# PREVENTING PERMAFROST DEGRADATION

SCREW JACKS

SPACE FRAME

GRAVEL PAD

PILES

PAD & WEDGE

THERMOSYPHONS

SLAB ON GRADE

ACTIVE LAYER

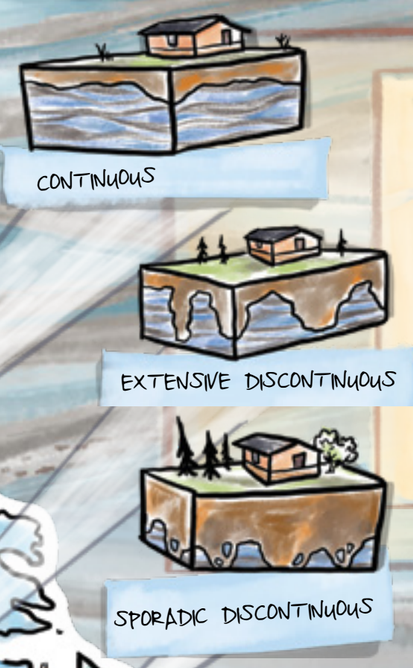
PERMAFROST

## PER·MA·FROST

GROUND THAT REMAINS FROZEN FOR AT LEAST TWO YEARS

## PERMAFROST MAP

- CONTINUOUS
- EXTENSIVE DISCONTINUOUS
- SPORADIC DISCONTINUOUS




MUCH OF THE NORTH'S INFRASTRUCTURE IS BUILT ON AND SUPPORTED BY PERMAFROST

PERMAFROST DEGRADATION CAN LEAD TO DISTRESS AND DAMAGE ON EXISTING STRUCTURES

## TAKE CARE OF YOUR PERMAFROST

### DO THIS:



- ✓ **Snow cleared** not insulating the ground
- ✓ **Gravel pad graded** keeps water away
- ✓ **Skirting open and unobstructed** wind can flow through
- ✓ **Shade provided** but it doesn't obstruct or cause snow drifting

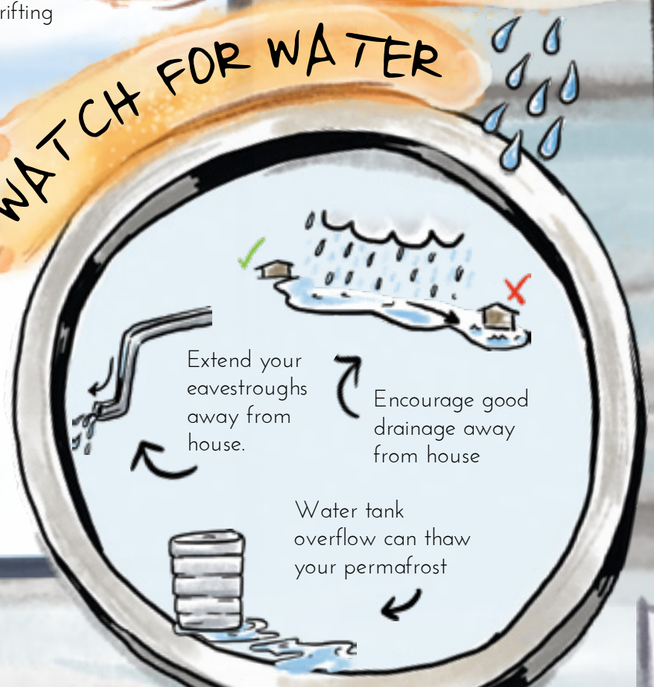
### NOT THIS:



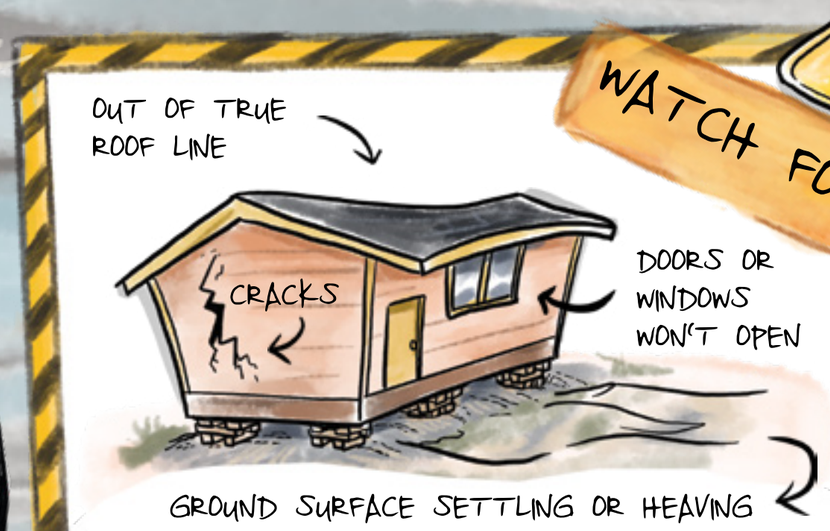
- ✗ **No shade on south side** shade protects permafrost from the sun's heat
- ✗ **Drifted snow** it insulates and prevents frost from cooling the ground
- ✗ **Blocked air flow** caused by closed skirting, storing stuff under house, nearby shed
- ✗ **Water flowing towards house** pooling water damages permafrost

