2017 Colorado Metal and Nonmetal Mine Rescue Contest

JUDGES' PACKET
Field Competition

Mine Information Sheet
Colorado Mining Co. – Number 7 Mine

General:
The Colorado Mining Co.'s Number 7 Mine is a single level Class III underground room and pillar trona mine. It is owned and operated by Colorado Mining Company. The mine operates development and retreat mining sections with continuous mining machines and shuttle car haulage. The mine operates 3 eight-hour shifts per day, 7 days per week with two production shifts and one maintenance shift.

Mine Access:
Mine access is provided through intake drifts. Pillars are 20 feet by 20 feet, and openings are 10 feet wide. The typical back height is 8 feet, undulating occasionally.

Ventilation:
The mine is ventilated by a non-reversible, 250,000 CFM Main Fan. The Main Fan is located on the exhaust shaft. Mine enters the workings through the intake drifts and flows to the exhaust shaft and out of the mine.

Mine Classification & Other Mine Gases:
In accordance with Title 30 CFR 57.22003, the mine is classified as Category III. That is, noncombustible ore is extracted and which liberates a concentration of methane that is capable of forming explosive mixtures in air. Additionally, some ammonia is liberated during the extraction process, but levels have not been established.

Electric Power:
Electrical service is provided to the mine from the local electric company. All power to the underground has been de-energized, locked, and guarded. Power is supplied to the exhaust shaft, but the exhaust fan is off.

Mine Map:
The mine map was last updated June 1, 2017.

Ground/Rib and Roof Control:
The immediate roof, or back, is supported by six-foot fully grouted resin bolts and supplemented with 12-foot cable bolts in the intersections. The mine has a history of ground falls. Timber supports are used as additional supplemental support.

Explosives:
Explosives are not used in this mine since it is gassy.

Materials:
All materials to work the problem are located underground or on the surface.

Communications:
Communication is provided by battery mine phones.

Mine Information Sheet (continued)
Colorado Mining Co. – Number 7 Mine

Mining Methods:
The mine is a room and pillar mine. Mining is accomplished with a continuous miner and shuttle car face haulage. Conveyor belts take ore to the surface.

Water, Pumps, and Waterlines:
The mine does not have a history of water problems in the active works.

Notification:
All federal, state, and local officials have been notified. Ambulance service is present and on standby.

Backup Teams:
Two fully-trained and fully-equipped mine rescue teams are onsite to back you up.

Team Briefing Statement

You are located underground at the Fresh Air Base that has been established in the #1 Section of the Colorado Mining Co.'s Number 7 Mine. This is a single-level Class III underground room and pillar trona mine. The mine is ventilated by a non-reversible 250,000 CFM exhaust fan located on the exhaust shaft.

Last night at 5 pm, the main fan registered a pressure spike. Significant dust was seen blowing out of the shaft. Sampling revealed high methane levels and ammonia levels that were over our sensor ranges. Due to the high methane, the fan was shut down.

Two of the five-person clean-up crew exited the mine at 9 pm last night. They had significant eye irritation and trouble breathing. They were treated at the hospital for acute pulmonary edema. We have lost contact with the remaining persons.

All power to the mine has been de-energized. The main fain can be restarted upon request.

We have called all of the government agencies for help. Guards have been posted at the shafts and at the main fan. There is a fully equipped mine rescue team located on the surface and they are ready to serve as your team's backup.

Another team will be sent into the mine to replace you after 75 minutes.

GOOD LUCK!

Team Instructions

- Explore and map all conditions found and any changes made by the team
- Extinguish or seal any fires;
- Account for the missing miners;
- Bring any live miners to the fresh air base.

Mine Manager Instructions

Introduce yourself to the team as the "Mine Manager." Then, introduce the #1, and #2 Judges. The team has been briefed on the problem and the mine information. Read the following instructions to the team:

> **At this time, I have no new information for your team. During the working of the problem, I will answer any question that you may have; however, by problem design, my response may be limited in scope. The fresh air base attendant and mine rescue team alternate must remain at the underground fresh air base. Only the fresh air base attendant can speak with the team via the communication system to discuss the rescue activities performed or proposed. If the team returns to the fresh air base, only the attendant or alternate will be allowed to assist them. However, neither the attendant nor the alternate can physically go beyond the fresh air base to assist the team unless he/she becomes a team member when someone drops out.**
>
> **After the team has completed its 50 foot check, they will not be allowed to physically compare the team map with the fresh air base attendant's map or the team alternate's map. No side by side comparison will be allowed and no changes (edits) can be made to any map while the team is at the surface fresh air base.**
>
> **The fresh air base attendant or team alternate is not allowed to speak with anyone <u>except</u> the team members, the mine manager, or the judges.**
>
> **At the end of the problem, both the team map and the fresh air base attendant's map will be collected and scored. All map editing must take place prior to stopping the clock. The alternate's map will also be collected at this time but it will not be scored.**
>
> **Do you understand these instructions?**

When they verify understanding the instructions, have the Team Captain start the clock and hand the team their copies of the **Team Briefing Information**, the **Mine Information Sheets**, and the **<u>three</u> mine maps**.

Remember to add: **"Good Luck!"**

When the team makes a stop in Drift #1 at the first crosscut, **disconnect the communication line.**

After 2nd Ventilation Change, hand Fresh Airbase Attendant **Refuge Chamber Contact** Card.

Roof Fall

There has been a ROOF FALL immediately behind you over the communication line.

Communication System Information

You will be required to complete the problem with this wireless communication system. You will not be discounted for any docks associated with a lifeline or team line. The rest of the problem must be completed with the wireless communication system. Team must use a link line where required.

Refuge Chamber Contact

We just received a call from the Refuge Chamber. There is one miner in the chamber. The chamber is airtight. Please hurry and get him out. No other contact after.

Field Problem Solution (Team Stops)

DISCLAIMER:
There are many ways to successfully solve this problem. The following outlines one possible way for use during MSHA field judges' training.

FAB

After mine manager finishes instructions, captain will start the official clock. Captain then writes the month, day, year, and the team position number on the sign-in board (or sheet). The captain's failure to perform any of these tasks will result in discounts (4 x each infraction) per Judge 1 – Surface Rule #8.

