

# SANAE 51



THE NEWSLETTER OF THE 51st SOUTH AFRICAN NATIONAL ANTARCTIC OVERWINTERING EXPEDITION



## BASE BASICS AND SPACE SCIENCE

Read more about the structure, mechanics and electrical systems of the base, how waste gets handled, as well as an introduction to the science research done at SANAE..

### PREPARING FOR WINTER

Jon Ward

Over the last few weeks, the team has begun to notice that the days are rapidly becoming shorter and shorter. These are the signs of the impending austral winter, during which we will experience plummeting temperatures and 24 hours of darkness. This will make many outdoor activities almost impossible and the team has been planning and preparing for this eventuality since the end of the summer take-over.

These preparations have included securing equipment and moving packed sleds from our summer depot, near the base, to our winter depot, which is situated in a more open area to the north-east of SANAE IV. These sleds are then



#### In this issue:

Preparing for winter.....	1
Emo oranges.....	2
Home sweet home: SANAE IV structure.....	3
Mechanical support.....	6

Wired up.....	6
Science in Antarctica, but why?.....	7
"SNOWBATH!!".....	8
Getting wasted at SANAE.....	9
Antarctic crossword.....	10
SANAE trends.....	11

parked on ramps, which are dozed parallel to the prevailing winds. This prevents snow build-up close to the base and allows us to recover our equipment, which otherwise would have become buried, more easily. Each sled is also marked with poles and the GPS co-ordinates of the ramps are recorded to facilitate the recovery.



Items that are stored in the winter depot include, containers filled with take-over equipment, fuel drums for next season's flights, waste barrels from the base, long range skidoos as well as empty diesel tanks.

Other preparations include gathering emergency food, clothing, medical and safety

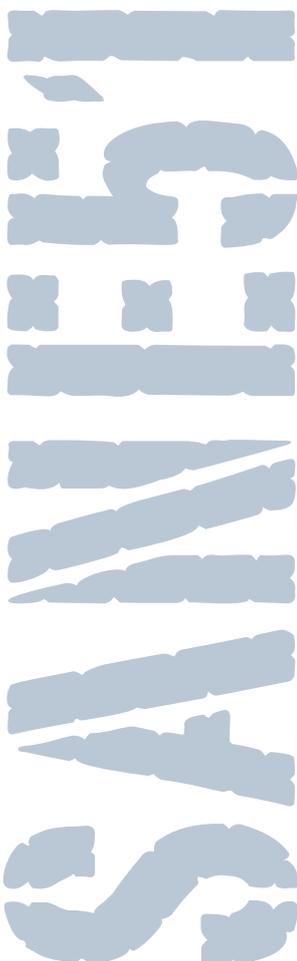
supplies as well as maintaining and sealing our two cabooses, which will serve as our emergency shelters in the unlikely event that we should have to evacuate the base.



The heavy vehicles are also parked, their batteries removed and doors sealed. The light vehicles, such as skidoos, are then brought up to the base's hanger.



This required the participation of the entire team and many hours of outside work and I am pleased to say that everything went smoothly. 🙌



## EMO ORANGES

Stefanie Strachan

When life gives you oranges...  
...slice them up and sow them back together!

This was the main objective (along with don't cut off your fingers and no sowing yourself to the table) when Dr Doc taught us the basics of how to put in sutures (yes, this

is totally the fancy word for stitches).



Since we only have one doctor and at least one

known klutz on the team, it seemed like a good plan to train the rest of us in some basic medical skills. When we are on CAT trains or field trips the

team will be divided and we won't always have a



their orange, sowed it up, and then had to do a big operation to remove it again. We are pleased to report that after some TLC, the orange was saved, only to be juiced another day...



doctor with both parties. The team did a basic first aid course while still back in Cape Town, so we already knew how to do CPR, help a choking person, bind a wound, etc. Next on the list was how to suture a wound, so after watching a few educational videos on how exactly to hold the needle with the pinchy thingies, Jako did a live demo on one of the oranges we still had left in the fridge. We



divided up into groups of two or three and each one got to sow up a freshly cut 'wound' while the other played nurse and either held the squeamish orange or dabbed the sweat off the nervous doc's forehead. One team \*cough- Jon and Braam-cough\* even got a tad carried away with the whole playing doctor scene and deposited a Sparkle in



