



# Northwest Territories Association of Communities



PERMAFROST  
THE GROUND IS  
LITERALLY MELTING  
BENEATH OUR FEET

State of Knowledge Regarding Permafrost Degradation and Community  
Infrastructure in the NWT

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State of Knowledge Regarding  
Permafrost Degradation and  
Community Infrastructure  
In the NWT

This report is the Project Final Report  
for the project entitled  
“State of Knowledge regarding Permafrost  
Degradation and Community Infrastructure in  
the Northwest Territories (Phase 2)”

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Permafrost –

The Ground is Literally Melting Beneath our Feet!

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Permafrost –

The Ground is Literally Melting Beneath our Feet!

## Definitions

### Permafrost:

*Permafrost is ground (soil or rock) that remains below 0 °C for two or more consecutive years.*

*The ground above permafrost that thaws each summer and refreezes in the winter is called the *active layer*.*

*The permafrost region covers about half of Canada. North of the tree line, permafrost underlies almost all the land area and is spatially continuous, while south of the tree line is a broad zone of discontinuous permafrost. Within the discontinuous permafrost zone the proportion of land underlain by permafrost decreases southwards.*

### Adaptation:

*Adaptation to climate change consists of initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Various types of adaptation can be distinguished, including anticipatory or proactive adaptation versus reactive adaptation, private and public adaptation and autonomous and planned adaptation. This is in distinction to the mitigation of global warming*

## **1. PROJECT BACKGROUND**

This project is not about who or what is causing global warming, it is about our reality here in the NWT - with climate change rates of at least double of those in the rest of Canada, we cannot afford to put this issue on the backburner.

This is an important issue to communities especially when the costs estimated for damage to buildings alone due to Permafrost deterioration is as high as \$400,000,000 for the NWT. Start adding in other infrastructure like roads, utilidors, airport runways, water and waste and you can only imagine what the costs might be.

Over the last century, the Western Arctic has experienced rapid and intense changes associated with Climate Change. Estimates have indicated that the Arctic is changing at more than double the rate of the rest of Canada. Surveys of the communities in the Northwest Territories indicate that almost all are already seeing the impact of climate change. Of particular concern to municipal corporations is the impact of rising temperatures and changing precipitation levels on permafrost and how that will in turn impact on infrastructure.

In the NWT, through the “New Deal”, most municipalities have only recently been transferred the responsibility for planning and developing local infrastructure. Although these governments are best able to assess their infrastructure needs and set priorities, this challenge is further complicated by the need to evaluate current infrastructure based on climate change scenarios as well as new infrastructure. Although some work has been done on the vulnerability of infrastructure in the communities very little of this information has been passed onto the communities.

Municipal infrastructure is expected to serve communities for fifty years or longer and much of the infrastructure in Northern communities relies on permafrost for stability. Melting permafrost could seriously degrade the performance of critical infrastructure and will change how we design infrastructure in the future. This includes water and waste water distribution and treatment systems, building,



roads, utilities and embankments. Unmitigated the damages are estimated to cost hundreds of millions of dollars to repair. Without a strong capacity available at a community level, critical infrastructure in many Northern Communities may be seriously compromised over the coming decades.

Coping with the impacts of climate change whether in a pro-active or a re-active manner will be absolutely crippling the local economies without assistance from other levels of government. Continuing to work with our various partners who are also facing this challenge continue to be a critical component of the success of community adaptation.



In May 2009, the NWTAC passed a motion to establish the Climate Change Working Group to lead the professional and institutional development of community based adaptation projects relating to Climate Change Adaptation in the NWT.

The motion as approved reads:

WHEREAS communities across the north are starting to see the impacts of Climate Change in their communities

WHEREAS recent studies have shown that there will be significant changes to the permafrost in the NWT in the future due to Climate Change

WHEREAS studies have estimated that without mitigation the damages due to permafrost degradation will be in the order of \$100's of millions

WHEREAS Municipalities and community members build infrastructure and buildings that are expected to have 50 or 100 year life spans and therefore their designs must address these anticipated changes now

THEREFORE BE IT RESOLVED THAT NWTAC establish a Working Group to first establish what work has or is being done to look at Building and various design codes and Best Management Practices to ensure that Permafrost impacts are being considered and secondly to make recommendations for addressing any identified gaps

AND FURTHER THAT NWTAC apply to the GNWT and INAC for funding a staff person and/or consultant(s) to provide the Working Group with technical and administrative support

AND FURTHER THAT the Working Group should report back to the NWTAC Board

THEREFORE BE IT RESOLVED THAT the NWTAC request that the Northern Territories Waste and Water Association be requested to complete a review of climate change impacts on Water, Wastewater and Waste facilities



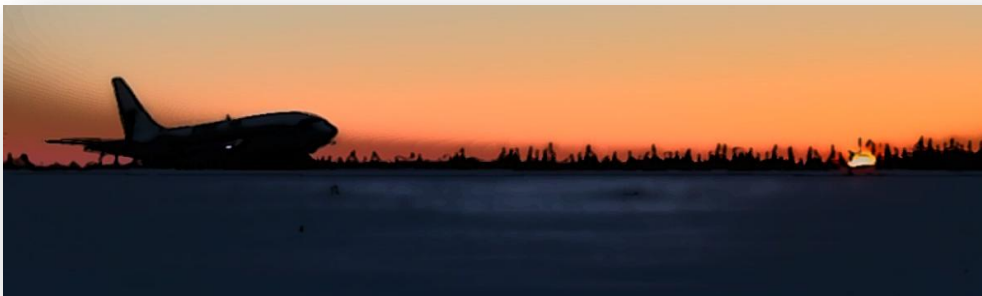
AND FURTHER THAT that the Northern Territories Waste and Water Association report back to the NWTAC on a proposed course of action to address these challenges such as a updating of design criteria and manuals

THEREFORE BE IT RESOLVED THAT both NWTAC and LGANT create forums for the sharing of innovation, best management practices, and ideas to address both reducing greenhouse gas emissions and the mitigation and adaptation to Climate Change

THEREFORE BE IT RESOLVED THAT the School of Community Government set up workshops to educate Municipal Councils and staff about the potential impacts of Climate Change on their communities

The aim of this project is to identify, collect and classify all of the information available related to permafrost degradation and infrastructure. A database was built with all of the information collected and made available to all communities. A gap analysis was completed to identify, based on the different studies that have already been completed, what needs to be completed and where to provide communities with all the tools to identify the vulnerabilities of their infrastructure.