Since the mine is a Category III, the team needs to use non-sparking tools to work the problem. If the team does not have non-sparking tools and requests them from the official in charge, the tools that they brought with them will be deemed non-sparking.

Failing to use non-sparking tools in gassy mine is Judge 1 – UG Rule #10b.

Examining Mine Openings

Captain will perform Roof and Rib (**RT**) checks at all openings before proceeding in to the mine. Gas Tests (**GT**) will be performed at each opening as well. Captain will Date and Initial (**DI**) the stopping in Drift 2 and the Caved Air Tight in Drift 3.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
DI is Judge 1 – UG Rule #9

Gas Box Testing Station:

Located at the FAB. The team must provide its own calibration cup to report: O_2, CH_4, CO, and NO_2. Judge 2 will write down the team's measurements and have the person taking the measurements initial the document.

Gas Box is Judge 2 – UG Rule #4.

Entering the mine

The team must enter through Drift 1 and count off when entering mine.

Breaching through Drift 2 without a barricade is Judge 2 – UG Rule #10.
Failure to Count off is Judge 1 – Sur Rule #10

Stop 1

Teams must enter through Drift 1. Team must perform 50' check. Hand captain **Roof Fall** Card. Judge 2 will Flip placards indicating **Caved Air Tight**. Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. If team goes immediately out, and then comes back in the mine and completes, do not dock for this.

50’ Check is Judge 1 – UG Rule #3
RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c

Stop 2
Team returns to FAB. Captain must perform RT before passing through door. Team must close inby door in Drift 2 before opening outby door. Hand team communication box with **Communication System Instructions**.

RT is Judge 1 – UG Rule #8b
Failing to close door before going through is Judge 2 – UG Rule #10
Not proceeding out after losing communications is Judge 1 – Rule #10b

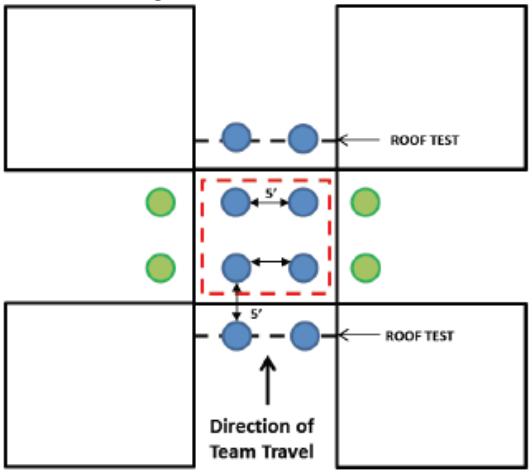
Stop 3
Team enters mine through Drift #2. Must close outby door before opening inby door.

Failing to close door before going through is Judge 2 – UG Rule #10

Stop 4
Team enters explosive mix and must notify FAB. Team must request Ammonia Tube. Give team Ammonia Tube. Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. Captain DI Caved as FPA.

RT is Judge 1 – UG Rule #8b
Failing to notify FAB of explosive gas is Judge 1 – UG Rule #14
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9

Stop 5
Team reaches unsafe roof. Team is not yet required to timber. Captain must do RT at unsafe roof. If timbering, follow diagram below.



Blue supports are required in direction of travel. Green are only required if traveling east to west. Timbers set within 1-foot of the brow inby and outby.

Team is not required to tie in Drift #2 to Drift #3 in this crosscut. But if they do, Captain must DI FPA at cave.

RT is Judge 1 – UG Rule #8b
Traveling through unsupported back is Judge 1 – Rule 10 (15 x each team member)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9

Stop 6
Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c

Stop 7
Team must examine bottom of shaft and not step under shaft bottom. Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. Captain DI stopping and regulator as FPA.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9
Any member under open shaft is Judge 1 – UG Rule #10a

Stop 8
Team cannot proceed more than 3 feet inby in Drift #2 since Drift #3 has not been tied back. Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
2+3 is Judge 1 – UG Rule #11

Stop 9
Team cannot proceed more than 3 feet inby in Drift #3 since Drift #3 has not been tied back. Captain must notify team of the unsafe rib ***each*** time the team passes. Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. Captain must DI cave as FPA and the body. When team encounters body, they will assess breathing and feel for pulse. **After feeling for pulse, flip placard** to indicate deceased. Person touching patient must have BSI. BSI must be changed before touching any other patient.

RT is Judge 1 – UG Rule #8b

GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9
Failing to take BSI is Judge 1 – UG Rule #10a
Captain not indicating unsafe rib is Judge 1 – UG Rule #8a
2+3 is Judge 1 – UG Rule #11

Stop 10
Captain must notify team of the unsafe rib ***each*** time the team passes. Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. Captain must DI face of Drift as FPA and Door to Refuge Area. When team knocks on Refuge Area Door, indicate "**No Response**".

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9
Captain not indicating unsafe rib is Judge 1 – UG Rule #8a
Opening Door to RA is Judge 1 – UG Rule #18

Stop 11
Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. Captain must DI face as FPA.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9

Stop 12
Team must RT at intersection, GT at each opening. Captain must be first to break the plane of each opening. Captain must DI stopping and face as FPA and the body. When team encounters body, they will assess breathing and feel for pulse. **After feeling for pulse, flip placard** to indicate deceased. Person touching patient must have BSI. BSI must be changed before touching any other patient.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9
Failing to take BSI is Judge 1 – UG Rule #10a

Vent Changes
The team must make 2 vent changes to clear the gas mixtures before breaching RA.

Vent 1 (one possible solution)
Team must perform following:

- Move Battery Mine Phone from next to regulator

- Open Regulator
- Build at 1-3 locations (see map for locations)
- Open outby doors
- Ask to turn on main fan

Captain must perform a RT at each build location. Take care to ensure that explosive mix does not go across ignition source (Scoop Batteries, Battery Mine Phone, and Non-permissible Battery Scoop). Scoop batteries and Battery Scoop cannot be moved.

After vent change is completed and fan turned on, **flip affected gas placards**. Team will have to retest gas at each location that placards were flipped if they pass through these areas.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Passing explosive mix over ignition source is Judge 1 – UG Rule #10b and
Judge 1 – UG Rule #18

Vent 2
Team must perform following:

- Shut fan off
- Build at 3 locations (see map for locations)
- Ask to turn on main fan

Captain must perform a RT at each build location. Take care to ensure that explosive mix does not go across ignition source (Scoop Batteries, Battery Mine Phone, and Non-permissible Battery Scoop). Scoop batteries and Battery Scoop cannot be moved. Team must ventilate irrespirable from in front of RA before breaching door.

