SASOL – FORKLIFT SAFETY (including other smaller vehicles)

Date	20 June 2022
Time	14h10
Location	Secunda Operations, RCS, Refining east Mechanical (U232)
Description	While a forklift operator was transporting a framed catalyst bag from U232 catalyst store to the reactor catalyst loading area, the forklift collided with a pedestrian, who was then caught between the bottom of the load, the cemented road surface and the mast of the forklift. VIDEO
KUE | Scenario	Loss of separation between people and heavy or specialised mobile equipment
Consequences	Lost workday case potential level 1

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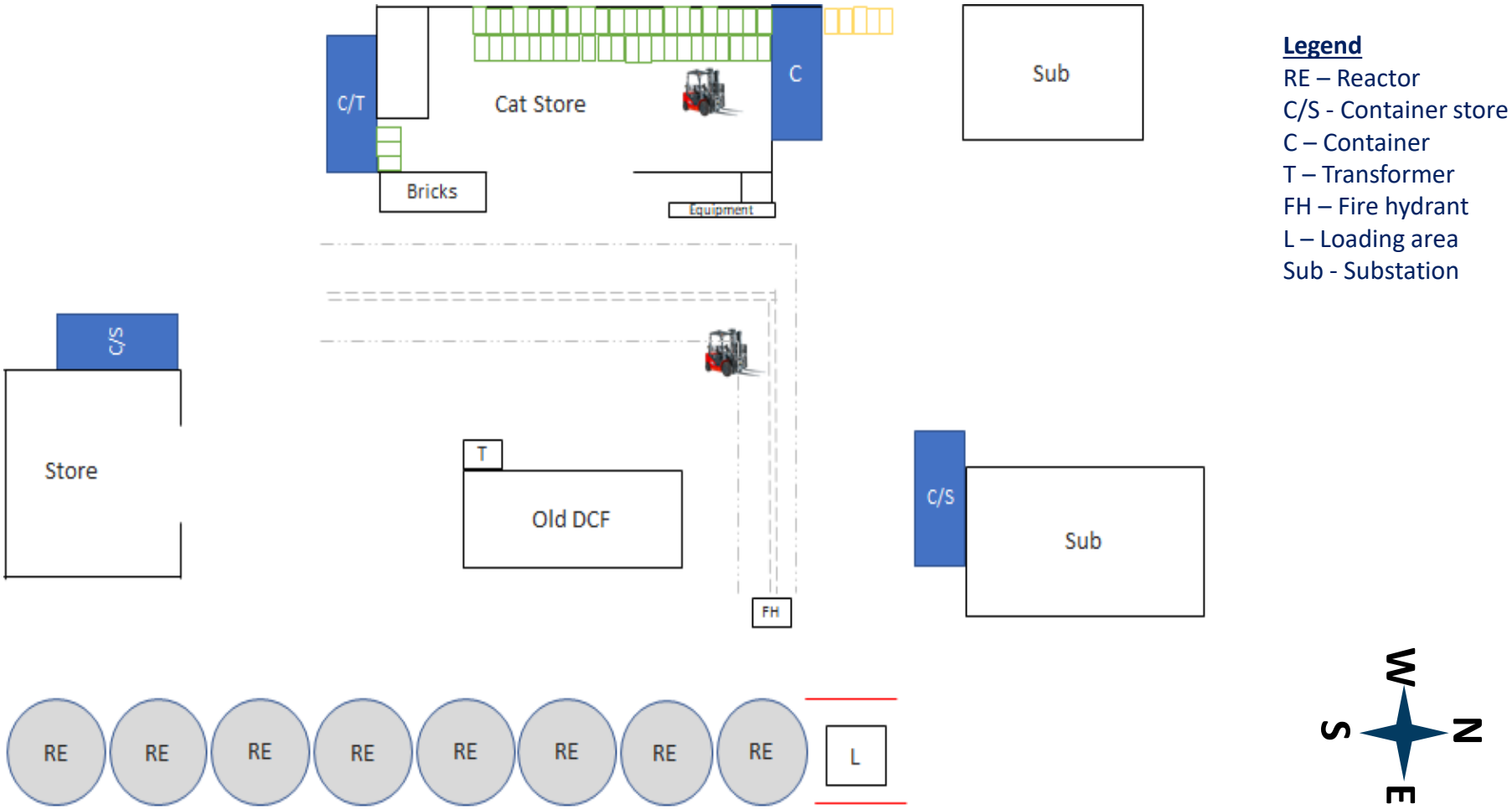
SASOL - Equipment and evidence sketches

Sketches to clarify circumstances surrounding the SHE incident



Legend

RE – Reactor
C/S - Container store