## KEEP IT COOL DOWN THERE &

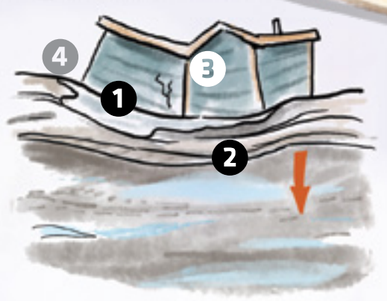
## WATCH FOR WATER




## WATCH FOR

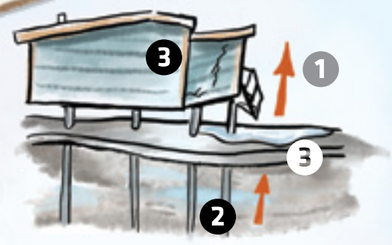



## IS IT?




### THAW SETTLEMENT

1. Surface water may accumulate
2. Bowl like depression
3. Cracks worsen year round
4. Settlement may slow in winter




### FROST HEAVE

1. Could be encouraged by heat from the building and poor ventilation
2. Expansion of water during the freezing process
3. Movement of water from unfrozen soil to freezing ground
4. Cracks that open and close throughout the year, most noticeable in winter

### HAVE A MONITORING PLAN

Inspect your foundation and document findings

### BE PROACTIVE

Take steps to preserve permafrost beneath or adjacent to infrastructure

### REMEMBER

Once it starts, permafrost degradation is difficult and expensive to stop

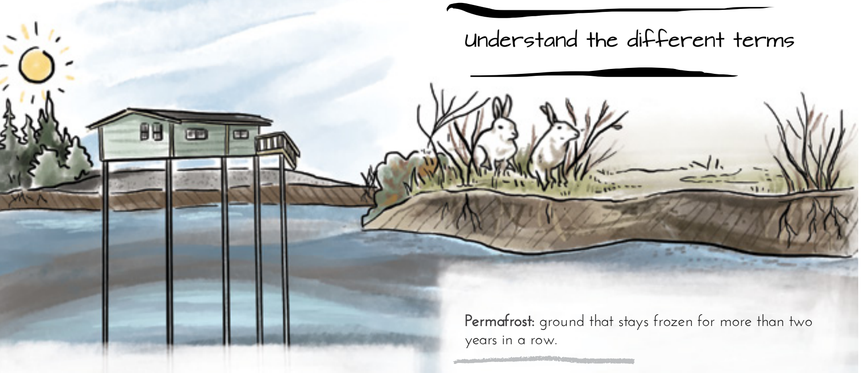
**GOAL: STABILIZE FOUNDATION BEFORE EXPENSIVE AND EXTENSIVE DAMAGE OCCURS**

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This is a user-friendly outline of CAN/CSA S501-14: Moderating the effects of permafrost degradation on existing building foundations.

## USE THIS GUIDE TO:

- Understand permafrost
- Detect signs of thaw under a building
- Carry out practices to reduce thawing
- Learn how to protect permafrost

Ecology North developed this guide for building owners and maintainers, community decision makers, and contractors across the north.

# WHAT IS PERMAFROST?

## Understand the different terms

**Permafrost:** ground that stays frozen for more than two years in a row.

**Active layer:** layer of ground on top of permafrost that freezes in the winter and thaws in summer.

**Thaw sensitive permafrost:** ground that settles when it thaws because it has more moisture (as ice) than it can hold.

**Thaw stable permafrost:** ground that does not settle when it thaws.

**Thaw settlement:** happens when ice in ground thaws and the water drains away.

**Frost heave:** ground that pushes up or out because the water in it freezes and expands.

# CLIMATE CHANGE

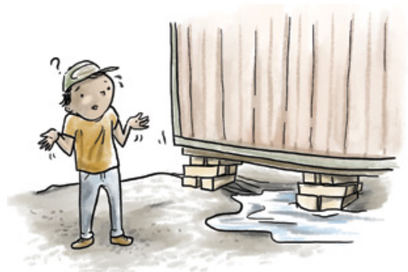
## Direct effects on permafrost

In the north, climate change is causing warmer winters, longer summers, and more variable precipitation.