After vent change is completed and fan turned on, **flip affected gas placards**. Team will have to retest gas at each location that placards were flipped if they pass through these areas.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Passing explosive mix over ignition source is Judge 1 – UG Rule #10b and
Judge 1 – UG Rule #18
Breaching door without ventilating is Judge 1 – GU Rule #18

Stop 13
Team will breach door to RA. Captain must be first to enter and perform a GT. When team encounters Patient, he will be conscious. They will perform a primary assessment. Person touching patient must have BSI. BSI must be changed since touching the bodies. Captain must DI location of patient.

RT is Judge 1 – UG Rule #8b
GT is Judge 2 - UG Rule #1 (Each gas, Each Omission)
Captain not first is Judge 1 – UG Rule #8c
DI is Judge 1 – UG Rule #9

Failing to take BSI is Judge 1 – UG Rule #10a
Touching Patient without clean BSI is Judge 1 – UG Rule #18

Stop 14
Team will take patient back to the FAB. When they do this, the captain can state that the team has completed its mission. The captain will then stop the clock.

Remember to tell the team, **"good job"** and thank them for their hard work. Collect the maps.

End of Problem
#1 Judge will quickly walk the field with the team captain and write in the final location of the ventilation controls. After this, have the captain sign the blank map. This will be used to compare the working map with the final condition.

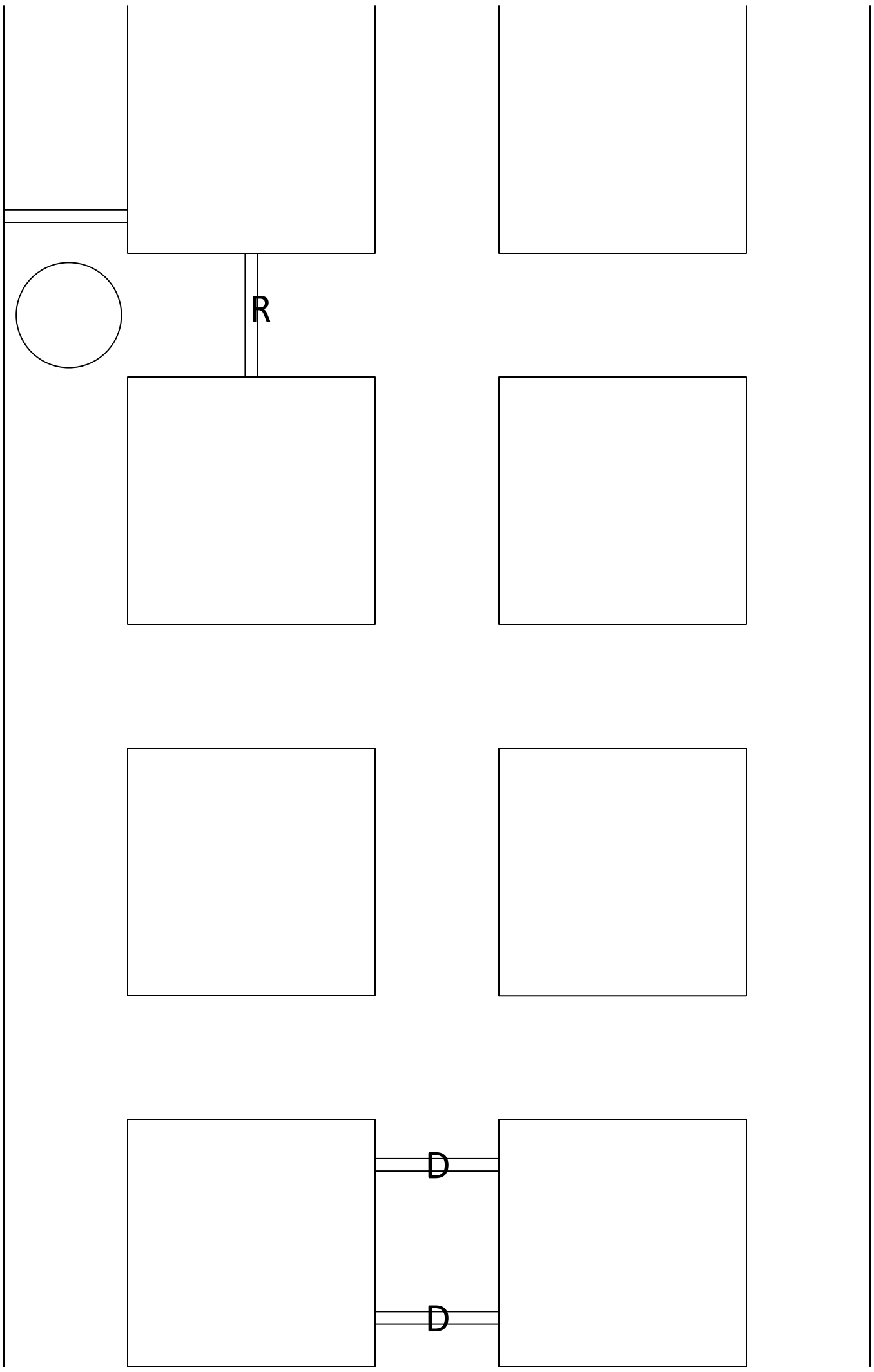
5-minute Look
Inform team of any infractions that have occurred. This should be brief. This is to discuss what infractions they incurred, not how many docks they will be assessed.