Apart from the fact that this was a fun learning experience, being able to treat a gaping wound will always be a valuable skill to have. We look forward to the next installment of the medical training, maybe we'll get to poke each other with needles!! 🧐

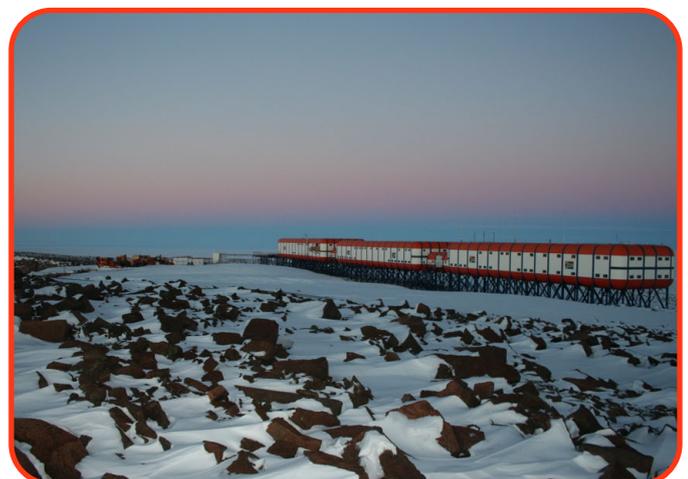
## HOME SWEET HOME : SANAE IV STRUCTURE

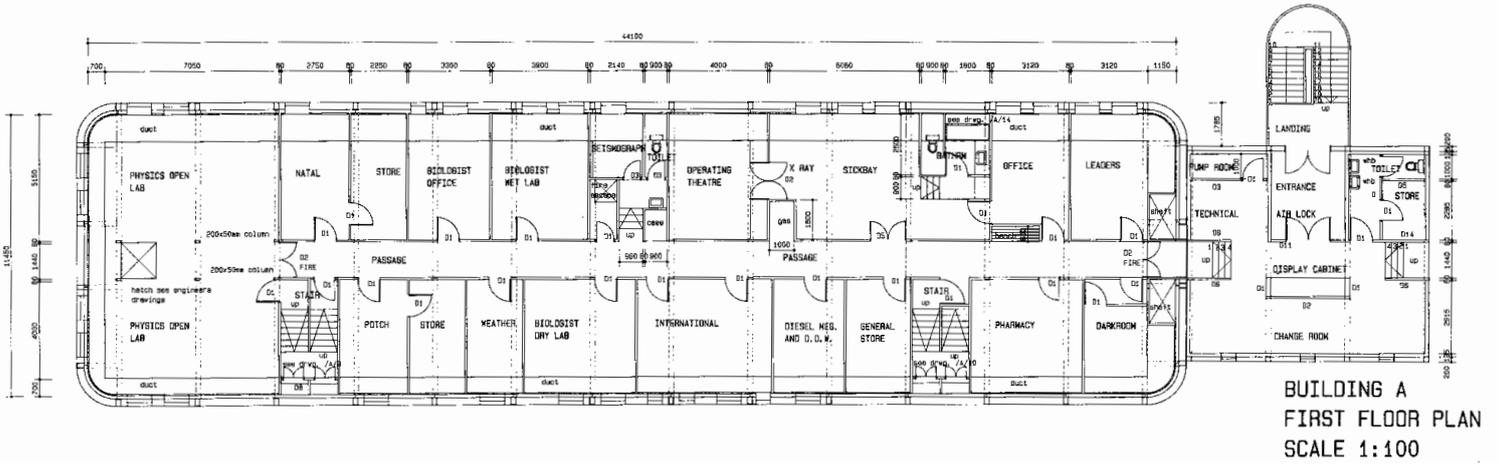
Johan du Plessis

What we call home will undoubtedly remind you more of a space station than a house, yet I cannot imagine a more comfortable home for this harsh environment. It contains all the amenities we need for survival and leisure during our 14 month stay in this uniquely beautiful place.