These changes lead to permafrost thaw, increasing depth of the active layer, and result in damage to infrastructure that relies on frozen ground.

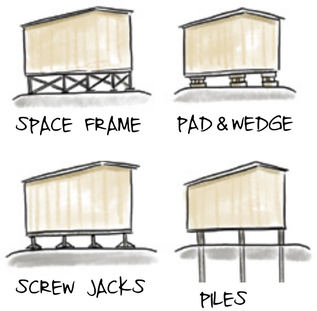
Many northern buildings sit on thaw sensitive permafrost. Northerners are noticing more impacts on buildings and more damage to infrastructure that relies on frozen ground.

We know climate change will continue to have increasingly dramatic effects in the North. There are ways to help reduce impacts on buildings, to prevent things from getting worse.



# BUILDING FOUNDATIONS

## Keep permafrost in mind




### DESIGN BUILDINGS TO:

- Prevent permafrost from thawing
- Reduce impacts of thawing permafrost

Different types of building foundations are designed and built for different situations. They vary in cost, effectiveness, and maintenance requirements. Understanding your foundation type and how it works and needs to be maintained is important to adapt to permafrost thaw and frost heave.

# WHAT AFFECTS THAW?

## Climate and weather

### TEMPERATURE:

The warmer it gets under a building, the more permafrost will thaw.

### SUN:

The relentless summer sun warms the ground and thaws permafrost.

### WATER:

Water is very effective at transferring heat from the surface into the ground.

### SNOW:

Snow insulates the ground. It prevents cold winter air from recharging permafrost.

### WIND:

Wind helps permafrost by evaporating moisture in summer and blowing away snow in winter. Wind can help thaw permafrost if it blows snow to an area where it builds up, such as low ground, around an object, or against a wall.

# TIPS TO PREVENT THAW

## Keep permafrost dry and cold

- Keep the ground cool in summer
- Allow cold to enter the ground in winter
- Limit heat and keep air flowing

- Shade south sides of buildings
- Use vegetation, mulch, even skirting
- Do not disturb the natural vegetation

- Direct drainage away from buildings
- Remove snow piles before they melt
- Proper eavestroughs and long downspouts

- Clear snow from around building all winter
- Remove snodrifts that are stopping air flow

- Promote airflow under buildings in winter
- Remove vegetation that limits wind
- Use mesh, not solid skirting
- Don't store things under or beside building



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Poster on the inside

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# SITE INVESTIGATION

## Monitor throughout the construction and life of building

### GENERAL INFO

- Building design and history
- Local permafrost conditions
- Drainage and water conditions
- Climate change and extreme weather events

### BUILDING DATA

- Damage/cracks
- Roof/floor lines out of true
- Ground settling or heaving
- Damage to water/sewage systems
- Surface drainage
- Ice damming
- Building levels

### SUB-SURFACE DATA

- Soil characteristics
- Depth to permafrost
- Amount of ground ice
- Ground temperature



# SIGNS OF PROBLEMS

## Permafrost thaw; Frost heave

Both permafrost thaw and frost heave have similar symptoms (see list below) but they are caused by different processes, and typically happen at different times of year. Understanding what is happening to your building will help you to address the root cause.

### WATCH FOR:

- Cracks in drywall
- Sticky doors and windows
- Cracks in foundation
- Settlement and heaving of building
- Floors or roof lines out of true

### PERMAFROST THAW

Thaw tends to be a long-term problem where ice-rich permafrost melts more each year and causes settling.

- Cracks or problems get worse year-after-year
- Changes are most visible in summer or fall

### FROST HEAVE

Is generally caused by water in the ground freezing in the winter, expanding and pushing foundations up.

- Cracks open and close throughout the year
- Changes are most noticeable in winter

# SERIOUS PROBLEMS

## Ask for help

### LEVEL THE BUILDING

Depending on foundation type, it might be possible to adjust the building. Do this every year.

### INSTALL GROUND INSULATION

Communities with permafrost that is at or below -4°C, on average, can consider insulating the ground from the heat of a building with gardens, mulch, or gravel.

### INSTALL REFRIGERATION DEVICES

Mechanized refrigeration or thermosyphons can be very effective at preserving permafrost, but hard to do under existing buildings.