Furthermore, best practices of municipalities throughout the North were examined as they relate to assessments, impacts and adaptation solutions. Smart Management Fact Sheets were developed that are relevant to NWT communities.





## **2. PROJECT STATISTICS**

<b>Activity</b>	<b>#</b>
Researchers contacted by E-mail	60
Face to Face Meetings	60
Letters Drafted	40
Studies and Guidelines Collected/Downloaded	470
Webinars Participated in	11

### **Other Climate Change Adaptation Work:**

- Set Up Office
- Create Filing System
- Development of Working Group Terms of Reference
- Creation of Project Backgrounder
- Draft of Project Work Plan
- Smart Management Ideas development with Planning Facilitator
- Review and comment on draft MACA Strategic Plan
- Review “Creating Our Future Together” Document in Climate Change context
- Drafting and Completing of Community Survey
- Set up and Populate community infrastructure database
- Exploring additional funding opportunities for project
- Final Workshop Development and Preparation
  - Collaboration with Pembina and Ecology North
- Working on funding opportunities for final workshop in March 2011



- Participate in CSA Climate Change Adaptation On-line training advisory
- Co-Chair CSA Permafrost and Climate Change Guideline
- Development of “Tackling Climate Change Through Standards” Paper
- NWTAC Board Meeting
- Met with the Consulting Engineers of Northwest Territories
- Participated in the Engineers Canada PIEVC Climate Change Risk Assessment Training
- Waste and Water Conference
- Participated in the Department of Transportation System (Road, Airport and Marine) Risk Assessment Exercise
- Project Presentation at Senior Administrative Officers Annual Meeting and Conference
- Attended Good Governance Meeting (SAO's and Councillors)
- Presentation to the NWT Association of Engineers and Geoscientists – Climate Change – The Perfect Storm = The Perfect Engineering Opportunity
- Various Meetings:
  - GNWT
    - Municipal and Community Affairs
    - Emergency Management
    - Environment and Natural Resources
    - Public Works and Services
    - Department of Transportation
    - MLA and Constituency Assistant
    - ICSP Steering Committee
  - Federal Government
    - Indian and Northern Affairs Canada
    - Director General of Geological Survey of Canada
    - Emergency Management
  - NGO's
    - Ecology North
    - Arctic Energy Alliance
    - Pembina Institute
  - Other:
    - Engineering Consultants
    - Consulting Engineers of the Northwest Territories



- Engineering Association of Architects
- NWT Association of Engineers and Geoscientists
- Yellowknife Area Climate Change Researchers
- Other NWT Researchers



### **3. ESTABLISHMENT OF THE CLIMATE CHANGE WORKING GROUP**

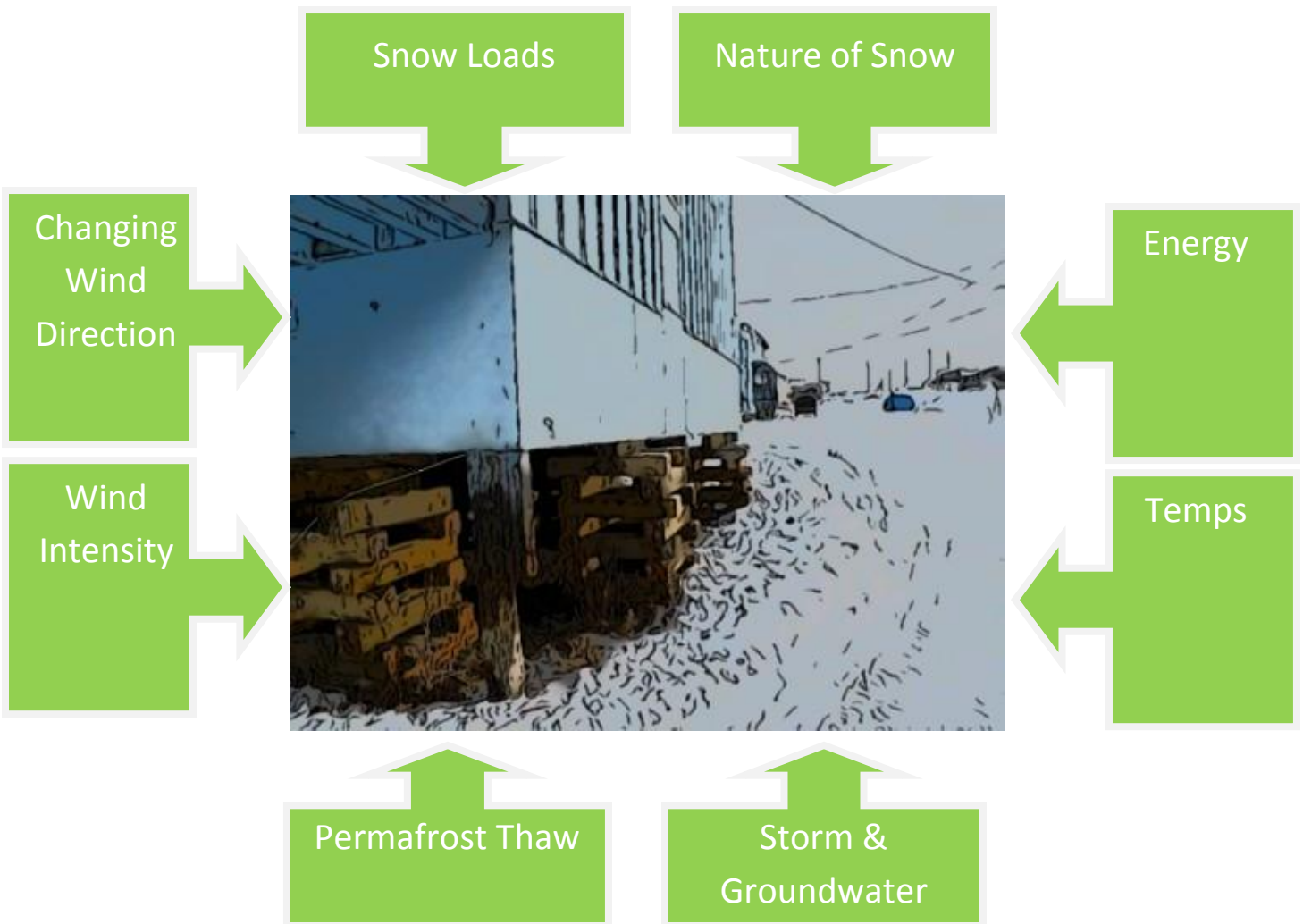
As per the 2009 Resolution, interest in the climate was solicited from administrative and Elected representatives. The Climate Change Adaptation Working Group as appointed by the NWTAC Board is:

Chair:	Gordon Van Tighem
Elected Officials:	Andrew Cassidy, Councillor, Hay River Joseph Lalonde, Councillor ,Enterprise
Administrative Representatives:	Margaret Ireland, Jean Marie River First Nation Lena Egotak, SAO Ulukhaktok
Technical Representatives:	Climate Change Group Rep, ENR, GNWT Infrastructure Rep PW&S, GNWT
NWTAC	Yvette Gonzalez, CEO
INAC Adaptation	Yves Theriault (Ex-Officio)



#### 4. KEY VULNERABILITIES IN COMMUNITY INFRASTRUCTURE

From a permafrost perspective the vulnerabilities of communities is compounded by the erosion of factors of safety being caused by climate change.

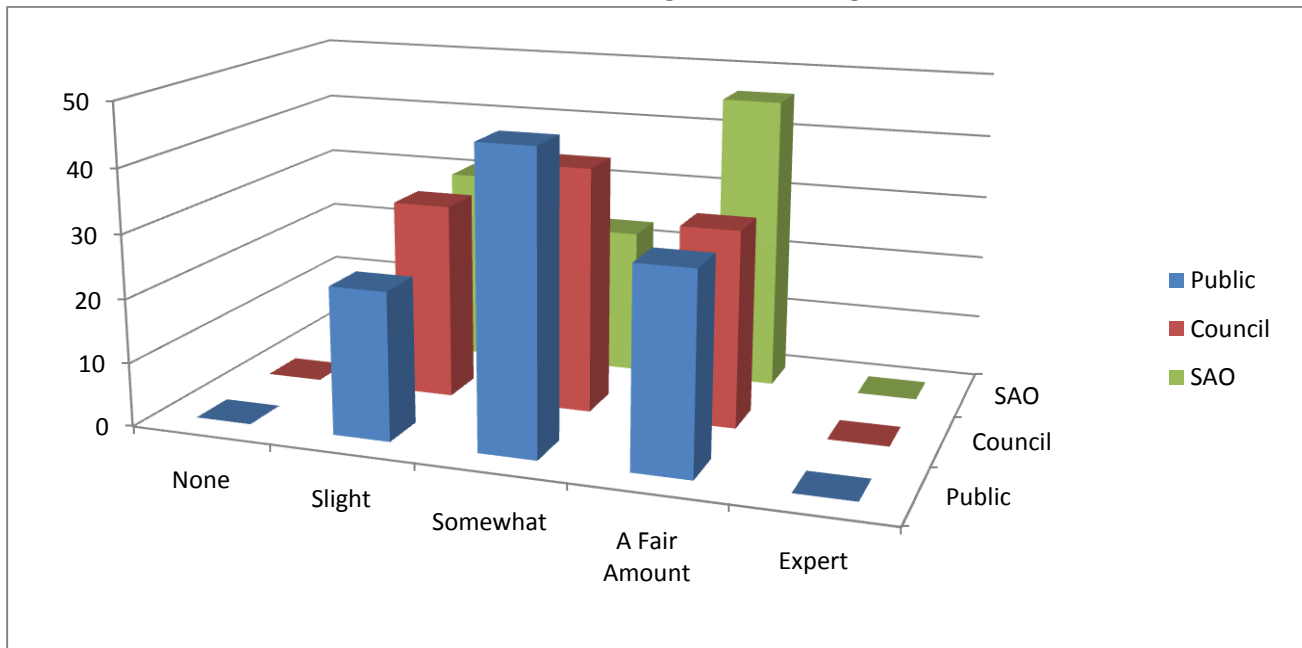


**EROSION OF FACTORS OF SAFETY**

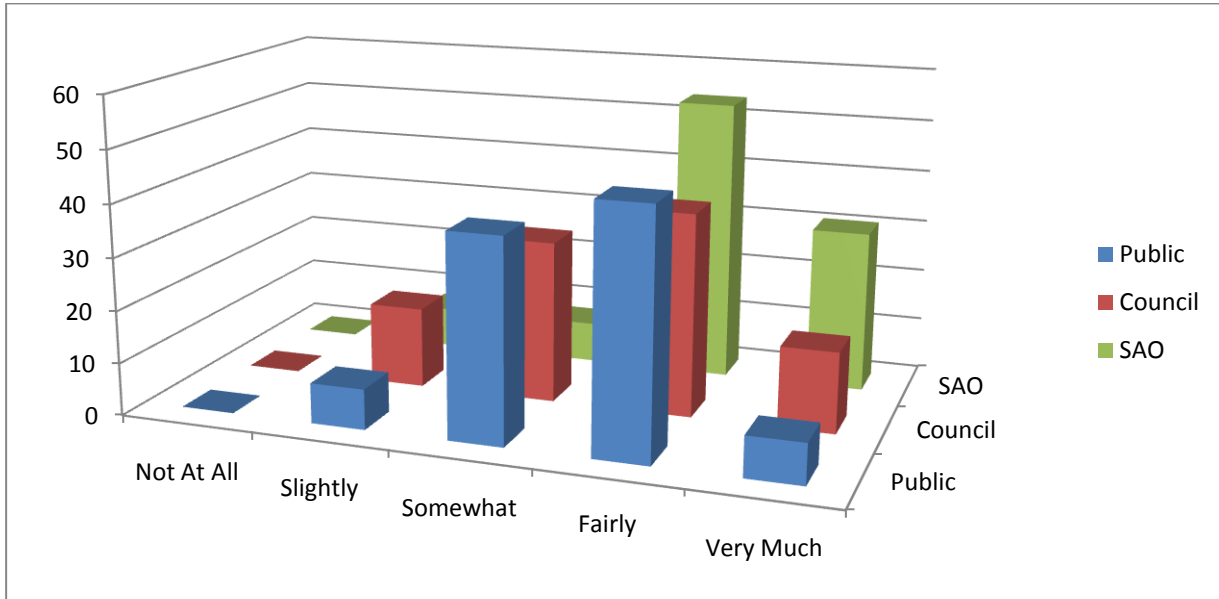
## 5. COMMUNITY SURVEY RESULTS

Surveys were completed and compiled from communities throughout the Territory. A detailed report on the surveys can be found in Appendix A

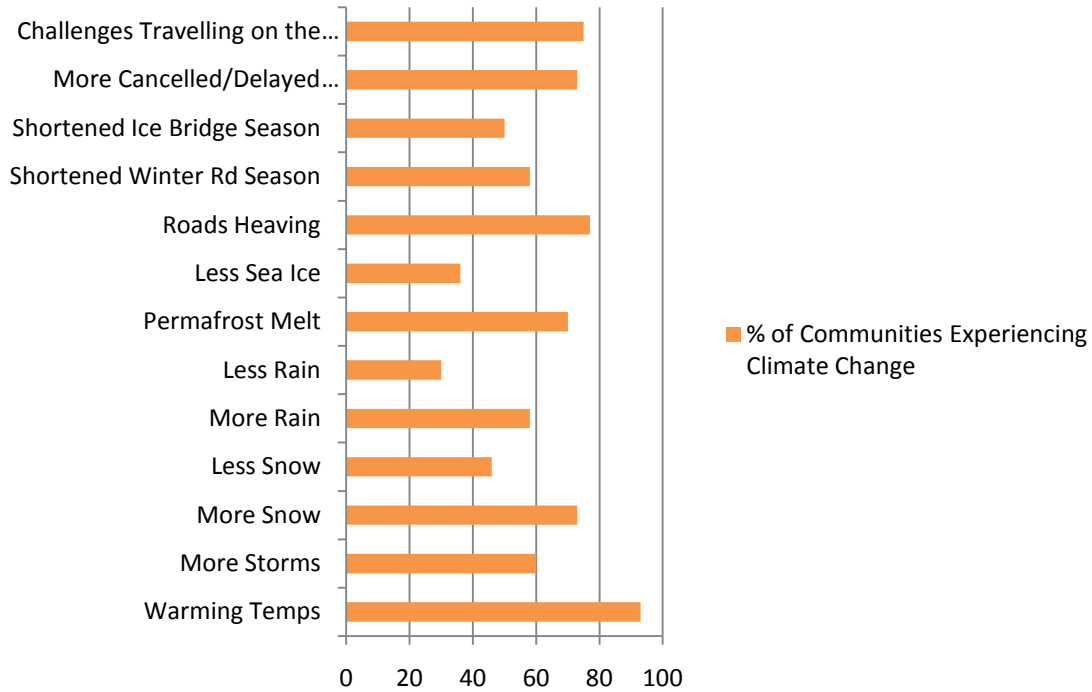
**Ratings of Public, Council and Senior Administrative Officer  
Climate Change Knowledge**