The use of struts to elevate the building above the surface was

quite revolutionary in Antarctica at the time of SANAE IV's construction (1993-1997). Most previous bases were built under the snow where it is protected from the extreme winds we experience on this continent. The





disadvantage of a sub surface structure is the build up of snow that gradually crushes the structure. This is also the reason

leeward side of the structure but rather blows over the cliff edge. Experienced bulldozer operators

annually clear up the minor build up that still occurs.

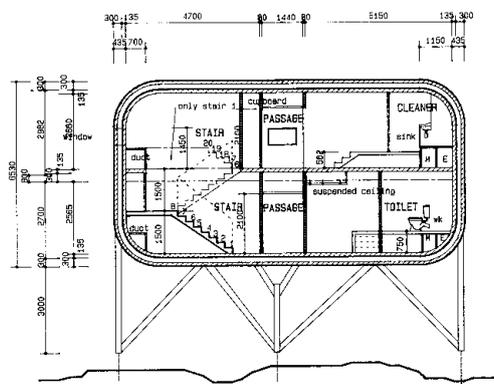
The base structure is of a

why SANAE is using its fourth base. The struts consist of roughly 200 mm diameter metal pipes that are sunk into the rocks. These pipes are



composite nature with steel foundations and frames and with fibreglass, aluminium and foam panels inserted into the frames. The rounded edges are designed specifically to reduce wind drag, which was

further stayed with 4 or 5 anchors to keep them in place. The framework was then welded onto these sunken foundations.

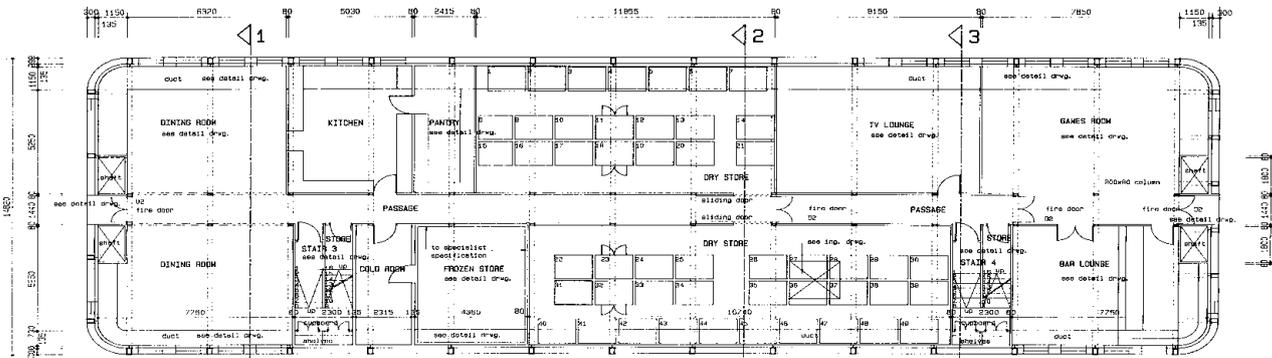


a key design criterion due to Antarctica's very strong winds. The panels also render very favourable insulating properties to ensure our warmth.

Another factor that increases the longevity of the base is the fact that it is built on the edge of a nunatak (rocky outcrop). This gives the benefit that wind driven snow does not build up on the

The base consists of three double storey cells of roughly 45 m by 14 m area. The total surface area is roughly 3300 square meters and includes the following:

- Gym,



**BLOCK B  
FIRST FLOOR PLAN  
SCALE 1:100**

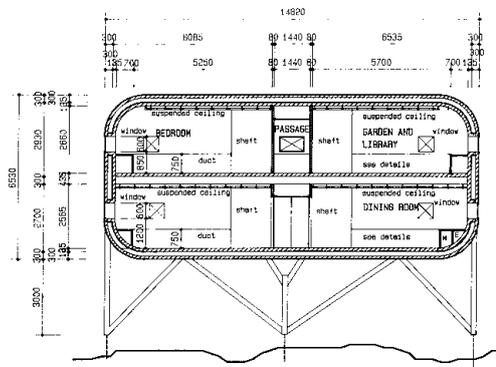
- Games room,
- Movie theatre,
- Bar,
- Sauna,
- Seventeen 2-bunk bedrooms in Block A,
- Eleven 4-bunk bedrooms in Block B,
- Two physics labs,
- Wet lab,
- Eleven offices,
- Kitchen,
- An internal cold room,
- Freezer room,
- Dry store,
- Operating theatre,
- Sickbay (with dentistry chair),
- Pharmacy,
- Darkroom for developing x-rays,
- Two Laundries,
- A hanger,
- Workshops,
- and a few Store rooms.



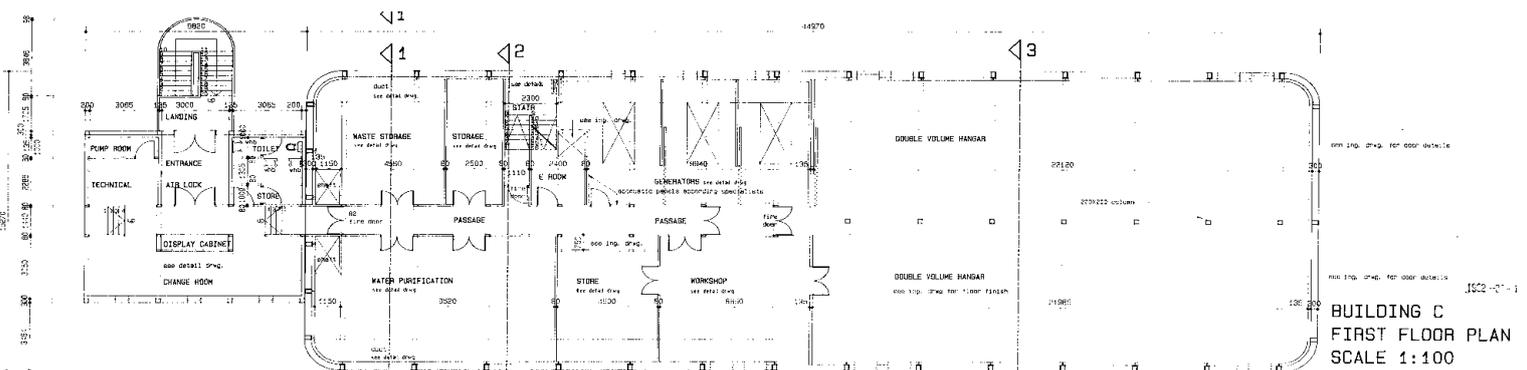
\*\* photo courtesy of SANAP website

Outside structures include a sat dome containing our communications equipment, a diesel bunker which holds 6 diesel bladders of 100 000 liters each and our water smelter.

Seeing that this structure with all its systems is basically a stand-alone life support system; it is not hard to imagine why our team with all its diversity and complimenting talents are needed to keep the wheels turning. ⚙️



**SECTION 1 BLOCK B SCALE 1:100**



**BUILDING C  
FIRST FLOOR PLAN  
SCALE 1:100**

# MECHANICAL SUPPORT

Vincent Rademeyer

To live on the South Pole for a year one has to overwinter on the Antarctic continent, which is not the friendliest place during the winter months. The temperature, wind speed and the darkness during this time requires certain support systems to be in place to survive. One of them is mechanical support.

The first thing that is obvious when sailing to Antarctica is the change in temperature so we put warmer clothes on, but warm clothes will only keep us warm to a certain degree and as soon as one is not so active and a slight breeze of wind blows, the cold will be there.