### REPLACE OR CHANGE FOUNDATION

It might be possible to move to a new foundation, such as screw jacks, piles, or a space frame, or to a new location that is on thaw stable permafrost.

### ABANDON AND DEMOLISH

Only if the building is dangerous and can't be fixed.

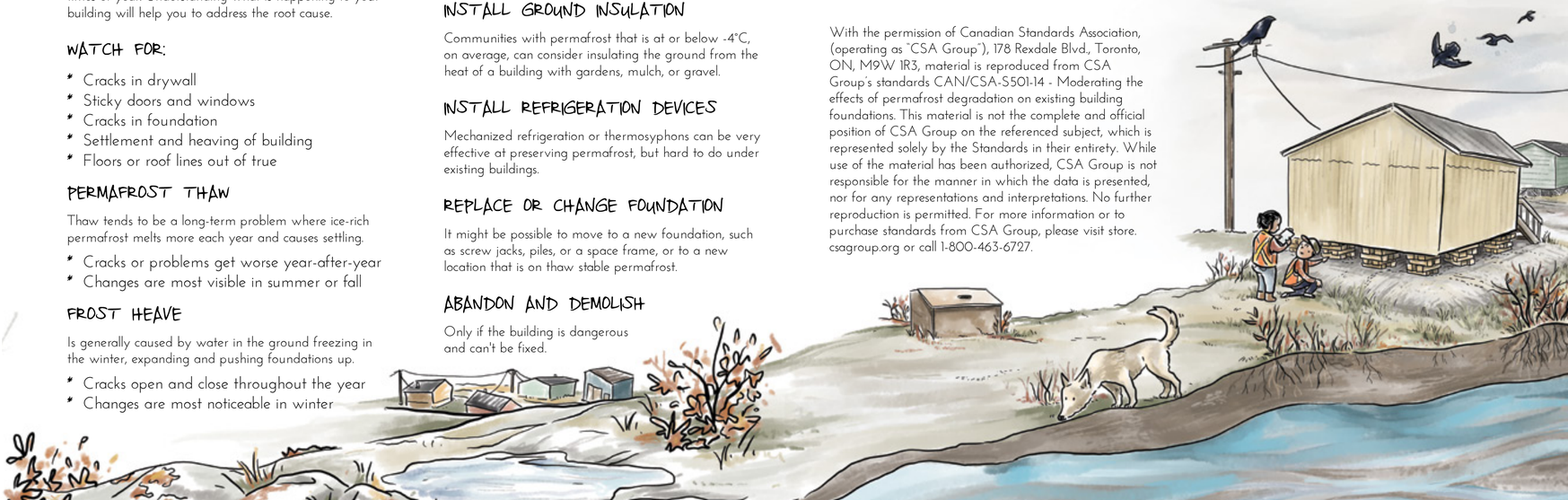
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## ᐅᓄᐃᑦ ᑐᑭᓯᐅᑦᑎᐊᓂᒃ?

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# PITTAILITIKHANGIT NUNAP PUVITQUUMANINGA MAHAKPALLIADJUTANUT

IHUAQHAQHIMAJUN TUNNGAVIKHAT

UVINGAIQTIRUTIT QIPUQTALGIT

UJARALIAQ IGLUQPANGNUT TUNNGAVIKHAQ

TUNNGAVIT

IGLUQPANGNUN TUNNGAVIKHAQ IKUVRAIT

THERMOSYPHONS

SIMANLIQTUQHIMAJUT TUNNGAVIKHAT

NUNAP QIQUMANGA INGUTARNINGANIT

NUNAP PUVITQUUMANINGA

NUNAP PUVITQUUMANINGA

NUNA QIQUMAHIMAJUKHAUJUQ MALRUNGNI UKIUNGNI

NUNAP PUVITQUUMANINGA NUNAUJAQ

- AULLARANGINNAQTUMIK
- NUTQAQTITPAGU ANGIJUMUT
- ILANNAGUN NUTQAQTITPAGU

AULLARANGINNAQTUMIK

NUTQAQTITPAGU ANGIJUMUT

ILANNAGUN NUTQAQTITPAGU

AMIGAITTUT UKIUQTAQTUMI NAPAQTIQHIMAJUT HANAJAUHIMAJUT IMAALU IKAJUQTAUPLUTIK NUNAP PUVITQUUMANINGANIT

NUNAP PUVITQUUMANINGA NUGUTPIALLIANINGANIT PIDJUTAUNIAQTUQ UVIQPALLIADJUTAULUTIK AHRRUUTILUTIKLUUNIT NAPAQTIQHIMAJUNUT

MUNARITTIARLUGU NUNAP PUVITQUUMANINGA

TAIMAILIURLUTIN:

- **Aput pualriqhuqtauhimajuq** qiqumahuirutauniaqtuq nunamun
- **Ujaraliaq igluqpangnut tunngavikhaq** pualriqhuqhimajarangami imallaittuq
- **Igluqpaup qijuliqturnia annuraitkutikhamik angmaumajumik imaalu matuitkumi** annuqhiinnarniaqtuq
- **Hiqinirmit talukhamik** tarutaungittuq imaaluuniit apidjutaulimaittuq

IMAATUNNGITTUMIK:

- **Aput pualriqhuqtauhimajuq** qiqumahuirutauniaqtuq nunamun
- **Ujaraliaq igluqpangnut tunngavikhaq** pualriqhuqhimajarangami imallaittuq
- **Anniavikhaittmik ikiarmut** igluqpaup qijuliqturnianit, tutqiqtirviupluni tamajanik ataanun igluqpaum, qanittuani hirluarmi
- **Imavaluk qurluaqtuq igluqpangmut** immangniq hunngiutivaktuq nunap puvitquumannga

NIGLAUMAPKARLUGU IGLUP ATAA

IMMAKTAILIPKARLUGULU

Igluqpakpin qilangata kiglinga agijumik angitqijaujukhaq iglungnit

Imaijarviliurlugu igluvit haniraagut

Imiqtautinit kuvinikuq auktuutiniaqturlu nunap puvitquumannga

NAHURILUGIT

ANGININGIT IGLUQPAUP QILANGANIT

QUPINIT

UKKUAT IGALAATLU UKKUILIMAIQPAKTUT

NUNAP QANNGA QIQHURIANGANI QUNMUKTIRNIA

TAIMAITPA?

NUNA QIQHURIANVGANI

1. Nunap qanganiittuq imavaluk angigliniarunaqhijuq
2. Urviktun ittuq attaqtuhiniq
3. Quppait ingattaqpallianiaqtut ukuingani
4. Nuna qiqhuriangani kajumiittumik qiqhurniaqtuq ukiumi

QIQITIRNIRMIT QUNMUKTIRNINGA

1. Pidjutauniaqtuq uunnarnirmit aanniajumit igluqpangmit imaalu qin'ngaitkumi
2. Angiglijarangami imaq qiqitilirangat
3. Aulaninga immap qiqihimailrumit nunamit qiqumanirmut nunamut
4. Qupiniit angmaqtiqpaktut umikkalutiklu qakugungurangat ukiungani, naunaiqpiakpaktut ukiumi

AMIQHIDJUTIKHAMINGNIK UPALUNGAIJAUTIT

Ihivriurlugu igluvit tunngavia imaalu titiraqpaglugit nanijatit qanurinningit

IHUARNINGANUN PINAHUARLUTIT

Ihuaqtumik pinahuarlutit pihimadjutikhanik nunap puvitquumaninganik igluqpaum ataanni ilanganiluuniit

ITQAUMAJAKHAQ

Mahaktilirangami, nunap puvitquumaningata mahakpalliadjutanut ajurnaqhivtivaktuq imaalu akittuqpiakhuni nutqaqtinnahuaraluaqhugu

TURAANGANIA: IHUAQHAQTAKHAQ TUNNGAVINGA HIVUANI AKITUQPIAKTUMIK IMAALU HIVITUJUMUT HUUN'NGIQPALLAQTINNAGU NUNAP QIQUMANGA INGUTARNINGANIT

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Hamna aturnianga atuqtunut ajurnaittuq CAN/CSA S501-14: Ikiglinahuarutikhanik pidjutinginnik nunap puvitquumannga mahakpalliadjutanut tadja igluqpait tunngavingit.

## ATURLUGU HAMNA MALIKTAKHAQ IMAATUT:

- Kangiqhidjutikhanut nunap puvitquumaningagut
- Naunaijarlugit hunat naunaitkutikhat auktuqtilirnianik ataani igluqpaum
- Atuqtauvakhimajut atuqhimmaarlugit ikiglinahuarlugu Mahaktirniqing
- Iliharlutit qanuqtut pittailitikhanik nunap puvitquumaninganik

Ecology North developed this guide for building owners and maintainers, community decision makers, and contractors across the north.

