagoon.

Source: *Department of Community Services, Infrastructure Status Report, 2002*  
*Carcross/Tagish First Nations Integrated Community Sustainability Plan*

**Current Projects:**

<b>Project</b>	<b>Est. Cost</b>
➡ Garage to house/clean & maintain sewage pump-out truck	\$180,000 (Gas Tax)

**Potential Projects:**

The following proposed projects were identified in the *Carcross/Tagish First Nations Integrated Community Sustainability Plan*:

<b>Project</b>	<b>Est. Cost</b>
➡ Community-wide piped sewage system to lagoon	unknown
➡ Sewage sludge drying beds	\$250,000

<b>CHAMPAGNE</b>	<b>Population:</b> 20	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b>		

<b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems
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### Observations and Comments

None.

<b>DEEP CREEK</b>	<b>Population:</b> 100	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None.

<b>DESTRUCTION BAY</b>	<b>Population:</b> 48	<b>System Provider:</b> Government of Yukon
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Secondary  In 1998 two communal in-ground septic systems were constructed	

### Observations and Comments

In 1998, construction of two in-ground septic disposal fields for the community eliminated the need for the utilidor and lift station system to collect and pump sewage to the lagoon system that was built in 1968. The last two homes were connected to the system in November of 2000. The utilidor and lift station were decommissioned in 2001 and the lagoon was decommissioned when the new Burwash facility was built in 2005.

Community Services has advised that an evaluation of the environmental impacts of the lower field should be undertaken. The assessment would determine whether there are any hydrological connections between the lower field and Kluane Lake or any other means for contaminants to enter the lake etc.

### Plans for Modification and Expansion

In the short-term minor repairs of the liner fabric at the discharge bib/structure is required. A new upper septic field needs to be constructed. Repairs are also needed to the collection system.

### Potential Projects:

The following proposed projects have been identified by Community Services:

<b>Project</b>	<b>Est. Cost</b>
➡ Assessment of environmental impacts of lower field	\$25,000
➡ Construction of new upper septic field	\$250,000
➡ Repairs to Collection System	\$50,000

<b>GOLDEN HORN</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b>	Private on-site septic systems	

Last Modified:

### Observations and Comments

None.

<b>GRIZZLY VALLEY</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None.

<b>HOTSPRINGS ROAD</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None.

<b>IBEX VALLEY</b>	<b>Population:</b> 315	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None.

<b>JOHNSON'S CROSSING</b>	<b>Population:</b> 25	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None.

<b>KENO CITY</b>	<b>Population:</b> 20	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary  Fencing and signage replaced in 2001	

### Observations and Comments

There is a small primary exfiltration sewage pit located at solid waste facility which is provided by the Yukon Government. A pump-out truck from Mayo services on-site septic systems as required.

<b>MARSH LAKE</b>	<b>Population:</b>	<b>System Provider:</b> Government of Yukon and Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Secondary 1998	

### Observations and Comments

The present treatment facility was opened in the fall of 1998 and consists of a multi-celled lagoon system providing secondary treatment, which discharges to the ground via a large infiltration basin. Sewage from private holding tanks and septic tank pump-outs is trucked to the facility from Marsh Lake and the surrounding region. Other residents are on private systems.

Community Services would like to undertake a review and assessment of the current design to determining monitoring requirements and to mitigate any environmental impacts.

### Potential Projects:

The following proposed projects have been identified by Community Services:

<b>Project</b>	<b>Est. Cost</b>
➡ Design review and assessment	\$75,000

<b>MENDENHALL</b>	<b>Population:</b>	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None

<b>MT. LORNE</b>	<b>Population:</b> 379	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

Private sector sewage education contractors haul to Carcross or Whitehorse.

<b>OLD CROW</b>	<b>Population:</b> 251	<b>System Provider:</b> Government of Yukon
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary	

### Observations and Comments

Daily trucked education service from private holding tanks is hauled to sewage lagoon. The primary treatment cell is designed for a continuous exfiltration from Spring to Fall to the adjacent wetlands. No discharge has been required since the facility was constructed. The outlet pipe (discharge) was shifted by frost action and will require repair if a discharge is required.

The Vuntut Gwitchin First Nation has in the past raised the issue of relocating the lagoon to another site.

### Plans for Modification and Expansion

None at this time given the constraints to development in the area. If the community grows and begins to develop on the plateau; there may be a request from the community to consider relocation of the lagoon. A new site has not been identified.

<b>PELLEY CROSSING</b>	<b>Population:</b> 323	<b>System Provider:</b> Selkirk First Nation
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary	

### Observations and Comments

Currently Pelly Crossing uses individual septic fields and pump-out tanks. Sludge from the septic tanks is collected by a community pump-out truck and disposed of at an in-filtration sewage treatment pit located beside the community landfill. The Selkirk First Nation operates the primary sewage disposal pit under a Federal Land Use Permit. The infiltration pit was taken over by the Selkirk First Nation from the Yukon Government as part of the Self Government Agreement.

### Plans for Modification and Expansion

The Selkirk First Nations has plans to build a new long term sewage disposal facility. The new sewage lagoon will replace the existing lagoon at the landfill site and will be managed by the SFN. It is anticipated that the development of the new three cell infiltration system will begin in the summer of 2009 with funding provided by the SFN and the Municipal Rural Infrastructure Fund.

Source: *Selkirk First Nation, Pelly Crossing, Integrated Community Sustainability Plan, 2007*

### Current Projects:

The following project will be undertaken by the Selkirk First Nation:

Project	Est. Cost
➡ long term sewage disposal facility	\$250,000 (MRIF)

<b>ROSS RIVER</b>	<b>Population:</b> 369	<b>System Provider:</b> Government of Yukon
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary	

**Observations and Comments**

An exfiltration cell is used as a disposal site for the trucked sewage education service that is provided by First Nation and private contractors. The Ross River Dena Council provides service to its own housing whereas a private contractor provides service to Yukon Housing and others.

The Integrated Community Sustainability Plan completed by the Ross River Dena indicated that the First Nation would like to have a new sewage lagoon constructed with wetlands discharge; community-wide piped sewage system to the lagoon; an increase in the number of cluster-style sewage tanks with a long-term plan to connect these to the proposed piped sewage system.

There is no water license in place for the existing sewage pit. An amendment to the existing water license for the proposed sewage treatment facility that was never built is underway. Construction of a new sewage pit on the site of the proposed sewage lagoon has been recommended as a requirement of the water license renewal.

Source: Ross River Dena Council, *Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*

**Potential Projects:**

The following proposed projects were identified in the Ross River Dena Council’s Integrated Community Sustainability Plan:

<b>Project</b>	<b>Est. Cost</b>
➔ approved sewage lagoon with wetlands discharge	Unknown
➔ community-wide piped sewage system to lagoon	Unknown
➔ an increase in the number of cluster-style sewage tanks with long-term planning to fit into a piped sewage system	Unknown

<b>SILVER CITY</b>	<b>Population:</b> 15	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary	

**Observations and Comments**

None.