At the South African base, SANAE IV, we have three diesel generators that supply electricity to the base. The exhaust gasses of the generators are used to heat the



air-condition water by means of a water / exhaust gas heat exchanger. The air conditioner water flows throughout the entire base. At the different blocks of the building, an air fan blows cold fresh air from outside through a fan coil unit which is more or less the same as a radiator. The heat from the warm water is carried over to the cold air by means of the fan coil unit and the air is transferred throughout the base, which in turn heats the base up. There are also additional heaters built into the air conditioning plant to heat the water up more if necessary.

The diesel generators are the heart of the base because it produces the electricity that is used for the many needs at the base - like melting the snow for fresh water. Electrical elements are used to melt the water at the water melting plant called the “ smelly” from where the water is then transferred to the base.

The other mechanical support we have at the base are the bulldozers and cranes that we need for doing cargo work and to dig out or clear snow and ice from our containers, cargo sledges and equipment. For these diesel engines there also needs to be fuel that can work here at Antarctica. This is called Polar diesel.

Without polar diesel the machines would not have worked here in these cold conditions. ❄️

# WIRED UP

Singa Msimanga

The Base was officially handed over to Team 51 on the 28<sup>th</sup> of January 2012. During the take over period, the National Department of Public Works (NDPW) – under the leadership of

Heine Smith – repaired all the electrical installations and equipment which were out of order. Only a few items were left out due to time constraints. Faiz Sait, the Electrical Engineer from the National Department of Public Works did an excellent job within a short space of time. At times, I had an opportunity to work with



him and it was really nice working together. Currently, the entire electrical installation and equipment are in good working condition. All I have to do is to sustain or improve on the bench mark set up



by the National Department of Public Works.

Prior to hand over, we experienced power failure almost every week. However, since Team 51 took over, we only had two power failures due to loose connections in the generator control

panel. In both instances of power failure, power was restored within thirty six seconds. Credit goes to our Diesel Mechanics, Avhahudzani Nemutandani and Vincent Rademeyer. Keep up the good work guys. In summary, power generation, reticulation and distribution in the base is in order and I will – together with other team members – ensure that it is kept that way. Power to the base!!! Amaaaaandla!!! 🙏

## SCIENCE IN ANTARCTICA, BUT WHY?

Braam Beukes

One of the main reasons some of us end up here in Antarctica is because of the science that is happening here. But why would you want to make recordings in such a remote place?

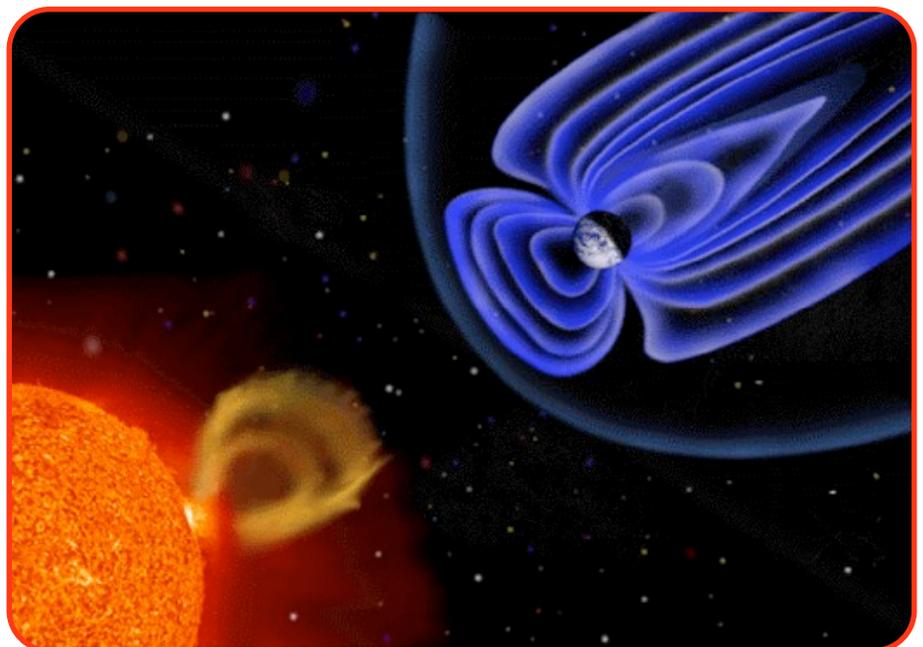
The main reason for this seemingly insane practise becomes clear when you view our planet as one big bar magnet. As with any bar magnet you have magnetic field lines that originate from the magnet's north pole and converge at the south pole of the magnet. When we look at our planet we call the area where the magnetic field dominates the magnetosphere. Here we also have magnetic field lines converging at the poles, and that is why we do scientific recordings at the South Pole or Antarctica.