# HUNAUVA NUNAP PUVITQUUMANINGA?

## Kangiqhinahuarlugit aallatqiiktut tainingit



**Nunap puvitquumaninga:** nuna qiqumavaktuq hivitutqijanit malrungni ukiungni atajumik.

**Nunap puvitquumaninga ingutarninganit:** : nuna qannganiittuq haffuma nunap puvitquumaninganni qiqivaktuq ukiumi imaalu auktuqpakhuni aujami.

**Mahaktirniq pidjutiqaqtut nunap puvitquumaninga:** nuna nutqaqpaktuq auktuqtirangami kinipatqijaulirangami (hikumit) pihimajakhaminit.

**Mahaktirnirmit nunap puvitquumaninga:** nuna qiqhulmaittuq mahakkangami.

**Nuna qiqhuqpaktuq:** pivaktuq hiku nunami mahaktirangat imarlu qurluarangami imaiktitkangat.

**Qiqitirnirmit qunmuktirninga:** nuna qungmuktirninga imaaluuniit hilanmut imaq qiqigami angiklipkaramilu.

# HILAUP AALLANGUQTIRNINGANUT

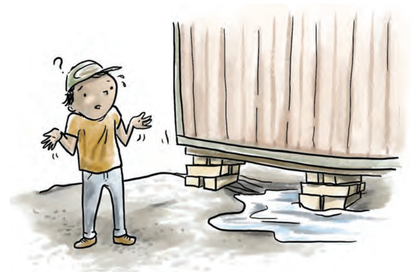
## Pidjutingit taffuma nunap puvitquumaninganun

Ukiuqtaqtumi, hilaup allanguqtirninga pidjutauliqtuq qajurnaitqijauvaliqtuq ukiuq, hivtitutqijauliqhunilu aujaq, imaalu nipaliqattaqpalirhuni ukiakhami, ukiumilu.

Hapkuat aallangurniit pidjutiqaqpaktut nunap puvitquumaninga auktuqtirangat, angigliijuummiutigivaktaa nunap puvitquumaninga ingutarninganit, imaalu ihuirutaupluni nappaqtiqhimajunut qiqumajumiittunut nunami.

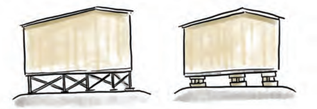
Amigaittut ukiuqtaqtumi igluqpait nappaktiqtauhimajut mahaktirnirmit pitlajunit nunap puvitquumaninga. Ukiuqtaqturmiut ilitturivaliqtut pidjutaujunik igluqpangnut imaalu ahirruqtut nappaqtiqhimajut qiqumajumi nunami.

Ilihimajugut hilaup allanguqtirninga pidjutiqaqparniaqtuq aallatqiiktunik Ukiuqtaqtumi. Ikajuutikhaqaqtuq ikiglinahuarutikhanik pidjutauvaktunut igluqpangnut, ingattaqpallalaitkutikhanik.



# IGLUQPAIT TUNNGAVIKHANGIT

## Hamna nunap puvitquumaninga ihumagilugu



IHUAQHAQHIMAJUN TUNNGAVIKHAT



IGLUQPANGNUN TUNNGAVIKHAQ IKUVRAIT



UVINGAIQTRUTIT QIPUQTALGIT



TUNNGAVIIT

QANURITTUMIK HANAJAUNIKHAIT IGLUQPAIT TALVUNGA:

- Nunap puvitquumaninga mahaktiqtailitikhanik
- Ikiglinahuarutikhanik pidjutaujut mahaktirnirmit nunap puvitquumaninga

Aallatqiiktut igluqpangnut tunngavikhat piliuqtauvaktut imaalu hanajauplutik aallatqiiktunut pidjutinginnut. Aallatqiiktut akingit, ihuarningit, munaqhidjutikhangillu pijariaqaqtut. Naunaijarlugu qanurittungmangat igluqparvit tunngavinga imaalu qanuqtut havakpangmangat imaalu ihuaqharialaqikpat anginiqaqtuq nammakhijangani nunap puvitquumaninga mahaktirniq unalu qiqitirnirmit qunmuktirninga.

# HUNAT PIDJUTIQAQQATA MAHAKTRNRMIT?

## Hilap qanurinnia hilap uunnarnia qajurnia

### UUNARNIA

Uunnalaqilirangami ataani igluqpaum, angitqijjarmik nunap puvitquumaninga mahaktirniaqtuq.

### HIQINIQ

Aujami hiqinirmit uunnaalaqivaktaa nuna imaalu mahaktiliqhugu nunap puvitquumaninga

### IMAQ

Imaq ihuaqpiaktuq nuutiutikhanut uunnarnirmik qannganit nunamut.