<b>STEWART CROSSING</b>	<b>Population:</b> 30	<b>System Provider:</b> Government of Yukon
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary  Fencing and signage replaced in 1999	

**Observations and Comments**

Small primary exfiltration sewage pit at solid waste facility. Very little usage. Pumpout truck from Carmacks or Mayo serves residents and the RV park.



<b>TAGISH</b>	<b>Population:</b> 221	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Primary	

### Observations and Comments

The community had a single cell lagoon which offered primary treatment. The facility has since been decommissioned.

<b>TAKHINI SUBDIVISION</b>	<b>Population:</b>	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private individual on-site septic systems	

### Observations and Comments

None.

<b>UPPER LIARD</b>	<b>Population:</b> 100	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

Sludge from septic tanks is collected by a community sewage pump-out truck and disposed of at the Town of Watson Lake sewage disposal facility. According to the Liard First Nation Integrated Community Sustainability Plan, residents have identified that they are generally satisfied with the sewage disposal system and there are no reported problems with the new or existing septic fields. However, the plan suggests that a waste water treatment facility should be considered at Two Mile

Source: Liard *First Nation, Integrated Community Sustainability Plan, 2007*

<b>WEST DAWSON/SUNNYDALE</b>	<b>Population:</b> unknown	<b>System Provider:</b> Private Systems
<b>Sewage Treatment:</b> <b>Level of Sewage Treatment:</b> <b>Year Constructed:</b> <b>Last Modified:</b>	Private on-site septic systems	

### Observations and Comments

None.

## 4.0 SOLID WASTE

Under the *Municipal Act*, municipalities must operate solid waste disposal facilities for their residents. Eight municipalities outside of Whitehorse operate their own solid waste disposal sites. Most municipalities operate on a trench and burn approach, whereby domestic waste is deposited in a trench and burned once per week. Burnt residue is compacted approximately once per month or as required and when the trench is full it is capped off with cover material. Whitehorse is the only municipality that does not burn domestic garbage. Several other communities such as Dawson City, Haines Junction and Teslin have moved away from the typical trench and burn operation. Primarily this means stopping or reducing the amount of burning of domestic waste. Burning of brush and construction debris is still practiced at all sites except Whitehorse.

Community Services operates 19 solid waste facilities across the Yukon, most of which currently utilize burning vessels for domestic garbage and most of which have also been equipped with wildlife exclusion fencing. There are some differences between facilities in terms of the types of material that may be deposited. Many communities have recycling depots. Destruction Bay, Tagish and Mt. Lorne also have Free Stores allow for reuse of items that people have donated. Contracts are awarded from year to year for the removal of scrap metals from the solid waste facilities as required.

The maintenance of all Community Services facilities except the one in Old Crow are provided by private contractors or Community Societies. The facility in Old Crow is managed by the Department of Highways and Public Works, Yukon Government.

Operators within municipalities and unincorporated areas must follow stringent operating requirements as established by the Solid Waste Management Regulations which were adopted in January 2000. The regulations require all operators to complete a Solid Waste Management Plan for each solid waste facility. They also include requirements for: the identification of a new site to replace the existing facility when full; the preparation of a decommissioning and reclamation plan; annual groundwater monitoring; wildlife control and the collection of household hazardous waste in a safe and controlled manner.

Community Services is currently conducting a full review and options study for all solid waste facilities in incorporated and unincorporated communities as part of the development of a Yukon wide Solid Waste Strategy. This will be done in consultation with municipalities for the purpose of examining opportunities to explore common interests. Specific issues that are being examined in this review include the costs and benefits of eliminating burning as a means of disposal; use of community transfer stations; use of central landfill sites, etc. It is anticipated that any facility-specific upgrades or related infrastructure developments would be guided by the Strategy once it is completed and approved.

## 4.1 Incorporated Communities:

<b>CARMACKS</b>	<b>Population: 472</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Carmacks
<b>Number of regular users:</b>	472
<b>Solid Waste (tonnes/yr):</b>	247
<b>Remaining Lifespan (years):</b>	+18
<b>Items Accepted:</b>	Domestic refuse, metal, tire, batteries, recyclables, brush and construction materials
<b>Recyclables:</b>	Separate recycling centre

### Observations and Comments

Since the implementation of the Solid Waste Management Plan completed in 2003, there has not been a significant change in the average amount of normal waste deposited at the landfill. The Village of Carmacks currently does not accept waste from outside the community. This is a No Burn facility. On occasion there is sufficient bush collected and burned by Maintenance staff.

The Village of Carmacks is currently building a new recycling building at the landfill site which will continue to be operated by a community recycling society. Although this will improve the facilities, and hopefully increase usage, there will still be limitations on recycling. The new recycling centre will also still lack the ability to handle hazardous waste.

*Source: Village of Carmacks, Integrated Community Sustainability Plan, 2006  
Village of Carmacks Solid Waste Management Plan, 2003*

<b>DAWSON CITY</b>	<b>Population: 1,923</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Dawson, Klondike Valley, surrounding area
<b>Number of regular users:</b>	3000
<b>Solid Waste (tonnes/yr):</b>	2550
<b>Remaining Lifespan (years):</b>	13
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, recyclables, brush and construction materials
<b>Recyclables:</b>	In center of town

### Observations and Comments

The Quigley solid waste facility is a joint operation between YG and the City of Dawson. An agreement was signed that stated YG would provide the capital and Dawson City would assume the operation and maintenance responsibilities. Dawson City passed a bylaw in 1998, which allows the town to levy a fee on all properties in the community to offset the cost of operations at the landfill. Capital work will be completed on the facility shortly and the agreement on operation finalized. There is a burning vessel at the facility and only cardboard, brush and non-toxic construction materials are burnt.

*Source: The City of Dawson and the Tr'ondek Hwech'in First Nation, Integrated Community Sustainability Plan, 2008  
Department of Community Services, Infrastructure Status Report, 2002*

<b>FARO</b>	<b>Population: 395</b>
<b>Solid Waste Facility:</b>	
<b>Areas Serviced:</b>	Faro and surrounding area
<b>Number of regular users:</b>	450
<b>Solid Waste ( tonnes/yr ):</b>	183
<b>Remaining Lifespan (years):</b>	+13
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush and construction materials
<b>Recyclables:</b>	No

### Observations and Comments

Condition of Solid waste facility listed as “poor” in the *Town of Faro, Integrated Community Sustainability Plan*.

The *Integrated Community Sustainability Plan* Residents, visitors and industrial users sometimes inappropriately use the landfill for disposal of hazardous wastes, oil, batteries and other items. Compost, plastics and other materials that could otherwise be recycled often end up in the landfill. As a long-term negative impact, there is potential for ground water and soil contamination through leaching and surface water runoff.