**** THE END *****

_____ Map

Team Map

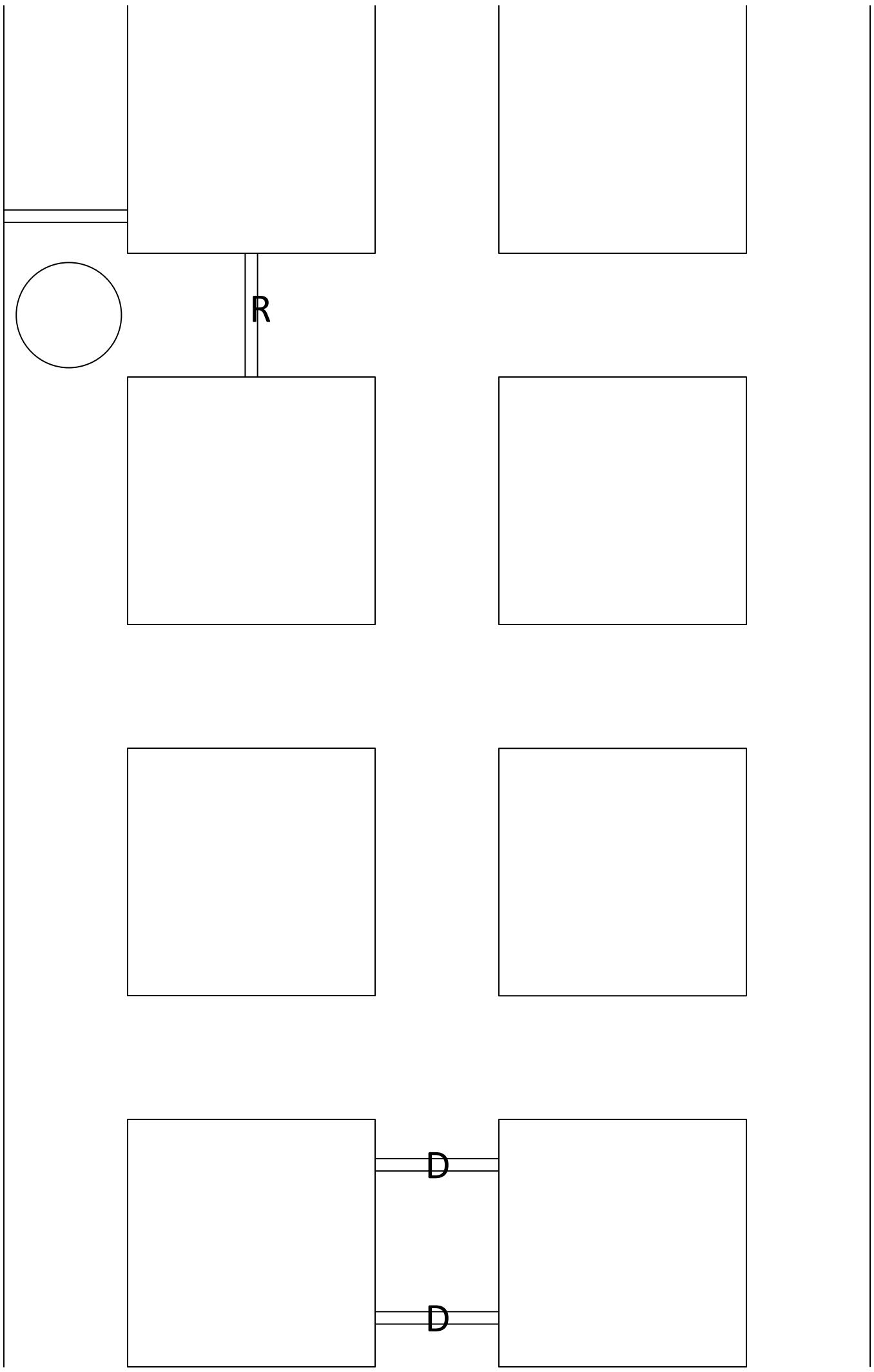
Team Working Order # ____



_____ Map

Fresh Air Base Map

Team Working Order # ____