### APUT

Aputip nungutailitinga nunap. Pittailitaujuq ukiumi qajurnaqtumik ikiarmik aallanguqtiqhugu nunap puvitquumaninga.

### ANURI

Anuri ikajuqpakta nunap puvitquumaninga panittitpalliaplugit ailarniit imavaluitlu aujami imaalu aput tingivralaaqtittugu ukiumi. Anuri ikajuqtaaktuq mahaktiqhugu nunap puvitquumaninga titqalaattitigumiuq aput aputtanguriangani, atpahiktumut nunamut, haniraanut hunavaluit, imaaluuniit igluqpaup haniraanunl.

# IKAJUUTIKHAT MAHAKTIQTAILITIKHANUT

## Nunap puvitquumaninga paniupapkarahuarlugu niglaumalugulu

- Nuna niglaumapkaqpaglugu aujami
- Niglaqtitpaklugu nuna ukiumi
- Uunnaktitpallaqtailipkarlgu imaalu ikiarmik aannuqhaaktitpaglugu iglum ataagut

- Taluvaglugit hivuraaniittut igluqpait
- Aturltit nunap naunianik, nauttianik auhimajunik, imaalu igluqpaup qijuliqturnianik aannuraitkutikhamik
- Inngutaaqtittaililugu nunami nauhimaniit

- Imaq qurluaqtitpaglugu ahiagut igluqpangnit
- Unngavaglugit aputtaat mahaktiqtinnagit
- Ihuaqtut igluqpakpin qilangata kiglinga agigumik kuvvivikhainniklu takkarnik

- Apuutaijaivagluhi igluqpangnit ukiuraalungmut
- Apitnirit aputtaatlu ahinungaqtitp aglugit ikiarmik aulapkailimaiqhungungmata

- Imaalu anukhaaqtittugu ikiarmik ataanun igluqpait ukiumi
- Unnavaqtirlugit nauningit anuraitkutauliqqata algukhiukpataluuniit
- Aturlutit alrujaujanik angmaumajunik, imaittungittumik igluqpaup qijuliqturnianik aannuraitkutikhamik
- Tutquqtirihuirlutit tamajanik ataanut hanianutluuniit igluqpaup




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Ecology North maniliungittut tiqutaujuq, piliuqtauhimajuq 1971 ikajuutikhanik ihuaqtut avatilirinirmut ihumaliurutikhainnik inungmut, nunamut imaalu avikturniannut.

Hivajarlutata kulugululuunnit qaritaujakkurvikput nauunairumajarnik imaalu aallanik maliktakhanik hapkutiguuna.

Nivingajukhat Taiguagakhat

Titiranguqtiqhimajut atuqtauffaaqhimajunut makpiaanut 2020

# NAJUGAKHAINUN IHIVRIURUTAIT

## Munarilugit nappaqtiqtaudjutanni aturninganillu igluqpaup

### NAUNAIJAUTIKHAT

- Igluqpaup qanurittumik hanajaunikhait qanngalu nappaqtiqtauhimavia
- Nunamingni nunap puvitquumaninga qanurinniit
- Imavaluit iaijarvikhait imaalu imap qanurinningit
- Hilaup allanguqtirninga imaalu aallatqiikpialiqtunik hilarlukpalingniit

### IGLUQPAUP NAUNAIJAUTAIT

- Huunngiqtuq/quppait
- Qilanga/natialuuniit nalrumajungnaiqtuq
- Nuna qiqhuqpaktuq imaaluuniit qunmuktirnia qiqitirnirmit aukturnirmittuuniit
- Ahirruqtut imaqtuutait/imaijarviit auladjutait tuqhuangitluuniit
- Qannganit imaijarvikhaa
- Hikutirnia igluqpaup qilangata kiglingagut
- Igluqpaup qaffinik natiqartut

### NUNAP-ILUANNI NAUNAITKLUTIKHAT

- Nunap iluata qanurittaakhaita
- Nunap qannganit unngahiktilanga tolvunga nunap puvitquumaninga
- Aktilanga hikuninganut nunap iluata
- Nunap qiqumania



# NAUNAITKUTIKHANGIT AJUQHAUTAULAJUNUT

## nunap puvitquumaninga Mahaktirniq qiqitirnirmit qunmuktirninga

Tamangnik nunap puvitquumaninga mahaktirniq imaalu qiqitirnirmit qunmuktirninga aadjikiivjaktunik naunaitkutiqaqtut (takulugu ataani titiraqhimajut) kihimik pidjutiqaqtut aallatqiinik, imaalu pivakhutik aallatqiiktuni qakgungurangat ukiungani. Naunaijattiarupkit qanurilinningit igluqpangnut ikajuutauhungujuq ihuaqhautikharnik ihuirniinnut.