There is a limited recycling program in place that includes refundables and non-refundables. There is also waste oil and hazardous waste collection There are programs aimed at diverting tires, batteries, construction materials and metals from the landfill. Personal composting is done, but there is no municipal facility.

Source: *Town of Faro, Integrated Community Sustainability Plan, 2007*  
*Town of Faro Solid Waste Management Plan, 2003*

<b>HAINES JUNCTION</b>	<b>Population: 848</b>
<b>Solid Waste Facility:</b>	
<b>Areas Serviced:</b>	Haines Junction and Surrounding Area
<b>Number of regular users:</b>	1000
<b>Solid Waste ( tonnes/yr ):</b>	850
<b>Remaining Lifespan (years):</b>	10 years
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, recyclables, brush and construction materials
<b>Recyclables:</b>	Yes

### Observations and Comments

The landfill site on the south end of the Village of Haines Junction consists of a series of pits within a fenced area. Separate pits exist for domestic, compost, metal, brush, and tire waste. Domestic waste is collected at a transfer station outside the landfill and the domestic pit is closed to the public. There is no burning at the site outside of special approval brush burning.

Next to the Transfer station is a compost area and a recycling depot privately run by the Haines Junction Recycling Group. The group offers in-town recycling collection at no charge to residents and goods are shipped to Whitehorse for processing with backhauls offered by various trucking companies in the Territory. The Village of Haines Junction built the recycling centre with funds from the Yukon Canada Infrastructure Program.

According to the Village of Haines Junction Integrated Community Sustainability Plan, the lifespan of the landfill site, which was previously estimated at twenty years, now only has 10 years left. This is partly a result of compacted waste, which is not bound, expanding over time. The landfill currently employs a compactor at the landfill to reduce the volume of waste entering the pits. But there is nothing in place to bind the compacted waste resulting in severely decreased effectiveness of the system. In conjunction with increased waste diversion efforts, the capacity to bail the compacted waste would increase the limited lifespan of the facility. It was recommended in the ICSP that bailer/compacting system be established at the landfill to address this issue.

Source: *Village of Haines Junction, Integrated Community Sustainability Plan, 2007*

### Potential Projects:

The following proposed projects were identified in the Village of Haines Junction, Integrated Community Sustainability Plan:

Project	Est. Cost
➡ bailer/compacting system for landfill	unknown

MAYO	Population: 466
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Mayo and surrounding area
<b>Number of regular users:</b>	500-600
<b>Solid Waste ( tonnes/yr ):</b>	365
<b>Remaining Lifespan (years):</b>	15 years
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, recyclables, brush and construction materials
<b>Recyclables:</b>	In town

### Observations and Comments

The current landfill has approximately 15 years left on its lifespan and a future landfill site has been identified and is being set aside as a reserve. NND is responsible for garbage pick-up for NND members, while the Village of Mayo currently looks after all operation and management costs of the landfill site.

According to the Village of Mayo Integrated Community Sustainability Plan, the community would like to completely eliminate the burning of solid waste at the landfill. Without burning or diverting waste from the dump, the lifespan of the landfill could be less than the projected 15 years.

Mayo does have a recycling facility but it is limited in the types of materials that can be accepted. It is suggested in the Village of Mayo Integrated Community Sustainability Plan that a new recycling centre with the capability to handle hazardous wastes would extend the life of the existing landfill as well as divert these products from the landfill.

## Potential Projects:

The following proposed projects were identified in the Village of Mayo Integrated Community Sustainability Plan:

Project	Est. Cost
➡ new recycling centre with the capability to handle hazardous wastes	unknown

Source: *Na-Cho Nyak Dun, Integrated Community Sustainability Plan, 2008*  
*Village of Mayo, Integrated Community Sustainability Plan, 2006*

TESLIN	Population: 458
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Teslin and surrounding areas
<b>Number of regular users:</b>	600
<b>Solid Waste ( tonnes/yr ):</b>	510
<b>Remaining Lifespan (years):</b>	8
<b>Items Accepted:</b>	Domestic, refuse, metal, tires, batteries, brush and construction materials
<b>Recyclables:</b>	Yes

## Observations and Comments

In 2008, the Village of Teslin received funding under the Gas Tax program to develop a transfer station to replace the existing landfill. All solid waste and recyclables are now trucked to the City of Whitehorse for processing. Waste oil is also stored and then transferred to appropriate facilities outside of the community.

The Village of Teslin is interested setting up a compost program and would also like to acquire a waste oil burner. A waste oil burner would replace some existing fossil fuel use and reduce the costs of shipping it outside the community. It may also help to eliminate some of the illegal disposal of waste oil that is occurring.

Source: *Teslin Tlingit Council & Village of Teslin, Integrated Community Sustainability Plan*

WATSON LAKE	Population: 1594
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Watson Lake and surrounding areas
<b>Number of regular users:</b>	1800
<b>Solid Waste ( tonnes/yr ):</b>	1600
<b>Remaining Lifespan (years):</b>	3+
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush and construction materials
<b>Recyclables:</b>	Recycling depot is located in town and capable of handling hazardous wastes

## Observations and Comments

Approx. 5% of all the solid waste generated is recycled or reused through the local depot or territorial programs. 95% of the garbage is deposited into a trench and burned. Hazardous and special wastes are collected and transported to Whitehorse, once a year.

The Integrated Community Sustainability Plan completed by the Town in 2007 indicates that it would like to move to a no-burn policy within 2 years.

The Town will soon be in the process of decommissioning its landfill site located on the east end of town and would like to establish a new facility on the west side of town where it is believed that prevailing winds may better direct emissions away from residential areas.

### **Plans for Modification and Expansion**

The Town has expressed an interest in establishing a new Solid Waste Processing and Recycling Facility with the following proposed features:

- **ANAEROBIC DIGESTER:** Compostable waste would be conveyed to an anaerobic digester where it will be broken down into material that would be sold as fertilizer. This unit would produce methane gas as a by-product which may be used to power the gasification unit (discussed below). The digester will also accept solid waste from surrounding mining sites so its capacity will need to be designed to be capable of accepting substantial volumes of solid waste.
- **GASSIFICATION UNIT:** The gasification unit would burn non-recyclables at a temperature of 5000<sup>0</sup> Celsius and render the waste to ash. The unit would be fuelled by a combination of methane gas (from the anaerobic digester) and or propane.
- **TIRE SHREDDING PLANT:** Tires would be accepted from all over the Yukon and northern BC at the proposed shredding plant. The shredded tires would be binned and delivered south to manufacturing plants in Alberta, BC and in the United States.
- **CARDBOARD BAILER:** Cardboard and other recyclables would be shredded or crushed and bailed. Bales would be kept in an dry storage area and trucked south to recycling manufacturers in Alberta.
- **METAL CRUSHING, SMELTING:** Metal, including cars will be crushed in a special crusher designed for this purpose. Engine blocks could be cut out to facilitate more efficient crushing and all drained oil diverted to a storage facility. The crushed metal would be bailed and shipped south. Smelting the waste metal could be considered at a later date and the raw material forged into sellable slabs. Other waste products such as fridges could be processed on site to reclaim the gas and redistribute it for future use. The metal parts would be crushed, bailed and sent south for smelting.
- **WASTE OIL:** This would be collected and shipped for processing out of province.