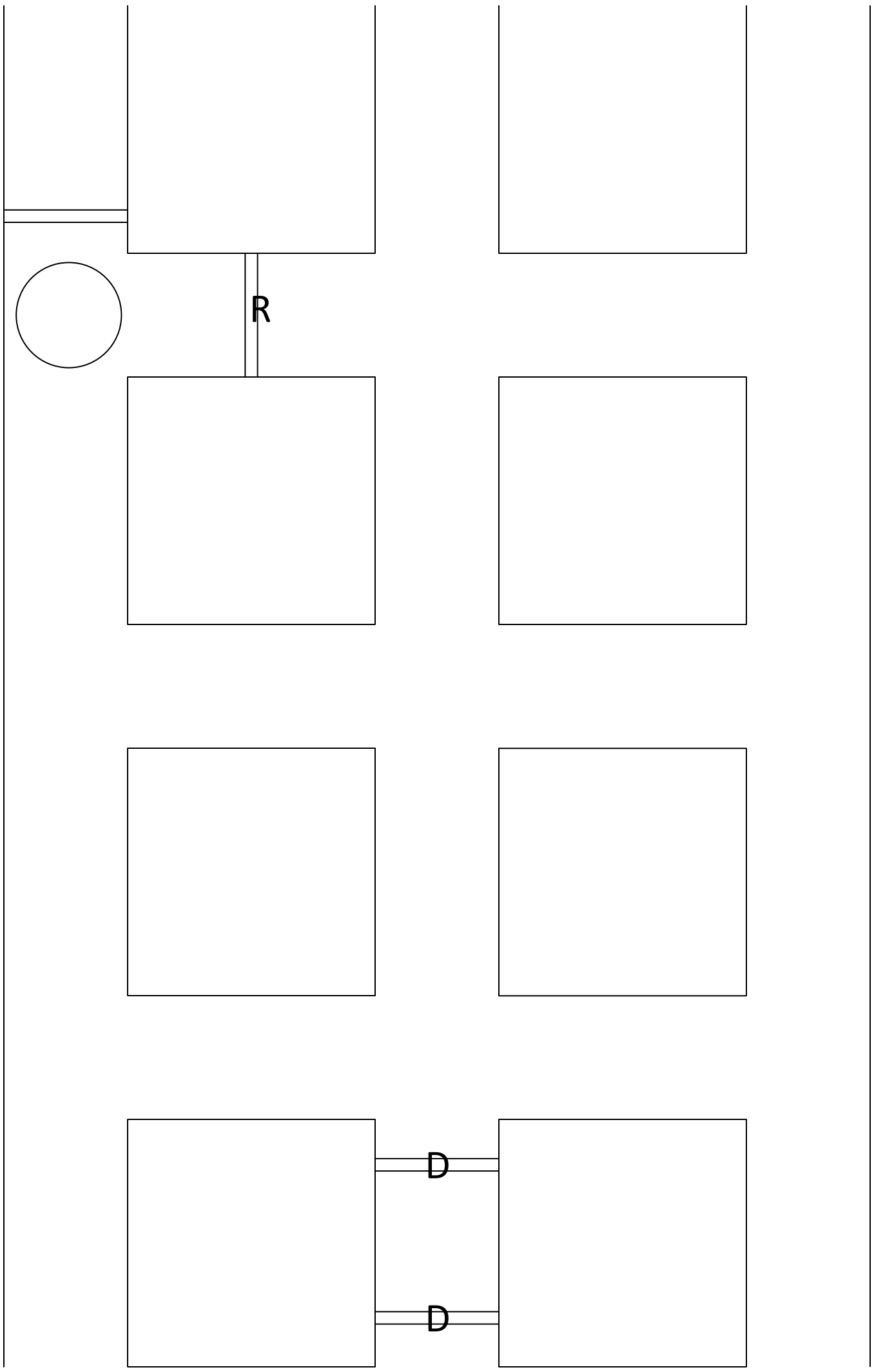


_____ Map

Alternate Map

Team Working Order # ____

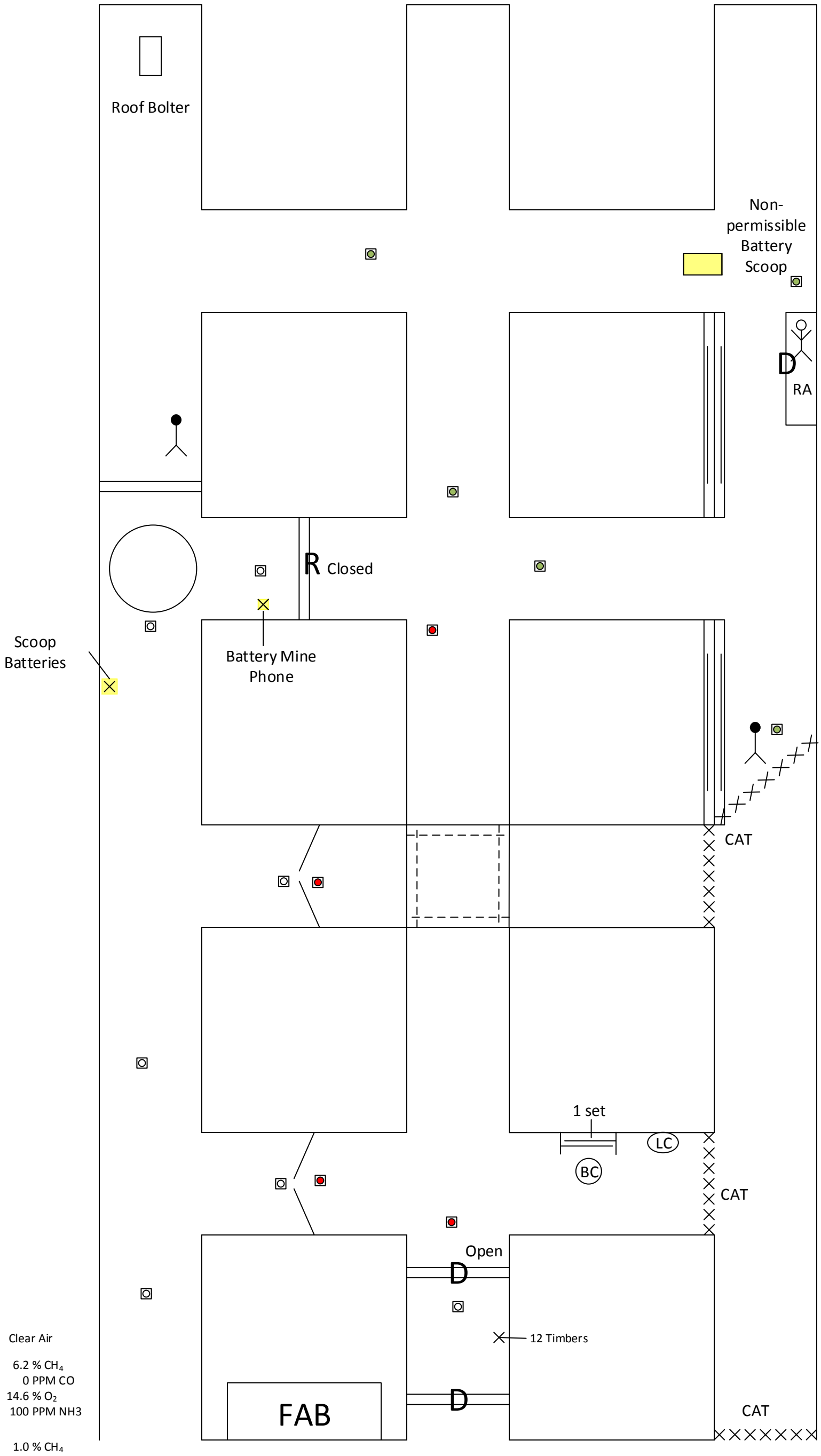
Not Scored