C – Container
T – Transformer
FH – Fire hydrant
L – Loading area
Sub - Substation

W
S
N
E

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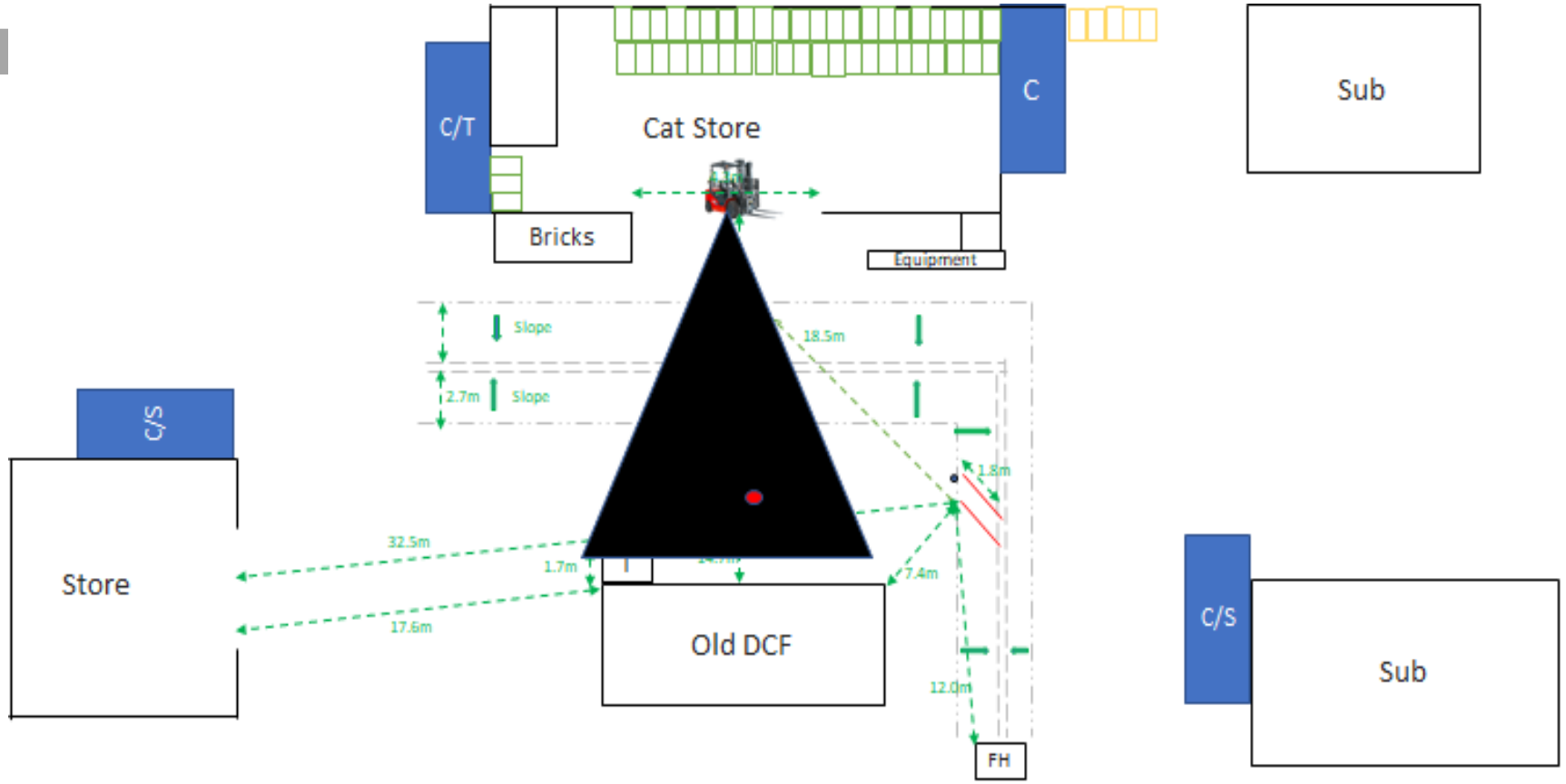
Facts gained - Specialist