### Climate Change Concerns by the Public, Council and Senior Administrative Officer



## % of Communities Experiencing Climate Change





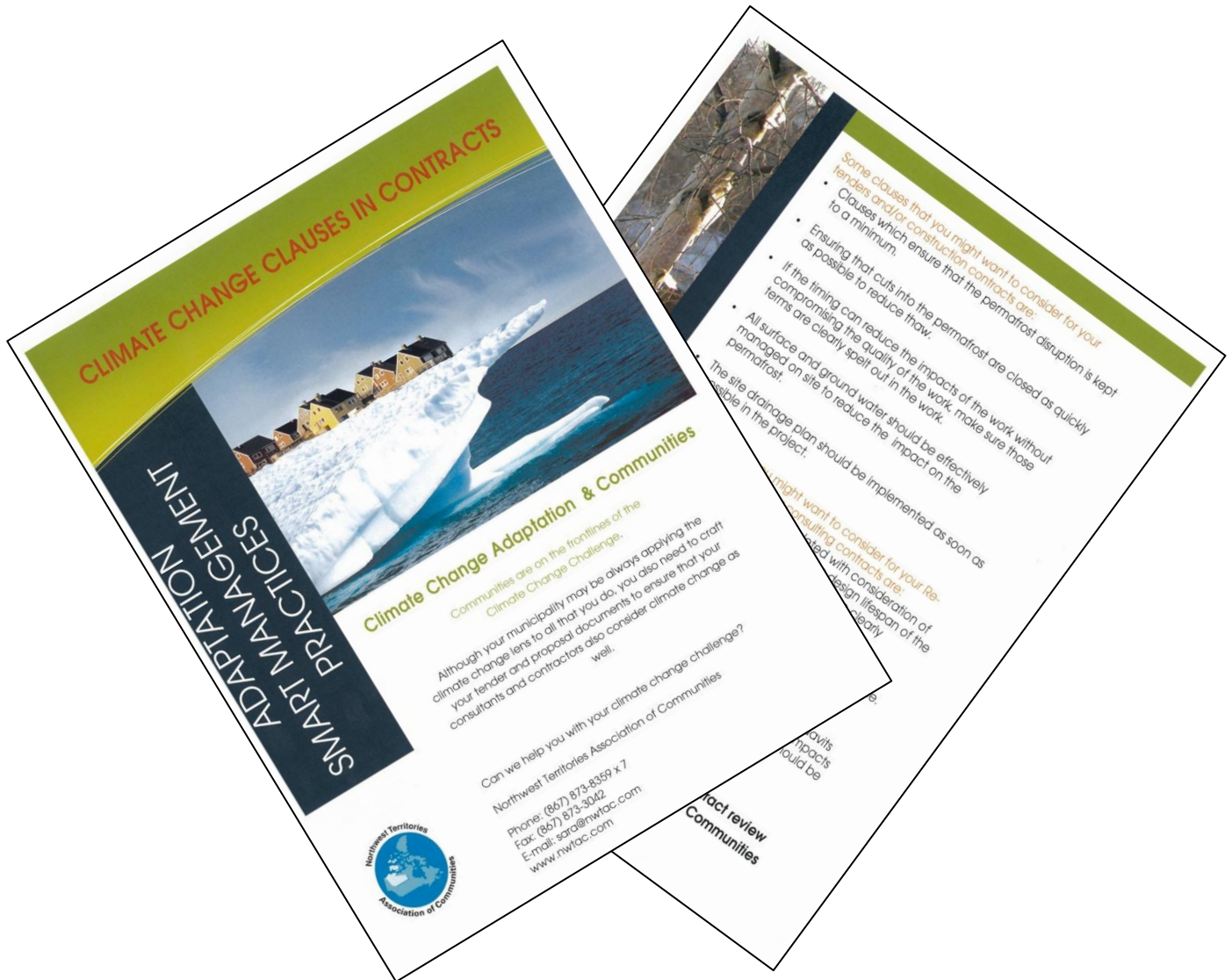
## 6. COMMUNITY ADAPTATION PLANS

We are aware of and have included copies in our database of the Adaptation Plans already completed by communities. Roughly 1/3 or 11 communities have completed plans to date. They include:

- Fort Resolution
- Tlicho Region
- Gameti
- Wekweeti
- Whati
- Behchoko
- Yellowknife
- Tsiigehtchic
- Fort McPherson
- Paulatuk
- Ulukhaktok
- Tuktoyaktuk

## 7. BEST MANAGEMENT PRACTICES

A series of Smart Management Practices was developed as part of this project.



In Appendix G you will find Smart Management Practices including:

- Climate Change Clauses in Contracts
- Climate Change and Site Plans
- Permafrost and Hazard Mapping
- The Climate Change Lens
- Community Drainage Plans

More will be developed in the following phases of the Climate Change Adaptation project.

The Smart Management Practices will be distributed to all the communities at the Annual General Meeting in June 2011 as well as being included on the updated website and through upcoming newsletters.



## 8. DATABASES

Through direct contact with researchers, working with various partners such as Public Works and Services with the GNWT, and on-line research, a database of 470 documents have been compiled.

They include:

- Studies and Papers on NWT Projects
- Studies and Papers other Northern
- Studies and Papers other
- Adaptation Plans - NWT and other Northern
- Guidelines and Texts
- Geotechnical Report Listing from the GNWT
- Compendium of Research Listings for the NWT

We are just in the process of redeveloping our website and all materials will be made available on the website, but in the meantime, all materials can be accessed through the NWTAC office. A number of communities have already taken advantage of this opportunity.



## **9. GAPS ANALYSIS and RECOMMENDED ACTIONS**

A Gaps Analysis was completed and broken down into various subject areas:

### **a. CLIMATE DATA**

All of the adaptation planning in the world will not be effective if there is not an accurate suite of climate change data available. The identified gaps and associated actions relative to climate data include:

- No climate change modeling has been done for the North
- Can no longer solely use historic experience in establishing codes, standards and guidelines due to climate change
- Climate modelling will form the core of most codes, standards and guidelines as we move forward

#### Associated Actions

- Encourage development of climate change models for each community and ensure that Environment Canada is resources to do so

### **b. RESEARCH**

A critical element of dealing with Climate Change is ensuring effective research is being completed to assist communities. Some of the identified gaps and associated action include:

- Lack of community involvement in setting research agendas
- Research outcomes are not provided to communities and often have to be purchased
- The academic knowledge base is scattered throughout the country

### Associated Actions

- work with our research partners to ensure the agenda reflects the needs of communities