### NAAHURILUGIT HAPKUAT:

- Quppaningniriit igluvit iluani hanirata qanngit (drywall)
- Ukuaqhiriiqaata ukuangit ingalangittlu
- Quppanikpata tunngaviit
- Nuna qiqhurangami imaalu qunmuktirnia igluqpaup
- Natia iglup qilangaluuniit nalrumajungnaiqqat

### NUNAP PUVITQUUMANINGA MAHAKTIRNIQ

Mahaktilirangat hivitujumut ajuqhautauliqpaktut hikuqaqpiaktumi nunap puvitquumaninga mahaktiqpaktuq imaalu nuna qiqhuqpaktuq

- Qupiniit ajuqhautaujut ingattaqpaktut aippagurangat amihungurangamik ukiut
- Aallanguqtirniit naunaitqijauvaktut aujami ukiuakhamiluuniit

### QIQITIRNIRMIT QUNMUKTIRNINGA

Imarmit nuna qiqitirangat ukiumi, angiglipkakpaktuq imaalu qunmuktiliqhuni nuna tunngavinga.

- Qupirangami angmaqpaktuq umikhunillu ukiungani qakugungurangat
- Aallanguqtirniit naunaitqijauliqpaktut ukiumi

# AJUKHAUTAUQPIAKTUT

## Apiqhilutit ikjauqtikharnik

### NALRUQTRAHUARNIA IGLUQPAUM

Pidjutigiplugu qanurinnia igluqpaum tunngavinga, ihuaqhijuminarunaqhijuq igluqpak. Taimailiuqpaklutit ukiuq tamaat.

### ILURARLUGU NUNAP UQQUQTIKHANGA

Nunallaat piqaqtut nunap puvitquumaningaimaatut qiqumaniqaqtut qiqumatqijaniklunniit -4°C, akungani, ihumaliunginnariaqaqtut uqququhiqturluqu nuna uunnarninganit igluqpangmit nauttianik, nauttiat auhimaniinnik imaaluuniit ujaraliarmik.

### ILURAILUTIT NIGLAQTIRUTIKHANIK

Ingniqutilingmik niglaqtirutikhamik imaaluuniit thermosyphons ihuaqutauniaqtut pihimajangani nunap puvitquumaninga, kihimi ajurnaqtuq pijangani igluqpaum ataanun napparriqhimajunut.

### HAMMAUHRLUGU NUTANNGUQTRLUGULUUNIT IGLUQPAUM TUNNGAVNGA

It might be possible to move to a new foundation, such as screw jacks, piles, or a space frame, or to a new location that is on thaw stable permafrost.

### QIMMAKUT IMAALU AHIRRUQTAUJUKHAT

Kihianik igluqpak qajangnaqhikpat hivuuranaqhikpatluuniit ihuaqhilimaiqqat.

Standards Council of Canada
Conseil canadien des normes

Crown-Indigenous Relations and Northern Affairs Canada | Relations Couronne-Autochtones et Affaires du Nord Canada

CSA GROUP

Nunavut

Angiqtaugamik Canadian Standards Association, (aulajut imaatut "CSA Group"), 178 Rexdale Blvd., Toronto, ON, M9W 1R3, tamajaitg havaktauvakhimajut ukunanga CSA Group's atuqpagait CAN/CSA-S501-14 - Nutannguqtiqhugu aktuutauniit nunap puvitquumaninga mahakpalliadjutanut tadja igluqpait tunngavingit. Hamna iniqhimaittuq huli ilitarijauimajut inikhaat CSA Group titiraqhimajukkut uqautaujunut, kivgaqtuqtaujuq taffumagainnaq Atuqpagait tamainnun. Aurnikhait hapkuat titiqqat angiqtauhimajut, CSA Group munaqhingittut titiraqhimajut naunaijautait tunijauhimajut, kivgaqtuijukhanut kangiqhidjutikhainnik. Aadjiliuqtautqujaungittut aallaniklu havaqujingittut. Naunaiqhittiarumaguvit imaaluuniit niuvrutikhanik atuqpagainnik ukunanga CSA Group, takulugu niuvvavik. csagroup.org imaaluuniit hivajarlutin 1-800-463-6727.

# PITTAILITIKHANGIT NUNAP PUVITQUUUMANINGA MAHAKPALLIADJUTANUT