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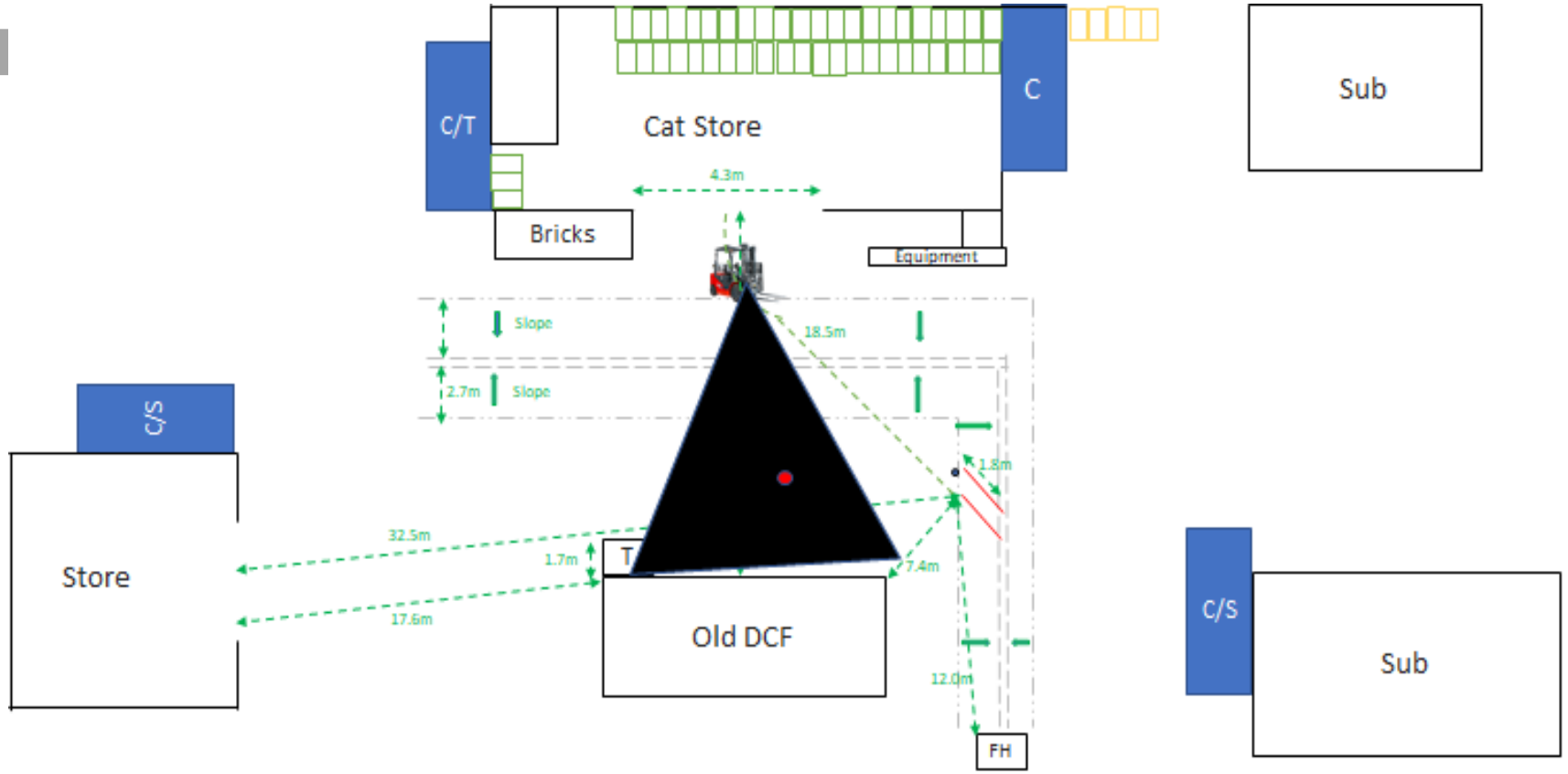

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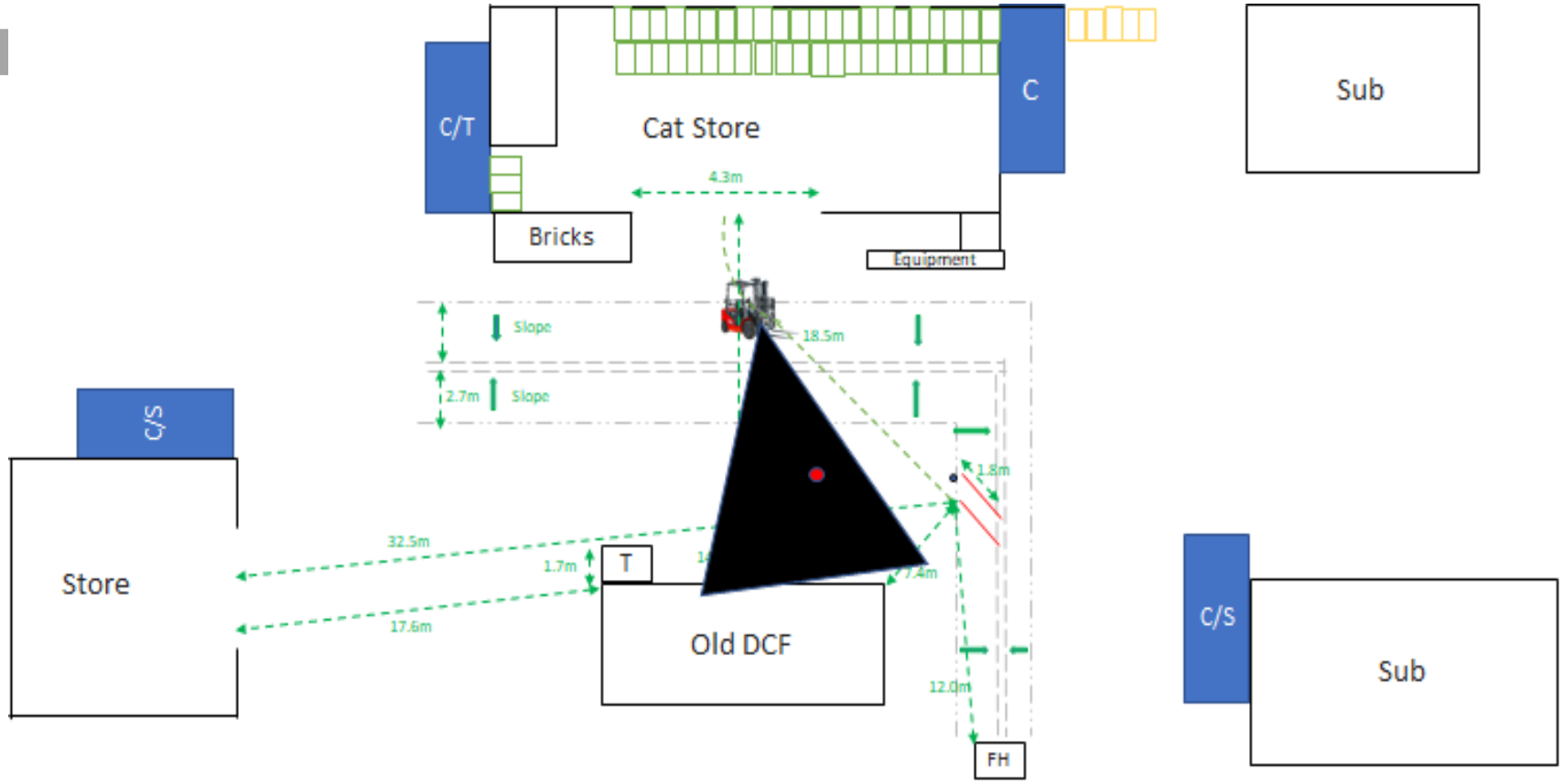