The Town has indicated that the estimated costs to design the facility would be \$203,245.02.

Source: *Town of Watson Lake, Integrated Community Sustainability Plan, 2007*  
*Town of Watson Lake, Rural Infrastructure Funding Proposal, September 2008*

### **Potential Projects:**

The following proposed projects have been identified by the Town of Watson Lake:

<b>Project</b>	<b>Est. Cost</b>
➔ Solid Waste Processing and Recycling Facility containing: anaerobic digester, gassification unit, tire shredding plant, bailer/compacting system, and metal crusher	Unknown

<b>WHITEHORSE</b>	<b>Population: 25,403</b>
<b>Solid Waste Facility:</b>	
<b>Areas Serviced:</b>	City of Whitehorse
<b>Number of regular users:</b>	23,000
<b>Solid Waste ( tonnes/yr ):</b>	22,500
<b>Remaining Lifespan (years):</b>	+13
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush and construction materials
<b>Recyclables:</b>	In town

### Observations and Comments

The City of Whitehorse War Eagle Landfill operates as a regional facility. Residential waste from Mount Lorne, Marsh Lake, Teslin and Deep Creek are brought to the Whitehorse landfill. The City and Yukon Government also have a disposal plan for tires from other communities in the Territory.

The City of Whitehorse does not accept non residential waste from Mount Lorne, Marsh Lake and Deep Creek. Mount Lorne and Marsh Lake are controlled transfer stations/landfills and Deep Creek is not controlled. Deep Creek and Marsh Lake have seen an increase in metal refuse in the last few years which may attribute in part that it is an uncontrolled facility.

The City operates the landfill site on a no-burn basis. The Whitehorse landfill is the only managed landfill in the territory. There may be opportunities to expand the use of the landfill as a regional landfill for other communities. The Yukon Government has suggested that a 100 mile radius could be considered, this would then include the communities of Carcross and Carmacks using the Whitehorse landfill.

Source: *City of Whitehorse, Integrated Community Sustainability Plan, 2007*

### Potential Projects:

The following proposed projects have been identified by the City of Whitehorse in their Integrated Community Sustainability Plan:

<b>Project</b>	<b>Est. Cost</b>
➡ Landfill Upgrades	\$ 275,000
➡ Upgrade Compost Facility	\$ 125,000
➡ Paving Landfill Access Road	\$350,000

### 4.2 Unincorporated Communities:

<b>BEAVER CREEK</b>	<b>Population: 97</b>
<b>Solid Waste Facility:</b>	
<b>Areas Serviced:</b>	Beaver Creek and surrounding area
<b>Number of regular users:</b>	130
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	110
<b>Remaining Lifespan (years):</b>	13+
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Burn Operation (domestic)</b>	Weekly
<b>Recyclables:</b>	No



## Observations and Comments

O&M costs shown are paid by Community Services. This facility is not staffed and is open 24 hours per day. There is Poor waste segregation and uncontrolled deposit of hazardous waste.

A burning vessel was installed in October of 2006.

Community Services also operates the Horsecamp Hill solid waste facility which is located 40km south of Beaver Creek. The facility has a burning vessel as well as a perimeter electric fence which was installed in May 2005. The facility is not staffed and is open 24 hours per day.

## Plans for Modification and Expansion

Collection of household hazardous waste.

### Costs:

<b>BRAEBURN</b>	<b>Population: 15</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Braeburn, Fox Lake
<b>Number of regular users:</b>	10 to 15
<b>Maintained by:</b>	Under contract on as-required basis by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	10 to 13
<b>Remaining Lifespan (years):</b>	Unknown
<b>Items Accepted:</b>	Domestic refuse and batteries
<b>Recyclables:</b>	No
<b>Burn Operation (domestic)</b>	As required

## Observations and Comments

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation.

Uncontrolled deposit hazardous waste.

A burning vessel was installed at the facility in the Summer of 2007 to reduce waste volumes and to extend pit life. Contractors have been hired as required to perform litter pick up and routine site maintenance.

## Plans for Modification and Expansion

None at present.

### Costs:

<b>BURWASH LANDING</b>	<b>Population: 105</b>
<b>Solid Waste Facility:</b> <b>Areas Served:</b> <b>Number of regular users:</b> <b>Maintained by:</b> <b>Solid Waste ( tonnes/yr ):</b> <b>Remaining Lifespan (years):</b> <b>Items Accepted:</b> <b>Recyclables:</b> <b>Burn Operation (domestic)</b>	Burwash Landing / Destruction Bay 127 Department of Infrastructure 110 3 Domestic only No Weekly

### Observations and Comments

24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste. A burning vessel has been installed and is operational.

### Plans for Modification and Expansion

Collection of household hazardous waste

### Costs:

<b>CANYON CREEK</b>	<b>Population: 25</b>
<b>Solid Waste Facility:</b> <b>Areas Served:</b> <b>Number of regular users:</b> <b>Maintained by:</b> <b>Solid Waste ( tonnes/yr ):</b> <b>Remaining Lifespan (years):</b> <b>Items Accepted:</b> <b>Recyclables:</b> <b>Burn Operation (domestic)</b>	Canyon Creek 25 Under contract on as-required basis by Department of Community Services 25 13+ Domestic refuse, metal, tires, batteries, brush & construction materials No As required

### Observations and Comments

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation.

Uncontrolled deposit hazardous waste.

A burning vessel has been installed and is operational. Community Services has had some preliminary discussions with the Village of Haines Junction to act as an accepting landfill for possible transfer from this site.

### Plans for Modification and Expansion

None at present.

### Costs:

<b>CARCROSS</b>	<b>Population: 436</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Carcross
<b>Number of regular users:</b>	430
<b>Maintained by:</b>	Under contract by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	365
<b>Remaining Lifespan (years):</b>	13
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	No
<b>Burn Operation (domestic)</b>	Yes

### Observations and Comments

The facility continues to operate as trench and burn. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit of hazardous waste.

The Integrated Community Sustainability Plan (ICSP) completed by the Carcross/Tagish First Nation in 2007 suggests that the First Nation would like to see a movement away from the burning of waste as well as a reduction in the volume of waste generated by the community. The ICSP indicates a preference towards transferring the waste to a managed landfill, but recognizes that there would be environmental costs associated with transporting the garbage.