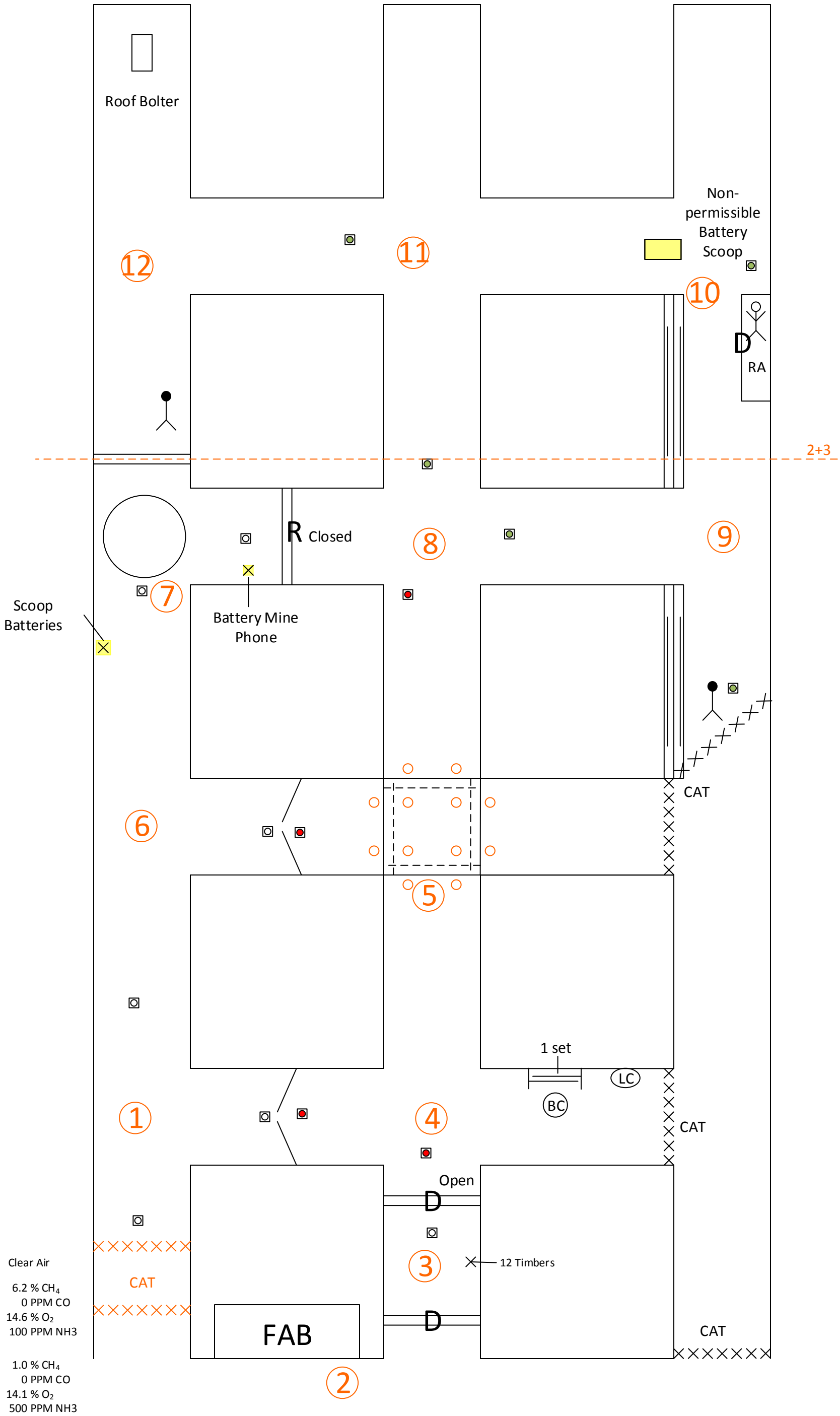
_____ Map

Problem Map

Team Working Order # ____



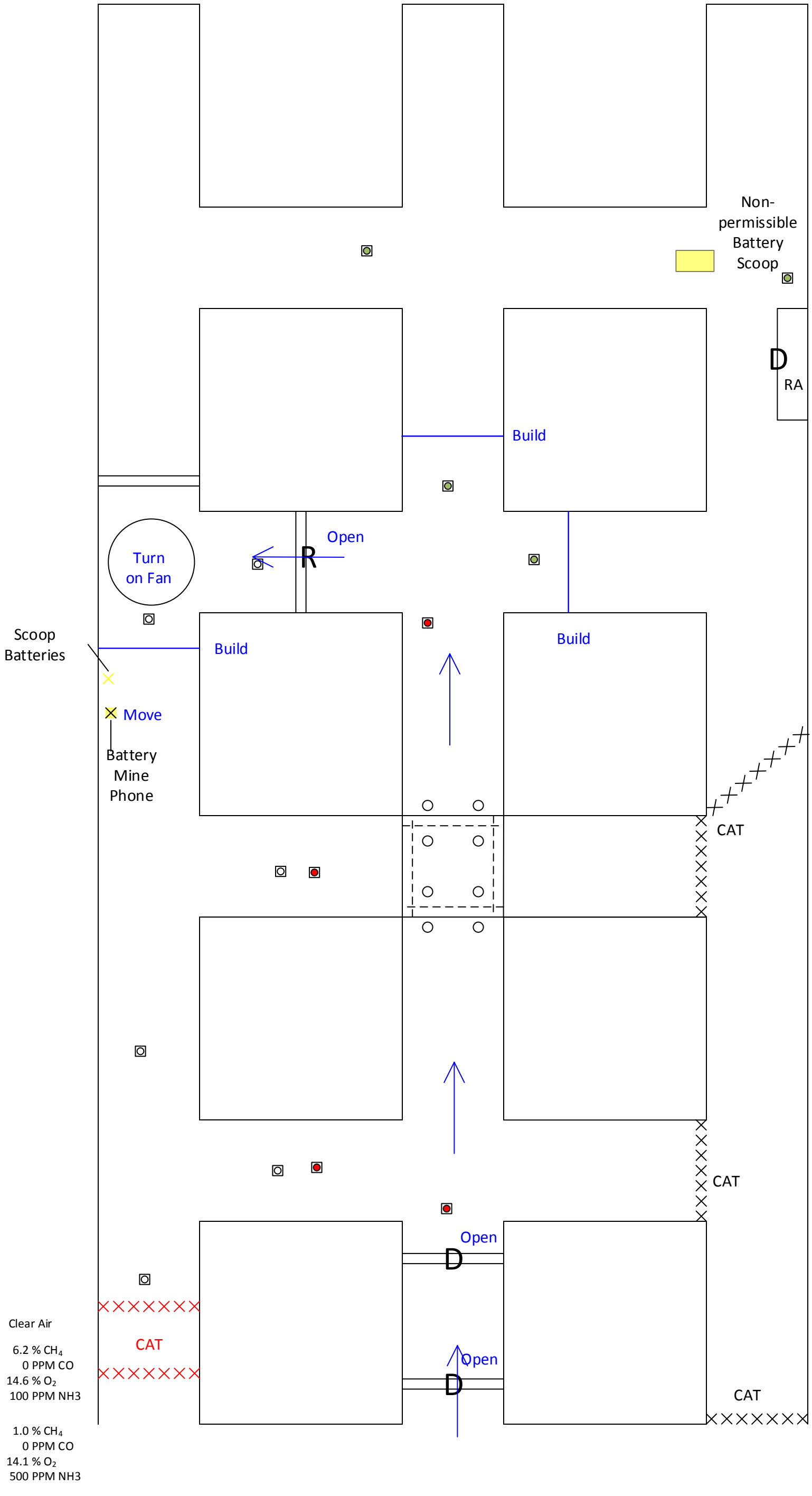
_____ Map Team Stop Map Team Working Order # ____