The sun in our solar system is essential for life on earth and its activity affects various planetary systems, not least of all our weather. This activity can include Coronal Mass Ejections which, when directed at Earth, can produce aurora and even weaken the Earth's magnetic field. The activity of the sun particularly affects our magnetosphere and atmosphere. This is why studying these effects are important as it can provide us with clues about the sun and how to prepare

for or lessen the negative effects it has on us and our technology.

Some of the negative effects include satellite communication disruption and even damage to satellites, High frequency (HF) communication disruption, loss of big expensive transformers by geomagnetically induced currents and magnetic interference in geological exploration to name but a few.

To give a better picture of the environment we are talking about please see the figure below (courtesy of NASA).



Here we can see the earth with its magnetosphere and the sun radiating energy and energetic particles toward the earth. One can also see how the magnetic field lines converge at the poles. And that is why we are here.. 🙏

# "SNOWBATH!"

Jako Bester

Every birthday at SANAE is a major highlight during our stay here! Not just because we get to have some fun or experiment with cake flour and candles to come up with something that closely resembles a birthday cake (Thanks Braam!), but because a birthday on the ice is a once in a lifetime experience for most and needs to be grabbed by all twenty hands of the whole team! Stef had the fortunate opportunity to be our first honorary birthday club member since takeover. It was celebrated the evening prior with some games and usual gathering in the bar until the clock struck twelve when everyone burst out

singing happy birthday! The rest of the day was filled with cake and

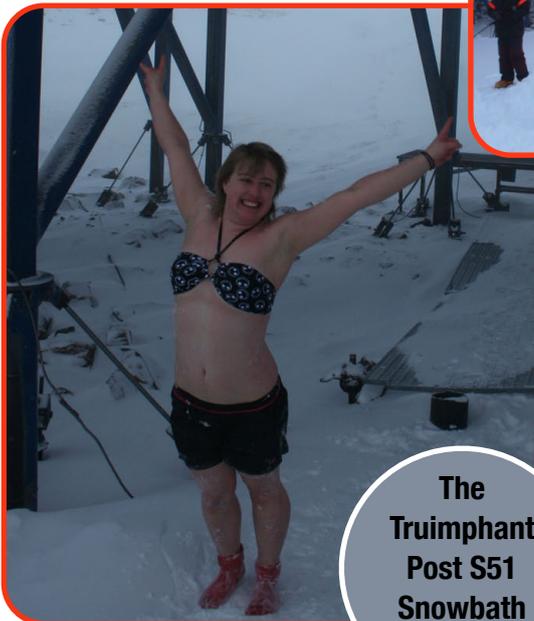
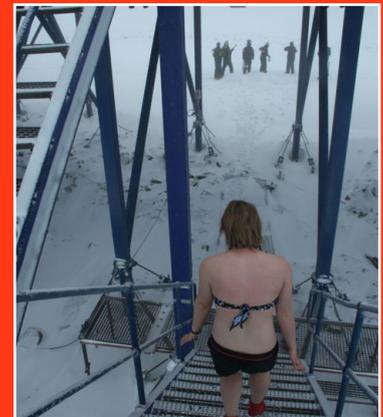
not waste any time and grabbed their party hats and shovels and made their way outside. After a standard quick motivating pep talk from the team doc Stef kept up her brave face and



snacks. Unfortunately we had to postpone the main event 'The traditional SANAE snowbath' due to weather. I thought I heard Stef give a quiet sigh of relief, one that she had hoped no-one had heard... It was short-lived as it only lasted for a day as a weather gap soon opened up and the rest of the team did

ventured out with her S51 red socks and set the standards high for the rest of her male team mates - no getting cold feet now guys! 🍷