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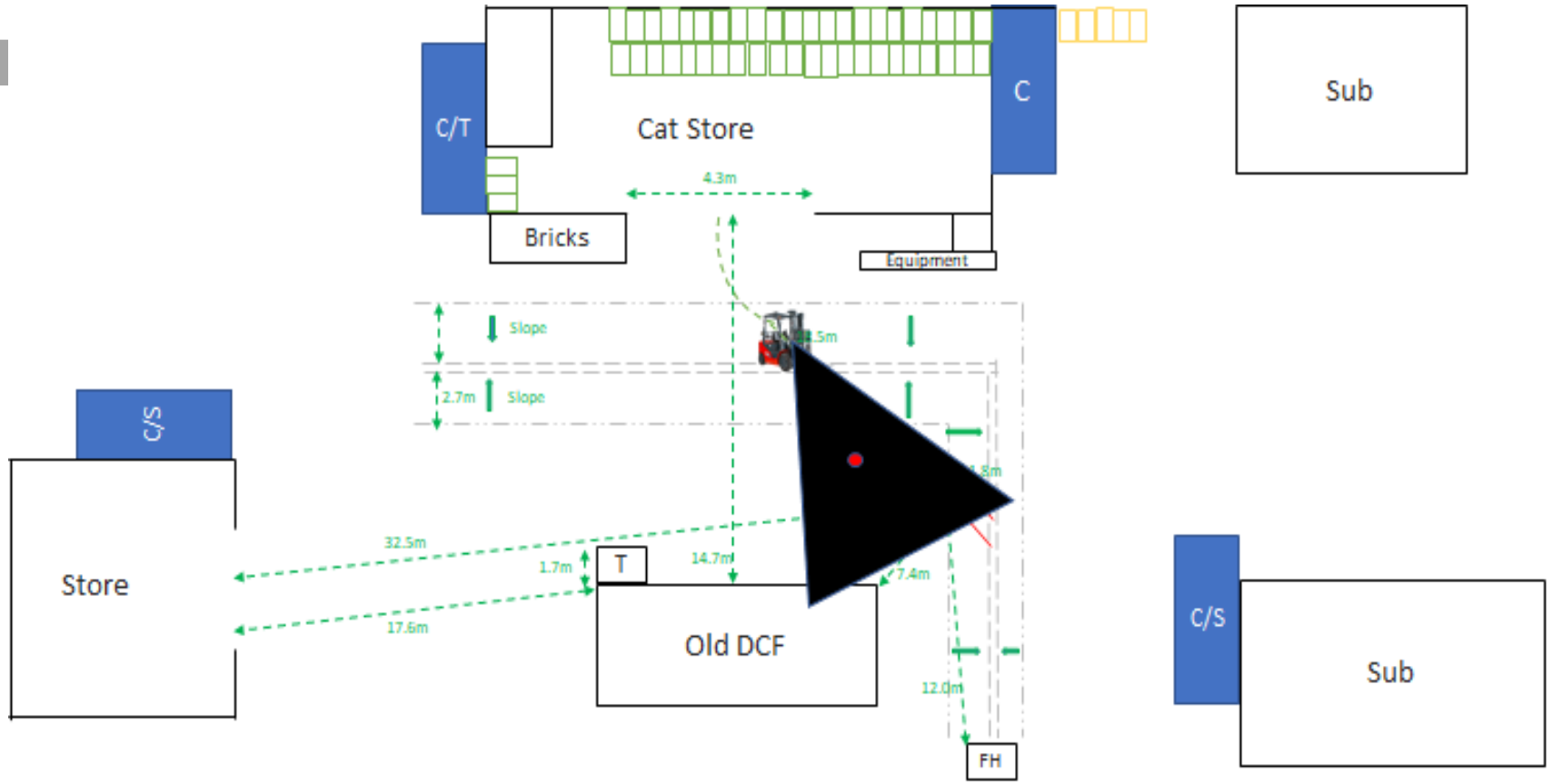

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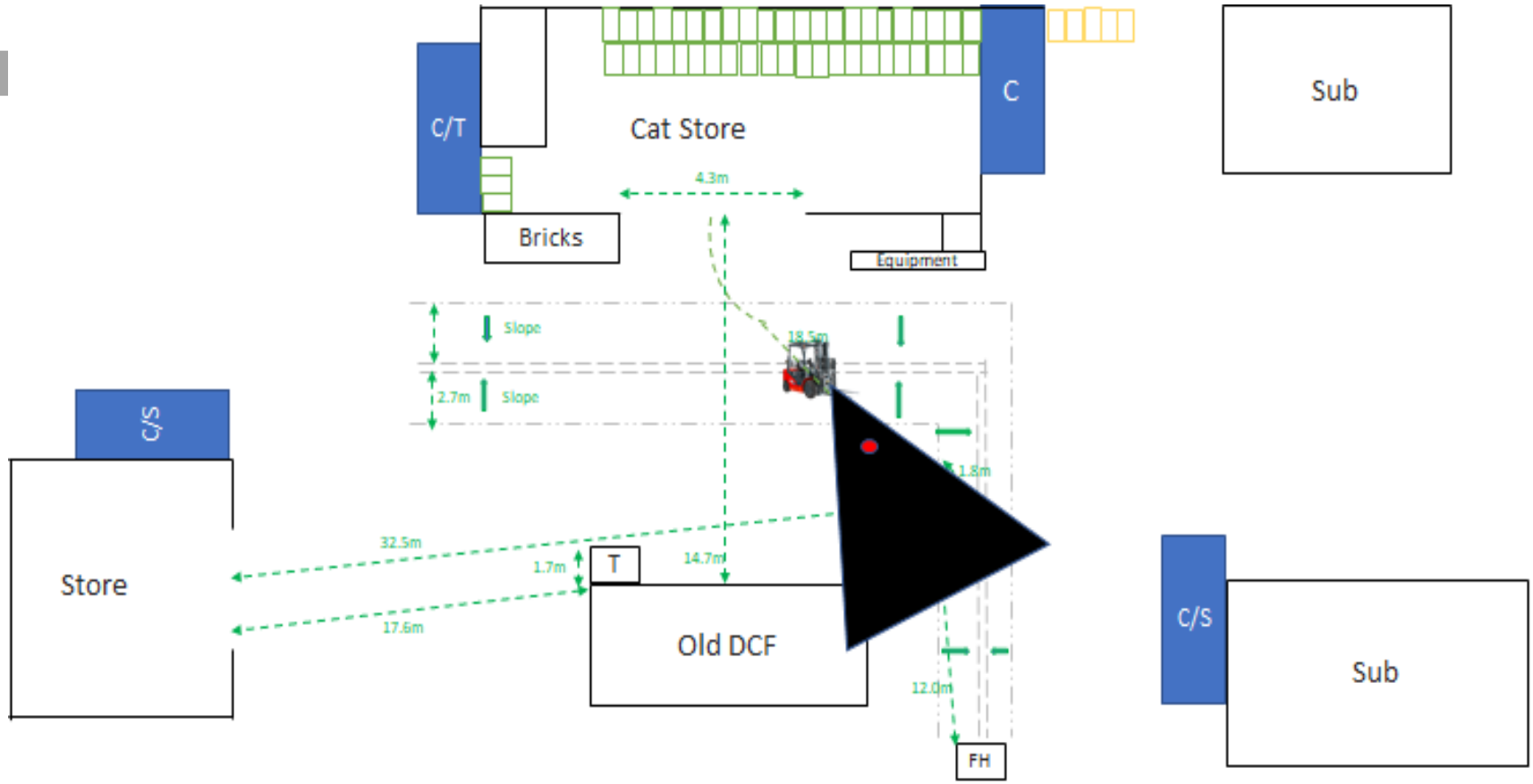

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