- Work with Aurora Research Institute to ensure research results are communicated back to communities
- Community names should be included within paper titles or keywords
- Find ways to foster resident northern expertise

## **c. ADAPTATION PLANS AND COMMUNITY DECISION MAKING**

Roughly 1/3 of communities have completed Adaptation Plans. These plans combined with Hazard Mapping and Vulnerability Assessments are critical elements in ensuring the resiliency of communities. The following gaps and Associated Actions are noted relative to Adaptation Plans:

- Many of the Adaptation Plans have little focus on Infrastructure (more attention has been paid on recent ones)
- No studies yet that focus on solutions or actual adaptation recommendations
- Little involvement of northern infrastructure experts to date

### Associated Actions

- Adequate Funding from the Federal Government needs to be made available for communities to complete Adaptation Plans
- The GNWT should assist communities with Adaptation Planning and Hazard Mapping

## **d. COMMUNICATION**

An extremely critical element of all of this work is communication. Communication cannot be restricted to conferences every two years but rather



all of the partners must work together to ensure it is an on-going exercise. To this end a number of Associated Actions are recommend:

Associated Actions

- Hosting of Webinars and other communication tools
- Recommend establishment of a Community of Practice Website to foster Develop toolkit to educate staff, Council and General Public
- Explore other networking opportunities

**e. PERMAFROST**

Focusing on Permafrost and Climate Change the following gaps have been identified and Associated Actions are recommended:

- Considerable Academic Work has been done on permafrost degradation and only a few on infrastructure impacts
- There has been a significant increase in the number of permafrost monitoring stations in the NWT but there are relatively few in the communities

Associated Actions

- Partnerships should be established between communities and Researchers/engineers to ensure effective in-community monitoring
- The GNWT should place permafrost monitoring equipment on all new major construction and re-construction projects



## **g. CODES AND STANDARDS**

One of the most important tools in tackling climate change are Codes, Standards and Guidelines. There is a distinct lack of Codes and Standards for the North. A more extensive review of the issue can be found in Appendix H. Some particular gaps surrounding this issue include:

- There is a clear need Northern Codes and Standards to deal with adaptation
- One particular gap is the lack of guidelines for existing buildings (CSA)

### Associated Actions

- All codes and standards should include climate change considerations
- Work with our various partners to develop codes and standards that include but are not limited to existing buildings, road design and drainage standards

## **h. ECONOMIC IMPACTS**

Even a very preliminary review of the Climate Change issue would lead to the conclusion that there are going to be very significant costs associated with Adaptation.