## STEF BRAVING THE COLD



The Truimphant Post S51 Snowbath Pose



# GETTING WASTED AT SANAE

Stefanie Strachan

One of the major differences between living in isolation and living in society is that we don't always have all the luxuries and services as readily available as back home. Yes, things like malls or fast food joints jump to mind, but what is more important is the handling and disposal of waste. To



ensure that we as humans do not have a major impact on the environment, the Antarctic Treaty has some guiding regulations regarding proper waste disposal that must be adhered to by all the signatory countries. This means that all waste produced at SANAE has to be properly stored and shipped back to South Africa in the summer.

Waste is divided into eight categories, each with their own color code to eliminate confusion after the waste containers/drums are sealed. Color coded bins are placed all over the base for the team's use, and then all the waste is processed weekly in the waste room as part of the skivvy duty.

This includes tasks like breaking glass, crushing tins, compacting general waste, and flattening cardboard. The respective waste categories are then placed in empty 220liter fuel drums, sealed, and stored in the waste room till the next waste run. General waste is compacted into cubes and placed in



one of the orange shipping containers that was used to store our luggage in on the way here. A waste run happens when the shipping container for cardboard and general waste is filled up and needs to be replaced. The two full containers are then lowered down onto a sled, along with all the sealed waste drums and the sled is then stored in the winter depot, ready to be hauled back to the Agulhas when the takeover crew arrives in the summer.



A more concerning matter is the handling of any fuel or oil spills. This is taken very seriously, and any spill of more than 2litres has to be reported to the Department of Environmental Affairs. Snow that was affected by fuel, oil, or antifreeze is cleaned up using shovels and black bags, emptied out into containers in the waste room to allow the ice to melt before pumping the