### Plans for Modification and Expansion

Collection of household hazardous waste.

An in-house transfer station feasibility study is currently underway.

Source: *Department of Community Services, Infrastructure Status Report, 2002*  
*Carcross/Tagish First Nations Integrated Community Sustainability Plan, 2007*

<b>CHAMPAGNE</b>	<b>Population: 20</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Champagne / Mendenhall Subdivision
<b>Number of regular users:</b>	50
<b>Maintained by:</b>	Under contract on as-required basis by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	45
<b>Remaining Lifespan (years):</b>	13+
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	As required

### Observations and Comments

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste.

A burning vessel has been installed and is operational. Waste metal was removed in the Summer of 2007. Community Services has had some preliminary discussions with the Village of Haines Junction to act as an accepting landfill for possible transfer from this site.

### Plans for Modification and Expansion

Collection of household hazardous waste.

<b>DEEP CREEK</b>	<b>Population: 100</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Deep Creek / Horse Creek / Takhini Hot Springs Rd.
<b>Number of regular users:</b>	100
<b>Maintained by:</b>	Under contract by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	85
<b>Remaining Lifespan (years):</b>	13+
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Weekly

### Observations and Comments

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste.

The facility began operating as a transfer station in August of 2006. Waste metal has been removed from the site on a yearly basis since 2006. Waste metal and construction debris volumes continue to escalate resulting in increasing operational costs.

A three year maintenance contract was awarded April 2007. Staffing trial is now operational at the facility during weekends. The facility does not have restricted hours of operation and there are no immediate talks with the Deep Creek Solid Waste Society to provide such a service at this time.

### Plans for Modification and Expansion

Collection of household hazardous waste.

<b>DESTRUCTION BAY (metals)</b>	<b>Population: 48</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Destruction Bay / Burwash Landing
<b>Number of regular users:</b>	127
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	Unknown
<b>Remaining Lifespan (years):</b>	Unknown
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Metals recycled or buried every 2-5 years

### Observations and Comments

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste.

**Plans for Modification and Expansion**

Shakwak project entering this area likely to require extra O & M to keep site under control.

<b>JOHNSON'S CROSSING</b>	<b>Population: 25</b>
<b>Solid Waste Facility:</b> <b>Areas Serviced:</b> <b>Number of regular users:</b> <b>Maintained by:</b> <b>Solid Waste ( tonnes/yr ):</b> <b>Remaining Lifespan (years):</b> <b>Items Accepted:</b> <b>Recyclables:</b> <b>Burn Operation (domestic)</b>	Johnson's Crossing 35 Department of Infrastructure 30 13+ Domestic refuse and batteries  As required

**Observations and Comments**

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation.

Uncontrolled deposit hazardous waste.

A burning vessel was installed at the facility in the summer of 2007 to reduce waste volumes and extend pit life. Contractors are hired as required to perform litter pick up and routine site maintenance.

**Plans for Modification and Expansion**

None at present.

<b>KENO CITY</b>	<b>Population: 20</b>
<b>Solid Waste Facility:</b> <b>Areas Serviced:</b> <b>Number of regular users:</b> <b>Maintained by:</b> <b>Solid Waste ( tonnes/yr ):</b> <b>Remaining Lifespan (years):</b> <b>Items Accepted:</b> <b>Recyclables:</b> <b>Burn Operation (domestic)</b>	Keno City / Elsa 20 Under contract by Department of Community Services 17 3 Domestic refuse, metal, tires, batteries, brush & construction materials  Weekly

**Observations and Comments**

O&M costs shown are paid by Community Services. Poor waste segregation.

Uncontrolled deposit hazardous waste.

A burning vessel was installed in June of 2006 and is working well with very little maintenance. Complete electric fence reconstruction was completed in May 2007. The facility is not staff and is open 24 hours per day.

**Plans for Modification and Expansion**

Collection of household hazardous waste.

<b>MARSH LAKE</b>	<b>Population:</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	All Marsh Lake Subdivisions
<b>Number of regular users:</b>	1000
<b>Maintained by:</b>	Under contract by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	850
<b>Remaining Lifespan (years):</b>	8
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Twice per week

**Observations and Comments**

The facility began operating as a transfer station in August 2006 and is running well. The Department of Community Services works closely with the Marsh Lake Solid Waste Society who provides staffing and operates the facility with restricted hours of operation (Monday, Tuesday, Friday, Saturday and Sunday). The O&M costs are currently paid by Community Services.

The hazardous waste shed has been upgraded to meet increasing volumes of waste. O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation.

Uncontrolled deposit hazardous waste.

<b>MT. LORNE</b>	<b>Population: 379</b>
<b>Solid Waste Facility:</b>	Transfer Station
<b>Areas Served:</b>	Mt. Lorne/Robinson/Annie Lake Road/Bear Creek/Golden Horn
<b>Number of regular users:</b>	380
<b>Maintained by:</b>	Under contract by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	320
<b>Items Accepted:</b>	Domestic refuse, batteries and recyclables
<b>Recyclables:</b>	Yes
<b>Burn Operation (domestic)</b>	No burn operation

**Observations and Comments**

The facility operates as a transfer station. Waste metal collection and removal (5-10 tones/year has been added to the role of the facility. A composting program was launched in Summer 2007, to reduce the amount of waste being transferred to the City of Whitehorse municipal landfill. The facility is staffed 3 days/week (Saturday, Sunday and Monday) and is closed otherwise. The Mount Lorne Solid Waste

Management Society provides the personnel through a contract with CS, which contributes \$2,000/month to the MLSWMS to offset most of the staffing costs at the facility.

<b>OLD CROW</b>	<b>Population: 251</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Old Crow
<b>Number of regular users:</b>	280
<b>Maintained by:</b>	Department of Highways and Public Works
<b>Solid Waste ( tonnes/yr ):</b>	240
<b>Remaining Lifespan (years):</b>	unknown
<b>Items Accepted:</b>	Domestic refuse only
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Weekly

**Observations and Comments**

The dump facility in Old Crow is located near the Porcupine River. A new cell has been constructed and there may be room to develop one more cell but the site is very constrained and a new location will be needed in five to ten years.

VGFN have prepared a Physical Infrastructure Plan, which identifies the need to relocate the dump in the future. As the land is controlled by the VGFN it is essential that they be involved from the outset since the approval of any land use permits rests with the First Nation. O&M costs shown are paid by Community Services. This facility is not staffed and is open 24 hours per day.

There is poor waste segregation as well as uncontrolled deposit hazardous waste.

A burning vessel was installed in June 2006 along with a full perimeter electric fence.

<b>OLD CROW (Metals)</b>	<b>Population: 251</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Old Crow
<b>Number of regular users:</b>	280
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	Unknown
<b>Remaining Lifespan (years):</b>	Unknown
<b>Items Accepted:</b>	Metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Bury as required

**Observations and Comments**

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste.