- To date there has been no comprehensive examination of the costs of adaptation (or not adapting)
- Need to demonstrate intuitive understanding that pro-active response is cheaper
- Need to lobby for funding together
- Need better “better bang for buck” with research \$\$\$

### Associated Actions

- Need to work with Partners to complete a business analysis of the costs of adaptation for all public infrastructure





## 10. CLIMATE CHANGE FORUM

At the end of March 2010, working with Pembina Institute and Ecology North, we were able to jointly host a Climate Change and Communities Workshop.

This project was only possible through the support of our various finding partners such as:

- INAC Territorial Development Fund
- INAC Community Adaptation Fund
- Environment and Natural Resources, Government of the Northwest Territories
- Municipal and Community Affairs, Government of the Northwest Territories
- Department of Transportation, Government of the Northwest Territories

A detailed report on the Forum can be found in Appendices B, C and D but the Forum Outcomes can be summarized as follows:

### **Attendance Numbers**

The Forum was attended by a wide variety of partners working on climate change issues. This fostered a high level of networking

Community Government Representatives	50
Aboriginal Government Representatives	4
Consultants	17
Federal Government	9
Territorial Government	24
Other Government	3
NGO's/Agencies	17
<u>Other</u>	<u>8</u>
<b>TOTAL ATTENDEES</b>	<b>132</b>



## Participant Satisfaction

Overall there was a very high level of participant satisfaction with the Forum.

Forum Element	Average (Out of 5)
Forum Location	4.5
Accommodations	4.4
Quality of Food	4.0
Mix of Presentations and discussion	4.2
Degree of Forum Organization	4.5
Forum Pace	4.4
<b>Average</b>	<b>4.4</b>

## Break-Out Session Action Items

### Permafrost Session – Day 1

- Need to establish monitoring programs through partnerships
- NWT Housing Corp needs to function as a partner with communities and respect community planning
- Vulnerability Mapping (Permafrost) needed for all communities
- Climate Change and Project Management need to be integrated into all School of Community Government Programs
- Explore communal opportunities to do some of the engineering, planning and research required

### Permafrost Session – Day 2

- Explore opportunities for community governments and engineering firms to partner together to do work.

- Develop standards for roads (and drainage) and communities to assist community's in dealing with permafrost adaptation for their existing infrastructure and also for new infrastructure
- Keep dialogue moving forward – partnerships to continue, and get information to communities and support.
- Community profiles to be completed on the specific situation of each community.
- Explore opportunities to collaborate together to look at data collection, analysis, and determining solutions to move forward.
- Develop resource book, website, forum of discussion – portal of community, experts, scientists.

### **Standards – Day 1**

- Recommendation for CSA Permafrost Guide for “Existing Infrastructure”
- It will be helpful to have northern standards and guidelines for existing and new infrastructure.
- Inspections – Support needed for community governments to incorporate inspection practices into building developments.
- Standards are needed for use of Alternative Energy technology for northern communities.
- Environment Canada needs the resources to ensure all appropriate modelling has been done for the North

### **Standards – Day 2**

- Explore opportunities for building inspectors to service all communities and do follow up spot checks
- Tools, standards and enforcement tools that are meaningful provided for building inspectors to service all NWT communities.
- Explore opportunities to enhance level of inspections – Video Conferencing Inspections for example
- Develop a plain language education tool for all communities to educate the general public on how to maintain the existing permafrost – ie. Things people can do to help with minimizing changes to permafrost.

- Explore opportunities for sharing of ideas of foundations – successes of Igloo Church, Inuvik, NWT
- Develop check lists as guidance and assistance for community governments to look at during inspections
- Look at opportunities to provide assistance for communities that want to take action on the wood pile foundations and making sure existing foundation problems are addressed
- Give EC more resources and support to collect data and interpretation
- Work with Ecology North on how to reduce over flow during truck fills
- Research the work of other northern jurisdictions on the adaptation work to deal with melting permafrost

### **Water and Wastewater – Day 1**

- Take steps to slowly change how we handle things- don't just dump stuff, don't burn garbage, place water intake away from these sources. Bad practices that we need MACA to make commitment before we start to make change
- If we could change our thinking about water, sewage, dumps, think about protection of community, it's not really being done. Always funding restraints on their ability to address this. Need to move beyond this.

### **Water and Wastewater – Day 2**

- Communities can get independent testing of water if you want
- Plan for water monitoring, with the uncertainties of climate change
- partnerships and communication –sharing knowledge, develop better communication,
- Support needed- continuous adaptation to changing standards, access to standards, increased information, education, ongoing dialogue, training for operators on site

### **Transportation – Day 1**

- Importance of Granular Plans to ensure the availability of the right materials



- Community Drainage Plans
- Inventory of Community Infrastructure ie/ Asset Management

### **Transportation – Day 2**

- Need to complete vulnerability assessments
- Need to work together to formulate solutions
- Need more education and training on the issue
- Sharing of Information is critical

### **Adaptation Planning – Day 1**

- What you need to do is use yourself: knowledge, experience, skills, you know what is happening
- Already have tools in your community. A lot can be done with existing resources
- Don't wait to start doing your job. Everybody has to start caring
- If you care for the environment, must do job if you have money or not

### **Adaptation Planning – Day 2**

- Cannot just adapt, need a solution: mitigation
- Can take action on adaptation planning with no money
  - Can integrate adaptation into land use plans
  - Utilize NGO's
  - Share knowledge between Elders and Youth
  - Encourage dialogue and info sharing
- Need to go back to harmonious relationship with the land

### **Energy Efficiency – Day 1**

- Implementation of EE by-laws/standards in some communities.