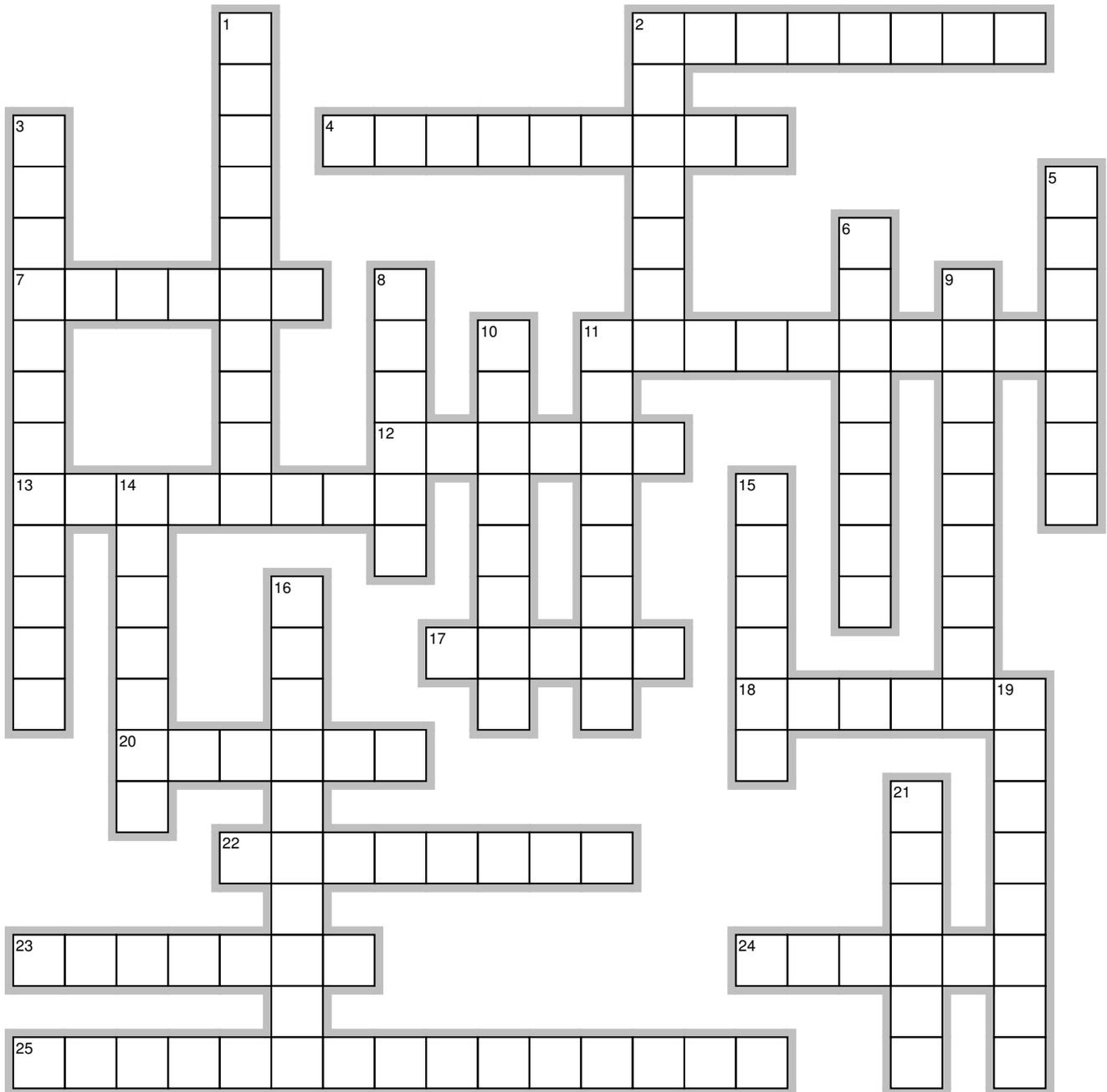


contaminated water into drums to be sealed and shipped back to SA along with all the other waste.

Even though great care is taken to have least possible impact on this pristine environment, introducing pollution is inevitable. Hopefully as our technology advances we might find a way to reduce our footprint here even further.. ♻️



# S51 PUZZLE 1 - ANTARCTIC CROSSWORD



## Across

2. convoy of Challengers
4. full-face beanie
7. Antarctic Matterhorn
11. SANAE breeding colony [4,6]
12. Snow motorbike
13. wind formed snow ridge
17. Antarctic bay
18. Antarctic plant form
20. arrest your fall
22. ocean's edge
23. flightless bird
24. cleaning duty
25. Southern lights [6,9]

## Down

1. snow tractor
2. foot spikes for ice travel
3. orange snow boot
5. SA polar research vessel
6. glacial movement crack
8. clamping knot
9. result of exposure
10. blind storm
11. birthday tradition
14. SA Antarctic base
15. water maker nickname
16. 7th continent
19. German Antarctic base
21. best friend in the Antarctic

Send your completed puzzle to [s51puzzles@gmail.com](mailto:s51puzzles@gmail.com)

\*solution will appear in the next issue

# SANAE TRENDS

## Temperature

Maximum	-7.7 °C
Average Max	-16.4 °C
Average	-19.4 °C
Average Min	-22.5 °C
Minimum	-27.1 °C

## Pressure

Maximum	896.9 hPa
Average Max	885.1 hPa
Average	881.8 hPa
Average Min	878.0 hPa
Minimum	864.1 hPa

## Humidity

Maximum	90%
Average	40%
Minimum	18%

## Wind speed

Mean	20 Knots (40 km/h)
Maximum Gust	88 Knots (176 km/h)

## Daytime lengths

Average day length	4:51 hrs
--------------------	----------

## Quote of the month

Johan: "Do you think this juice is still ok?"  
 Jon: "As long as it doesn't come from Challenger 3, its fine."

## Movie of the month

James Bond series

## Song of the month

Red Right Hand - Nick Cave & the bad seeds

## Dish of the month

Custard slices

# THANKS TO OUR SUPPORTERS:



MEERLUST





Support also by the following individuals:

Homemade Buffs – Mrs du Plessis

Homemade Ginger Biscuits – Mr and Mrs Knoesen, Mrs Bester