<b>PELLEY CROSSING</b>	<b>Population: 323</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Pelley Crossing
<b>Number of regular users:</b>	300
<b>Maintained by:</b>	Under contract by Department of Community Development
<b>Solid Waste ( tonnes/yr ):</b>	260

<b>Remaining Lifespan (years):</b>	3
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Weekly

### Observations and Comments

The SFN desire to have a new facility in another location as they feel the present dump is a danger to the surface and groundwater in the area. Studies undertaken in this regard have shown that there is very limited possibility of any contamination. In spite of these assurances, the SFN still desire relocation of the existing facility.

The community landfill has an estimated 10-year lifespan based on a 280 metric tonne annual production estimate. Some limited recycling does occur and there is a Hazardous Waste Management Plan in place as part of the landfill operations. There is no composting program at this point. A public education and community collection program would help encourage recycling and composting and increase the lifespan of the local landfill. SFN will work in coordination with the Government of Yukon to improve the conditions of the landfill.

A burning vessel has been installed at the facility to reduce waste volumes and extend pit life.

Source: *Selkirk First Nation, Pelly Crossing, Integrated Community Sustainability Plan, 2007*  
*Department of Community Services, Infrastructure Status Report, 2002*

<b>ROSS RIVER</b>	<b>Population: 369</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Ross River
<b>Number of regular users:</b>	380
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	320
<b>Remaining Lifespan (years):</b>	3
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Weekly

### Observations and Comments

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste.

The following comments were made about the facility in the Ross River Dena Council, *Integrated Community Sustainability Plan, 2006*:

*“Ross River’s solid waste disposal site and the techniques used to dispose of waste were both rated poor in the discussions of the Integrated Community Sustainability Plan. Hazardous and special wastes are disposed of haphazardly and often not separated from other waste. As has been the common practice throughout the rural Yukon, household garbage is burned in a pit rather than buried in a landfill. There is some recycling of materials done but to a limited degree.*



*The landfill is permitted but there is uncontrolled access and ongoing problems. There is no proper disposal of used oil and battery collection is rudimentary. Recycling is limited.”*

Upgrading of the Solid Waste Disposal facility was listed as a priority project in the *Infrastructure Works: Building Yukon’s Future Together* report prepared by the Associations of Yukon Communities, July 2002.

Electric fencing was installed in 2002. A burning vessel was installed in June 2006.

**Plans for Modification and Expansion**

Collection of household hazardous waste.

Source: Ross River Dena Council, *Integrated Community Sustainability Plan, 2006*  
*Department of Community Services, Infrastructure Status Report, 2002*  
 Associations of Yukon Communities, *Infrastructure Works: Building Yukon’s Future Together, 2002*

<b>SILVER CITY</b>	<b>Population: 15</b>
<b>Solid Waste Facility:</b>	
<b>Areas Serviced:</b>	Silver City
<b>Number of regular users:</b>	20
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	17
<b>Remaining Lifespan (years):</b>	13+
<b>Items Accepted:</b>	Domestic refuse only
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	As required

**Observations and Comments**

O&M costs shown are paid by Community Services. 24 hour access. Uncontrolled/unstaffed facility. Poor waste segregation. Uncontrolled deposit hazardous waste.

A burning vessel was installed in the Summer of 2005.

**Plans for Modification and Expansion**

None at present.

<b>STEWART CROSSING</b>	<b>Population: 30</b>
<b>Solid Waste Facility:</b>	
<b>Areas Serviced:</b>	Stewart Crossing
<b>Number of regular users:</b>	30
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	25
<b>Remaining Lifespan (years):</b>	13

<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	As required

### Observations and Comments

O&M costs shown are paid by Community Services. The facility is not staff and is open 24 hours per day. Poor waste segregation. Uncontrolled deposit hazardous waste.

A burning vessel was installed in June of 2006 and is working well with minor maintenance.

### Plans for Modification and Expansion

Collection of household hazardous waste

<b>TAGISH</b>	<b>Population: 221</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Tagish / Taku River Subdivision
<b>Number of regular users:</b>	280
<b>Maintained by:</b>	Under contract by Department of Community Services
<b>Solid Waste ( tonnes/yr ):</b>	240
<b>Remaining Lifespan (years):</b>	3-5
<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Weekly

### Observations and Comments

This facility is not staff and is open 24 hours per day. Poor waste segregation. Uncontrolled deposit hazardous waste. A burning vessel was installed in June of 2008. In the summer of 2006, all waste metal removed and a waste area was set up. An in-house transfer station feasibility study is now underway.

### Plans for Modification and Expansion

Collection of household hazardous waste.

<b>UPPER LIARD</b>	<b>Population: 100</b>
<b>Solid Waste Facility:</b>	
<b>Areas Served:</b>	Upper Liard
<b>Number of regular users:</b>	250
<b>Maintained by:</b>	Department of Infrastructure
<b>Solid Waste ( tonnes/yr ):</b>	215
<b>Remaining Lifespan (years):</b>	unknown

<b>Items Accepted:</b>	Domestic refuse, metal, tires, batteries, brush & construction materials
<b>Recyclables:</b>	
<b>Burn Operation (domestic)</b>	Weekly

## **Observations and Comments**

Solid Waste from the Upper Liard area is hauled to the upper Liard solid waste disposal site located approximately 800m west of Albert Creek off the Alaska Highway. Residents have identified concerns with burning of solid waste at this site.

The Liard First Nation Integrated Community Sustainability Plan states the following about the facility:

*“Studies have identified that leachates are migrating from this site but residents have also noted concerns that continued use of this site including dumping of hazardous wastes could affect their ground water supplies in the future. Negotiations are ongoing with the Territorial Government over remediation, recycling and relocation of this solid waste disposal facility.”*

A burning vessel was installed in June of 2006; however the vessel is not being used properly (waste is being dumped in front of the unit instead of inside it). Additional signage will be added to address this problem. The facility is not staff and is open 24 hours per day.

Source: Liard *First Nation, Integrated Community Sustainability Plan, 2007*

## **Plans for Modification and Expansion**

Collection of household hazardous waste.

# **Appendix A**

**CANADA – YUKON  
PROVINCIAL-TERRITORIAL BASE FUNDING AGREEMENT  
BUILDING CANADA PLAN  
ELIGIBLE CATEGORIES**

## **SCHEDULE A**

### **ELIGIBLE CATEGORIES**

The following are the minimum eligible categories of investment under the Provincial-Territorial Infrastructure Base Fund, and Canada reserves the right to add other categories of investment at its discretion, in consultation with Yukon.

#### 1. Water Infrastructure

- a. Drinking water treatment infrastructure.
- b. Drinking water distribution systems (may include metering as part of a larger project).