### **Energy Efficiency - Day 2**

- There is a need for education and training, from school-age children to building users, residents, building owners, and maintenance staff
- The need for more extensive building inspection services in the NWT
- The need for partnerships between community groups and communities

### **Energy Planning – Day 1**

- Find ways to communicate information on renewable energy technologies in an understandable way

### **Energy Planning – Day 2**

- Policy issues are moved by the communities. Communities can request change in policy
- Explore funding opportunities through GNWT and Federal Government
- Learn from other jurisdictions
- Ensure proper engagement and awareness in the community
- Negotiate opportunities for community owned utilities

## 11. MOVING FORWARD

Communities and all of their partners have already made big steps forward with this project and a few other recent initiatives but we need to continue to work together on the climate change challenge:

### BIG STEPS FORWARD TO DATE

Vulnerability  
Assessment Tools  
le/ PIEVC, CIER

CSA Permafrost  
Guideline



Communities and  
Climate Change  
Forum  
March 2011

Rural Secretariat  
Funding for  
Continued Work



## **PARTNERSHIPS**

We need to continue to work with our various partners to ensure we continue to move forward with this agenda.





## 12. CLIMATE CHANGE RESOLUTIONS

Combining the recommendation of the Gaps Analysis of this project, the Gaps Analysis of the Climate Change and Communities Forum and the Action Items from the Forum a comprehensive list of resolutions was developed.

The following suite of resolutions was recommended by the Board to go forward to the NWT Association of Communities Annual General Meeting on June 10-13, 2011.

### 2011-05 CLIMATE CHANGE ADAPTATION

**WHEREAS** Climate Change is occurring in the North at more than twice the rate of the rest of Canada;

**AND WHEREAS** The North is particularly vulnerable to climate change due to its reliance on temperature sensitive systems such as permafrost;

**AND WHEREAS** All Communities in the NWT have started to observe climate change;

**AND WHEREAS** taking proactive tactics to addressing climate change adaptation is the preferred approach;

**AND WHEREAS** We will see the best success by working collaboratively with our many partners;

**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities enact the following suite of climate change adaptation resolutions as follows;



**2011-05-A**                      **CLIMATE DATA**

**WHEREAS** predicting what impacts climate change is going to have on the NWT is highly contingent upon having appropriately developed climate models;

**AND WHEREAS** the practice of using historic experience to establish codes, standards and guidelines becomes less and less relevant with climate change;

**AND WHEREAS** Climate modeling will form the core of most codes, standards and guidelines moving forward;

**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities strongly encourages the Federal Government to ensure that Environment Canada is resourced to ensure that all appropriate modeling gets done for the North.

**2011-05-B**                      **RESEARCH**

**WHEREAS** there are limited funding opportunities for research in the North;

**AND WHEREAS** most communities have not been involved in setting the research agendas in their communities;

**AND WHEREAS** communities are often not made aware of the outcomes of the research being completed in their communities and many research papers must be purchased;

**AND WHEREAS** the lack of a northern university means that the academic knowledge base relating to Arctic issues is scattered throughout the country;

**AND WHEREAS** the Climate Change and Communities Forum 2011 was an important first step in allowing the various dialogues to start and to allow the communities to identify some of their research needs;



**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities will continue to work with its various partners to ensure funding dollars are optimized;

**AND FURTHER THAT** the Aurora Research Institute develop mechanisms to ensure that the results of research are communicated to communities and the NWT Association of Communities;

**AND FURTHER THAT** the Aurora Research Institute make the inclusion of the community name(s) or region in the title or list of key words a mandatory element;

**AND FURTHER THAT** the NWT Association of Communities work with its various partners to ensure that the research needs of the communities are being promoted when setting research agendas;

**AND FURTHER THAT** Communities engage the researchers who are already working in their communities to assist them with the community's research needs.



2011-05-C

**ADAPTATION PLANS & COMMUNITY DECISION MAKING**

**WHEREAS** roughly 1/3 of communities have an adaptation plan in place;

**AND WHEREAS** the development of Adaptation Plans and Hazard Mapping is a critical element in ensuring the resiliency of communities;

**AND WHEREAS** it is critical to ensure that infrastructure experts are included in the creation of Adaptation Plans and Hazard Mapping;

**AND WHEREAS** despite the fact that community level Adaptation Planning and Hazard Mapping must be done, it is also important that all municipal decision making must have a care to climate change;

**AND WHEREAS** securing funding to develop and implement Community Adaptation Plans and Hazard Mapping is critical to their completion;

**AND WHEREAS** the GNWT identified Supporting Communities both fiscally and from a resource basis as a priority within the Pan-Territorial Adaptation Strategy;

**THEREFORE BE IT RESOLVED THAT** the Federal Government should ensure that adequate funding is available to ensure that Adaptation Plans and Hazard Mapping is completed for all NWT communities including a thorough evaluation of all municipal infrastructure.

**AND FURTHER THAT** the GNWT assist communities to complete their Adaptation Planning and Hazard Mapping and Implementation;

**AND FURTHER THAT** the NWT Association of Communities work its various partners such as Ecology North and the Pembina Institute to explore opportunities to assist communities through the development of various tools.



March 31, 2011

2011-05-D

**COMMUNICATION**

**WHEREAS** it is critically important that the communication and information sharing that was established at the Climate Change and Communities Forum continue;

**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities work with the Pembina Institute and Ecology North to develop various communication tools including but not limited to webinars, newsletters, website development, discussion forums and education materials.