_____ Map

Vent 1 Map

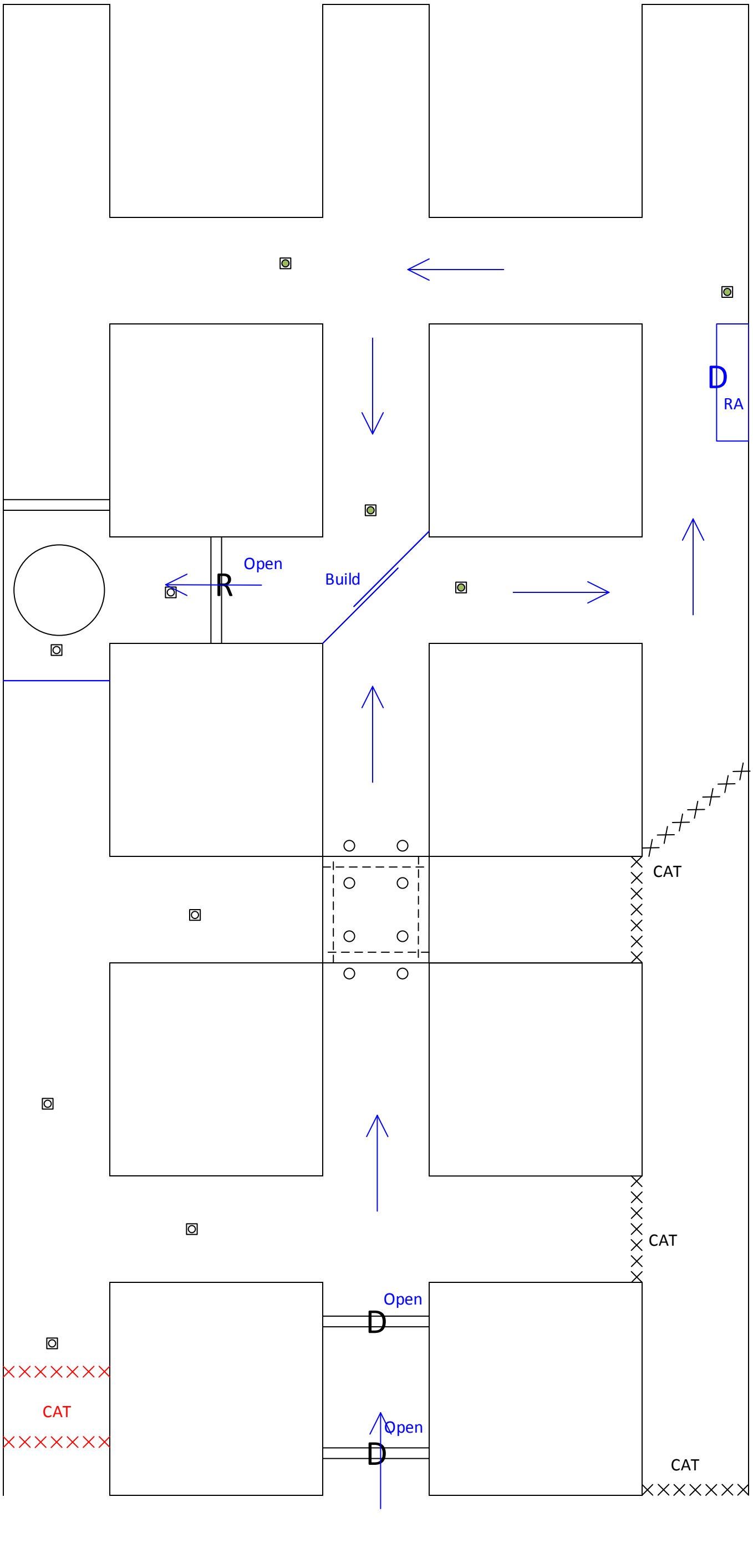
Team Working Order # ____



_____ Map

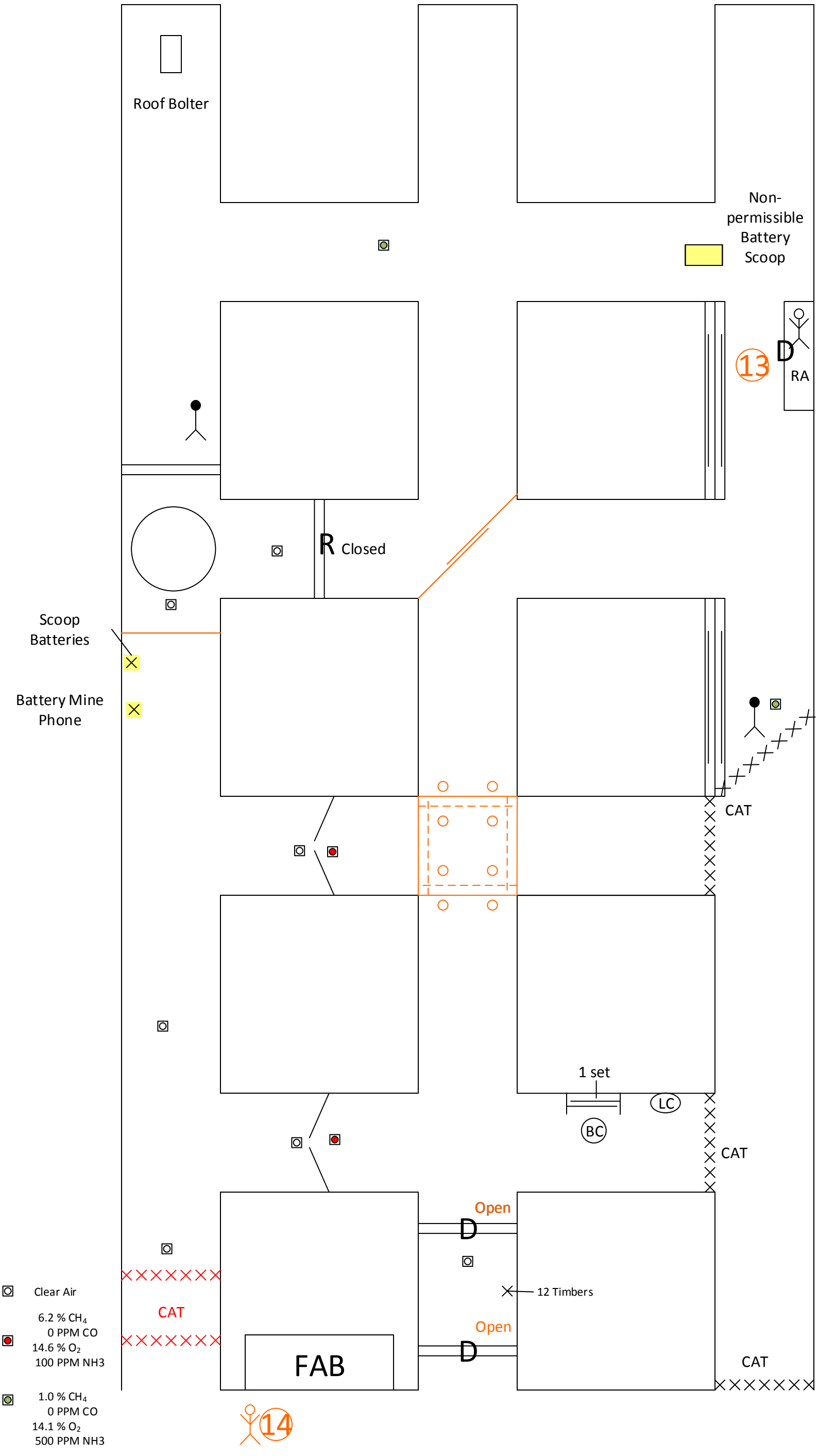
Vent 2 Map

Team Working Order # ____