#### 2. Wastewater Infrastructure

- a. Wastewater collection systems and/or wastewater treatment facilities or systems (which may include grey water reuse).
- b. Separation of combined sewers and/or combined sewer overflow control, including real-time control and system optimization.
- c. Separate storm water collection systems and/or storm water treatment facilities or systems.
- d. Wastewater sludge treatment and management systems.

#### 3. Public Transit Infrastructure

- a. Transit infrastructure, including, but not limited to, rail and bus rapid transit systems, and related facilities.
- b. Buses, rail cars, ferries, para transit vehicles, and other rolling stock and associated infrastructure, for the expansion of services, and green buses for replacement and expansion services.
- c. Intelligent Transport Systems (ITS) including, but not limited to, fare collection, fleet management, transit priority signalling, and real-time traveller information systems at stations and stops.
- d. Related capital infrastructure including, but not limited to, transit queue-jump lanes, reserved bus lanes, turning lanes or other related enhancements in support of public transit, streetcar/trolley infrastructure, storage and maintenance facilities, security enhancements, and transit passenger terminals.

When undertaken as part of above subcategory improvements, active transportation infrastructure, such as bicycle lanes that connect to transit facilities and bicycle storage and lockers at stations, is eligible.

#### 4. National Highway System Infrastructure

- a. Construction projects on highways (or ferry services) that form part of the National Highway System (NHS), including:

- Additional capacity (e.g. turning lanes, truck lanes, grade separations, interchanges, roundabouts, rest areas, etc.) and new urban bypasses that connect to the NHS at both ends.
- Rehabilitation of highway and bridge assets. Projects must meet the definition of 'rehabilitation' as agreed upon by the Council of Ministers responsible for Transportation and Highway Safety in 2005.
- Safety-related improvements.
- Intelligent Transportation Systems (ITS) projects.

## 5. Green Energy Infrastructure

- a. Reinforcement, expansion of existing and construction of new transmission grids to transmit clean electricity.
- b. Hydrogen infrastructure (generation, distribution and storage).
- c. Electric Vehicle Infrastructure (centralized refueling stations).
- d. Biofuels distribution/storage infrastructure.
- e. Thermal heat/cooling delivery system (i.e. district energy systems) using renewable or combined heat/power (CHP) plants.
- f. Clean coal facilities.
- g. Renewable Electricity Generation facilities for municipal consumption (e.g., wind energy, solar energy).
- h. Municipal building energy retrofits.

## 6. Disaster Mitigation Infrastructure

- a. Construction, modification or reinforcement of structures that protect from, prevent or mitigate potential physical damage resulting from extreme natural events, and impacts or events related to climate change.
- b. Modification, reinforcement or relocation of existing Public Infrastructure to mitigate the effects of and/or improve resiliency to extreme natural events and impacts or events related to climate change.<sup>1</sup>

Note: Construction, modification or reinforcement of structures exclude normal routine maintenance and operational work (e.g. dredging of sediment, gravel removal, debris traps, etc.).

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<sup>1</sup> Excludes the relocation of whole communities.

## 7. Solid Waste Management Infrastructure

### a. Solid waste diversion projects:

- Recycling.
- Composting.
- Anaerobic digestion.

### b. Solid waste disposal projects:

- Thermal processes, including gasification.
- Landfill gas recovery.

## 8. Brownfield Redevelopment Infrastructure

### a. Remediation or decontamination and redevelopment of a brownfield site within municipal boundaries, where the redevelopment includes:

- The construction of Public Infrastructure as identified in the context of any category under the Major Infrastructure Component and the Communities Component of the Building Canada Fund; and/ or
- The construction of municipal use public parks and publicly-owned social housing, alone or mixed with a private development component that includes any mix of residential, commercial, institutional or industrial uses.

## 9. Cultural Infrastructure

### a. Museums<sup>2</sup>.

### b. The preservation of designated heritage sites that are duly recognized by<sup>3</sup>:

- UNESCO;
- Canadian government as per the national federal register of historic places; or
- Provincial or Local Government.

### c. Provincial, territorial and Local Government-owned libraries and archives.

### d. Facilities for the creation, production and presentation of the arts.

### e. Infrastructure in support of the creation of a cultural precinct within an urban core.

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<sup>2</sup> A museum is a non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, artifacts related to people and their environment.

<sup>3</sup> Excludes private residences and religious sites.

## 10. Sport Infrastructure

- a. Sport infrastructure for community public use (can include training facilities for high performance amateur athletes).
- b. Sport infrastructure in support of major amateur athletic events.

## 11. Connectivity and Broadband Infrastructure

- a. High-speed backbone.
- b. Point of presence.
- c. Local distribution within communities.
- d. Satellite capacity.

## 12. Local Road Infrastructure

- a. Additional capacity and rehabilitation of roads within a municipal boundary, and high-occupancy and/or transit vehicle lanes, grade separations, interchange structures, bridges, tunnels, intersections, and roundabouts. Where Yukon acts as a Local Government, or where there is a governing entity that is established by a province or territory such projects are eligible.
- b. Infrastructure pursuant to compliance with accessibility, such as wheel chair let down
- c. Intelligent Transportation Systems (ITS)
- d. Active transportation projects, including sidewalks, bicycle lanes, pedestrian/ bike/ multi-use pathways as a component of a larger project
- e. Rehabilitation of bridges and major elevated or depressed structures (except those on the core National Highway System which are eligible for rehabilitation under the National Highway System Category)<sup>4</sup>

## 13. Short-line Rail Infrastructure

- a. Construction of industrial branch lines to allow a railway to serve a group of companies (an industrial park), an intermodal yard, a port, or a marine terminal.
- b. Construction, rehabilitation and/or upgrading of tracks and structures, excluding regular maintenance, to ensure safe travel at speeds deemed acceptable for safe and efficient operations.
- c. Construction, development or improvement of facilities to improve the interchange of goods between modes.
- d. Procurement of technology and equipment used to improve the interchange of goods between modes.

Note: Shortline operators must offer year round services.

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<sup>4</sup> Rehabilitation initiatives must meet the definition of 'rehabilitation' as agreed upon by the Council of Ministers responsible for Transportation and Highway Safety in 2005.



14. Short-sea Shipping Infrastructure

- a. Specialized marine terminal intermodal facilities or transshipment (marine to marine) facilities.
- b. Capitalized equipment for loading/unloading required expansion for short-sea shipping.
- c. Technology and equipment used to improve the interface between marine mode and the rail/highways modes or to improve integration within the marine mode including Intelligent Transportation Systems (ITS).

Note: For greater clarity, the purchase of vessels, infrastructure that supports passenger-only ferry services, rehabilitation and maintenance of existing facilities such as wharves and docks, and dredging are not eligible for funding.