**AND FURTHER THAT** the NWT Association of Communities work with the School of Community Government to review relevant programs to reflect the new climate change reality;

**AND FURTHER THAT** all future program development by the GNWT should include review from a climate change perspective.



March 31, 2011

2011-05-E

**PERMAFROST**

**WHEREAS** Considerable academic work has been done on permafrost degradation but only a few on infrastructure impacts;

**AND WHEREAS** there has been a significant increase in the number of permafrost monitoring stations throughout the Northwest Territories;

**AND WHEREAS** there are few permafrost monitoring stations in communities;

**AND WHEREAS** the GNWT and especially the Housing Corporation are partners with the communities in meeting the climate change adaptation challenge;

**AND WHEREAS** since surface water has significant impact on permafrost, the development and implementation of Community Drainage Plans is critical;

**AND WHEREAS** Communities wish to support their ratepayers by educating them about permafrost and climate change and how best to protect their properties;

**THEREFORE BE IT RESOLVED** that communities work with scientists and consultants to establish in-community monitoring programs (i.e. on new buildings) based on a collaborative model

**AND FURTHER THAT** the GNWT place permafrost monitoring equipment on all new major construction and reconstruction projects

**AND FURTHER THAT** the Housing Corp. should be sure that it is adequately consulting with communities about their development plans and ensuring that they respect all land use and adaptation plans;

**AND FURTHER THAT** the NWT Association of Communities work with our various partners to assist municipalities in completing and implementing Community Drainage Plans;



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**AND FURTHER THAT** the NWT Association of Communities work with our partners Ecology North and Pembina Institute to secure the funding to develop plain language materials to educate the public about permafrost i.e. what can be done to reduce permafrost thaw;

**AND FURTHER THAT** the NWT Association of Communities secure the funding to develop community government asset inspection checklists which build upon the risk reduction inspections sheets already developed by NCIP/NORCIX;

**AND FURTHER THAT** that the NWT Association of Communities work with our partners Ecology North and Pembina Institute to secure the funding to develop sample by-laws and policies to reduce water overflow from truck fill overflows;

**AND FURTHER THAT** the NWT Association of Communities work with our partners Ecology North and Pembina Institute to secure the funding to develop plain language materials to assist homeowners in protecting their properties from climate change impacts.

**2011-05-F                      TRANSPORTATION**

**WHEREAS** the infrastructure managed by the Department of Transportation is critical to the success of our communities and the health and safety of its residents;

**AND WHEREAS** there are plenty of opportunities for communities to work in collaboration with the Department of Transportation;

**THEREFORE BE IT RESOLVED THAT** the future changing needs due to climate change be considered in the development of future Granular plans in order to ensure the availability of the right materials;

**AND FURTHER THAT** the NWT Association of Communities encourages the Department of Transportation to continue its partnership approach with communities in addressing the various climate change challenges with respect to airports, marine, roads and winter roads.



**2011-05-G**

**CODES AND STANDARDS**

**WHEREAS** Codes, Standards and Guidelines are powerful tools in tackling the climate change challenge;

**AND WHEREAS** there is already an absence of codes, standards and guidelines to address the unique conditions in the North;

**AND WHEREAS** the Canadian Standards Association has a comprehensive standards development program and they have already developed Guidelines for foundation design of new facilities in permafrost;

**AND WHEREAS** the development of codes and standards needs to also address how compliance will be addressed;

**AND WHEREAS** few communities in the NWT have inspection or review staff;

**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities supports the development of Codes, Standards and Guidelines that deal specifically with the unique design challenges faced in the North;

**AND FURTHER THAT** All Codes, Standards and Guidelines should give appropriate climate change consideration;

**AND FURTHER THAT** the NWT Association of Communities staff are authorized to work with the various Code and Standard associations to encourage the development of Northern Based Codes, Standards and Guidelines including but not limited to Remediation of Existing Buildings, road design and drainage standards;

**AND FURTHER THAT** the GNWT should support the provision of inspection services throughout the NWT including the provision of this service through the Housing Corp.



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2011-05-H

**ECONOMIC IMPACTS**

**WHEREAS** there has been no comprehensive examination of the various adaptation scenarios on NWT Public Infrastructure;

**AND WHEREAS** all governments in the NWT need to attempt to articulate the cost of proactive vs. reactive response to climate change as part of the information needed to demonstrate funding needs;

**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities work with its various partners to secure funding to complete a business analysis of the costs of adaptation for all public infrastructure in the NWT.



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**2011-06**      **CLIMATE CHANGE MITIGATION (Energy)**

**WHEREAS** Climate Change mitigation is an important element of the recently completed ICSP's;

**AND WHEREAS** the need for codes and standards around alternate energy was identified by communities at the Climate Change and Communities Forum;

**AND WHEREAS** the Canadian Standards Association has a comprehensive standards development program and they have already developed some guidelines relating to alternate energy;

**AND WHEREAS** the development of codes and standards needs to also address how compliance will be addressed;

**AND WHEREAS** few communities in the NWT have inspection or review staff;

**THEREFORE BE IT RESOLVED THAT** the NWT Association of Communities supports the development of Codes, Standards and Guidelines that deal specifically with alternate energy products;

**AND FURTHER THAT** the NWT Association of Communities staff are authorized to work with the various Code and Standard associations to encourage the development of Alternate Energy Guidelines

**AND FURTHER THAT** the GNWT should support the provision of inspection services throughout the NWT including the provision of this service through the Housing Corporation;

**AND FURTHER** that the NWT Association of Communities will work with its various partners to ensure the effective communication of tools and resources to communities to address the various energy challenges including education materials, sample by-laws and policies, and funding opportunities.



### **13. PROJECT ACKNOWLEDGEMENTS**

We wish to extend our thanks to INAC for the funding that allowed this project to proceed. Further, we have also appreciated the expertise, encouragement and support that has been provided by the Project Officer, Yves Theriault. We would not have accomplished nearly what we were able to without his assistance.

Through the fantastic working relationship we were able to foster with our Forum Hosts, the Pembina Institute and Ecology North, we were clearly able to demonstrate the importance of partnerships in meeting the climate change challenge. By bringing different skills, resources and perspectives to the table we could achieve so much more.

In addition to the funding support that was received for the project and associated Forum, the response from all of the Departments, Boards and Agencies in support of this project has been absolutely amazing. All requests for information and assistance have been met with positive responses and enthusiasm. It is a clear indication of the many opportunities and challenges that we can meet together!