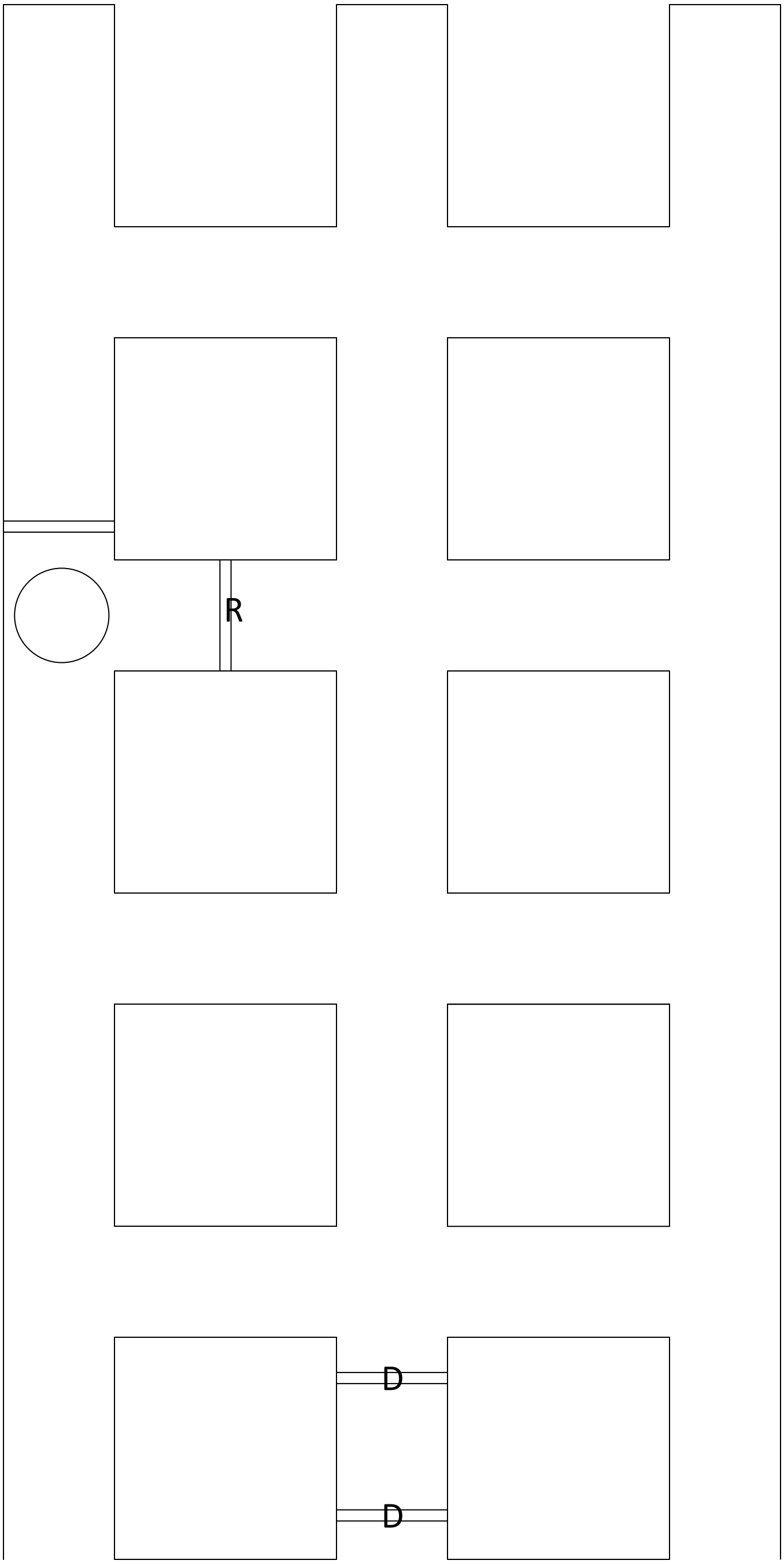
_____ Map Team Stops After Vent Map

Team Working Order # ____



_____ Map Vent Control Locations Map

Team Working Order # ____



_____ Map

Team Map Key

Team Working Order # ____