15. Regional and Local Airport Infrastructure

- a. Construction projects that enhance airports that are accessible all year-round, through the development, enhancement or rehabilitation of aeronautical and/or non-aeronautical infrastructure:
  - Aeronautical infrastructure includes, but is not limited to, runways, taxiways, aprons, hangars, lighting, Nav aids, maintenance sheds, airside mobile equipment and associated shelters, air terminal building, and groundside safety-related.
  - Non-aeronautical infrastructure such as groundside access, inland ports, parking facilities, and commercial and industrial activities.

16. Tourism

- a. Convention centres.
- b. Exhibition hall-type facilities.

17. Non-National Highway System Roads (Fiscal Year 2007-08 only):

- a. Provincially and territorially owned highways; and,
- b. Provincially and territorially owned roads.

18. Northern Infrastructure consistent with *SOR/2004-200, s.2.*

19. Research, knowledge, feasibility studies, and capacity building

Up to one (1) percent of the Funds in Yukon can be made available for:

- a. Asset management approaches;
  - Knowledge of their infrastructure assets (e.g. inventory and location, book value, condition, expected residual life).

- Determination and reduction of life cycle costs associated with infrastructure that is owned, leased and/or operated (e.g. maintenance, repairs, rehabilitation over the life cycle).
  - Improve collective understanding of the state and performance of Canada's infrastructure.
- b. Demand management approaches and strategies ;
- Assessment and implementation of demand management strategies and approaches to meet the needs of municipalities or groupings of municipalities, such as
    - benchmarking;
    - establishing trends and developing corrective measures;
    - incentives (e.g., user fees, regulation, public buy-in and involvement);
    - least cost and optimization analyses; and
    - alternatives to new capital investment.
  - Assessment of capacity and prevention of over-development in terms of management, operation and functionality of the existing or future infrastructure.
  - Establishment of minimum levels of service (e.g. considering health and safety, security, functionality, risk assessment, affordability, social expectations), which support planning and decision-making.
- c. Training
- Training to ensure that the knowledge and the tools developed can be maintained on a long-term basis by the proponent.
  - Training at various levels (technical, administrative, elected officials) on asset management processes, benefits, tools, etc.
- d. Feasibility studies;
- Studies that examine infrastructure issues as well as due diligence aspects of specific infrastructure projects, which at the time of the study are not being actively considered for funding under the Provincial-Territorial Base Fund.
- e. Infrastructure plans
- Provincial long-term infrastructure plans based on current knowledge of infrastructure needs and/or assets in order to identify priorities and guide Provincial-Territorial Base Funding investments.

# Appendix B

**CANADA – YUKON  
AGREEMENT ON THE TRANSFER OF FEDERAL GAS TAX REVENUES UNDER  
THE NEW DEAL FOR CITIES AND COMMUNITIES  
2005-2015**

**Eligible Project Categories  
&  
Eligible Costs Key**

## *Schedule A- Eligible Project Categories*

### **1) Environmentally Sustainable Municipal Infrastructure (ESMI) projects include the following:**

a) Public transit, e.g.:

- i) Rapid Transit: tangible capital assets and rolling stock (includes light rail, heavy rail additions, subways, ferries, transit stations, park and ride facilities, grade separated bus lanes and rail lines);
- ii) Transit Buses: bus rolling stock, transit bus stations;
- iii) Intelligent Transport System (ITS) and Transit Priority Capital Investments;
- iv) ITS technologies to improve transit priority signalling, passenger and traffic information and transit operations;
- v) Capital investments, such as transit queue-jumpers and High Occupancy Vehicle (HOV) lanes.

b) Water, e.g.:

Drinking water supply; drinking water purification and treatment systems; drinking water distribution systems; water metering systems.

c) Wastewater, e.g.:

Wastewater systems including sanitary and combined sewer systems; and separate storm water systems.

d) Solid waste, e.g.:

Waste diversion; material recovery facilities; organics management; collection depots; waste disposal landfills; thermal treatment and landfill gas recuperation.

e) Community Energy Systems, e.g.:

- i) Cogeneration or combined heat and power projects (where heat and power are produced through a single process);
- ii) District heating and cooling projects where heat (or cooling) is distributed to more than one building.

f) Active transportation infrastructure (e.g, bike lanes), local roads, bridges and tunnels that enhance sustainability outcomes.

g) Building system improvements that promote significant energy efficiency improvements and/or utility.

### **2) Capacity Building includes the following activities:**

- i) Collaboration: building partnerships and strategic alliances; participation; and consultation and outreach;
- ii) Knowledge: use of new technology; education and training; research; and monitoring and evaluation;
- iii) Integration: planning, policy development and implementation (e.g., environmental management systems, life cycle assessment).

## *Schedule B: Eligible Costs Key*

- A. Eligible Costs are direct costs that are in Canada's opinion properly and reasonably incurred and paid by the Recipient under a contract for goods and services necessary for the implementation of the Project.
- B. Eligible Costs may include only the following:
- a. the capital costs of acquiring, constructing or renovating a tangible capital asset and any debt financing charges related to that;
  - b. the fees paid to professionals (excluding lawyers) technical personnel, consultants and contractors specifically engaged to undertake the surveying, design, engineering, manufacturing or construction of the Project and related facilities and structures;
  - c. the costs of environmental assessments, monitor and follow-up programs as required by the Canada Environmental Assessment Act; or a territorial equivalent; and
  - d. the costs related to strengthening the ability of Local Governments to develop Integrated Community Sustainability Plans.
- C. If the Recipient is a remote municipality the out of pocket costs\* related to employees or equipment may be included as Eligible Costs under the following conditions:
- a. The Recipient determines that it is not economically feasible to tender a contract;
  - b. Employees or equipment are employed directly in respect of the work that would have been the subject of the tendered contract; and
  - c. The arrangement is approved in advance in writing by Yukon.
- \* This includes a Recipient's overhead costs, its direct or indirect operating or administrative costs, and more specifically its costs related to planning, engineering, architecture, supervision, management and other activities normally carried out by its staff;
- D. If the Recipient earns any interest on Contribution Funds invested pursuant to 243 of the Municipal Act, the Recipient may use that to pay for administration costs.
- E. Costs relating to the following items are not Eligible Costs:
- a. Project costs incurred before April 1, 2005;
  - b. Services or works that, in the opinion of Yukon, are normally provided by the Recipient or a related party;
  - c. Salaries and other employment benefits of any employees of the Recipient except those allowed by C;

- d. Costs of feasibility and planning for the Project;
- e. Taxes for which the Recipient is eligible for a tax rebate and all other costs eligible for rebates;
- f. Costs of land or any interest therein, and related costs;
- g. Cost of leasing equipment by the Recipient except those allowed by C;
- h. Routine repair and maintenance costs;
- i. Legal fees;
- j. Administrative costs incurred as a result of implementing this Agreement ; and
- k. Audit and evaluation costs.