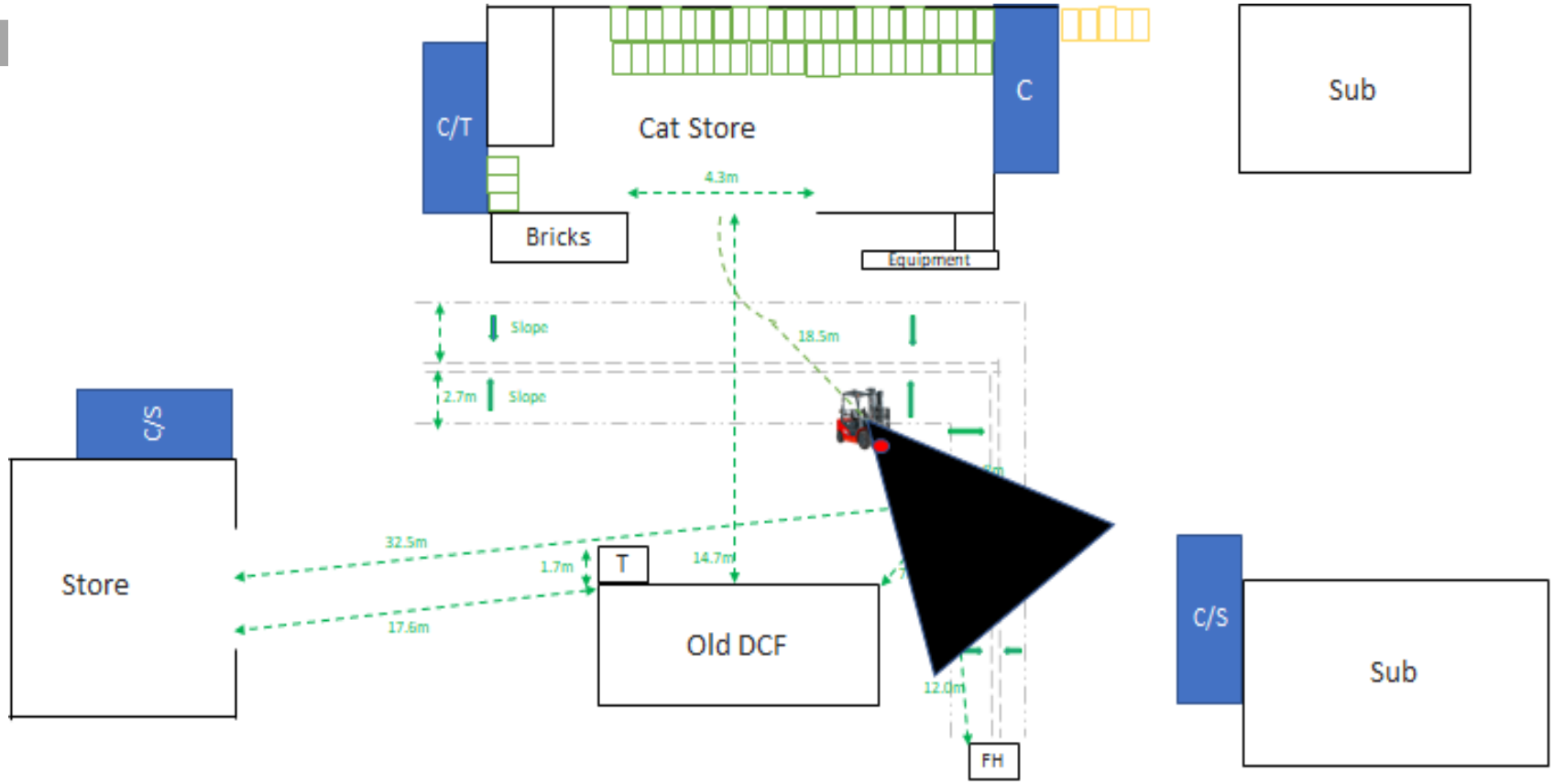

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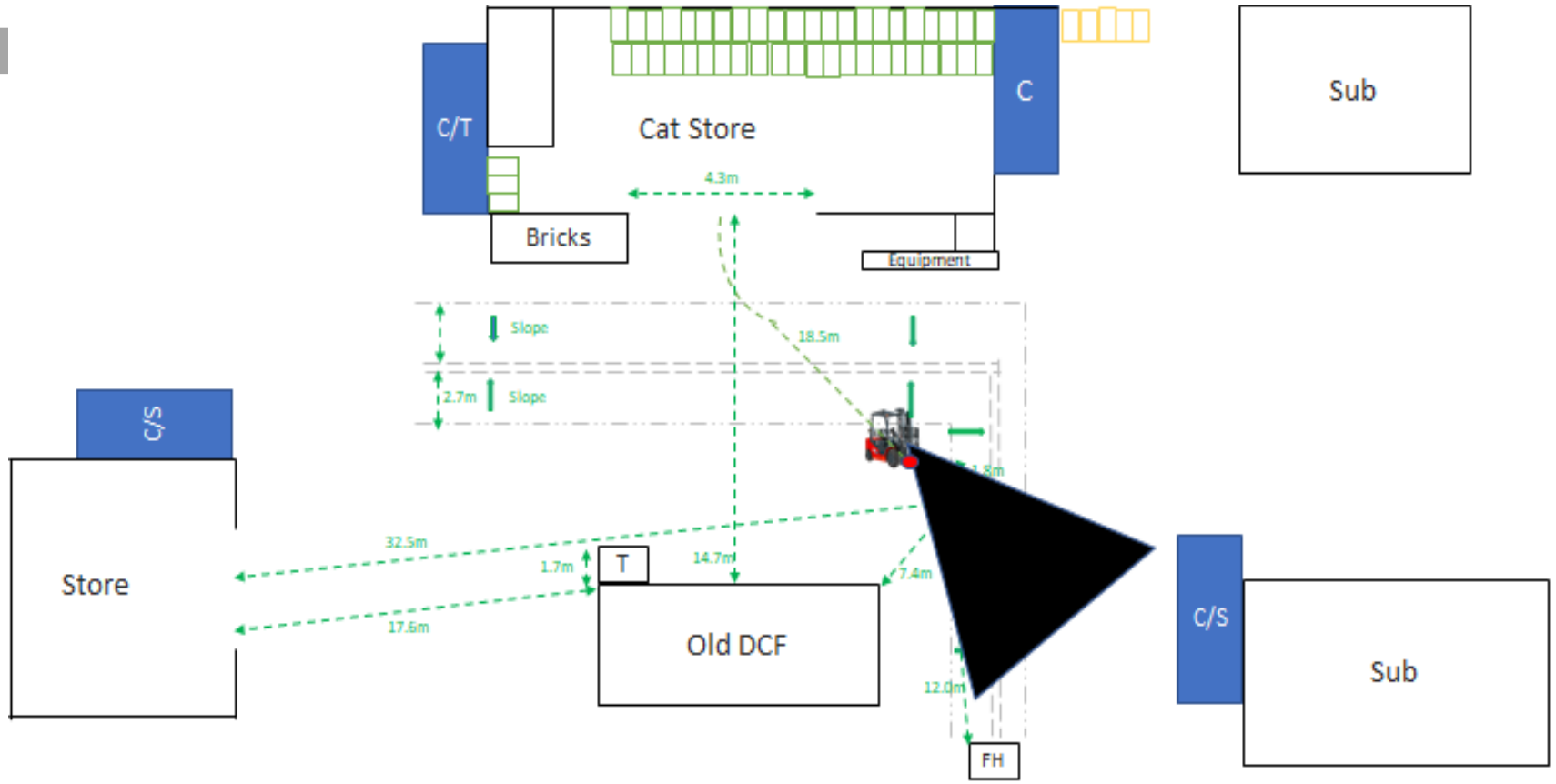

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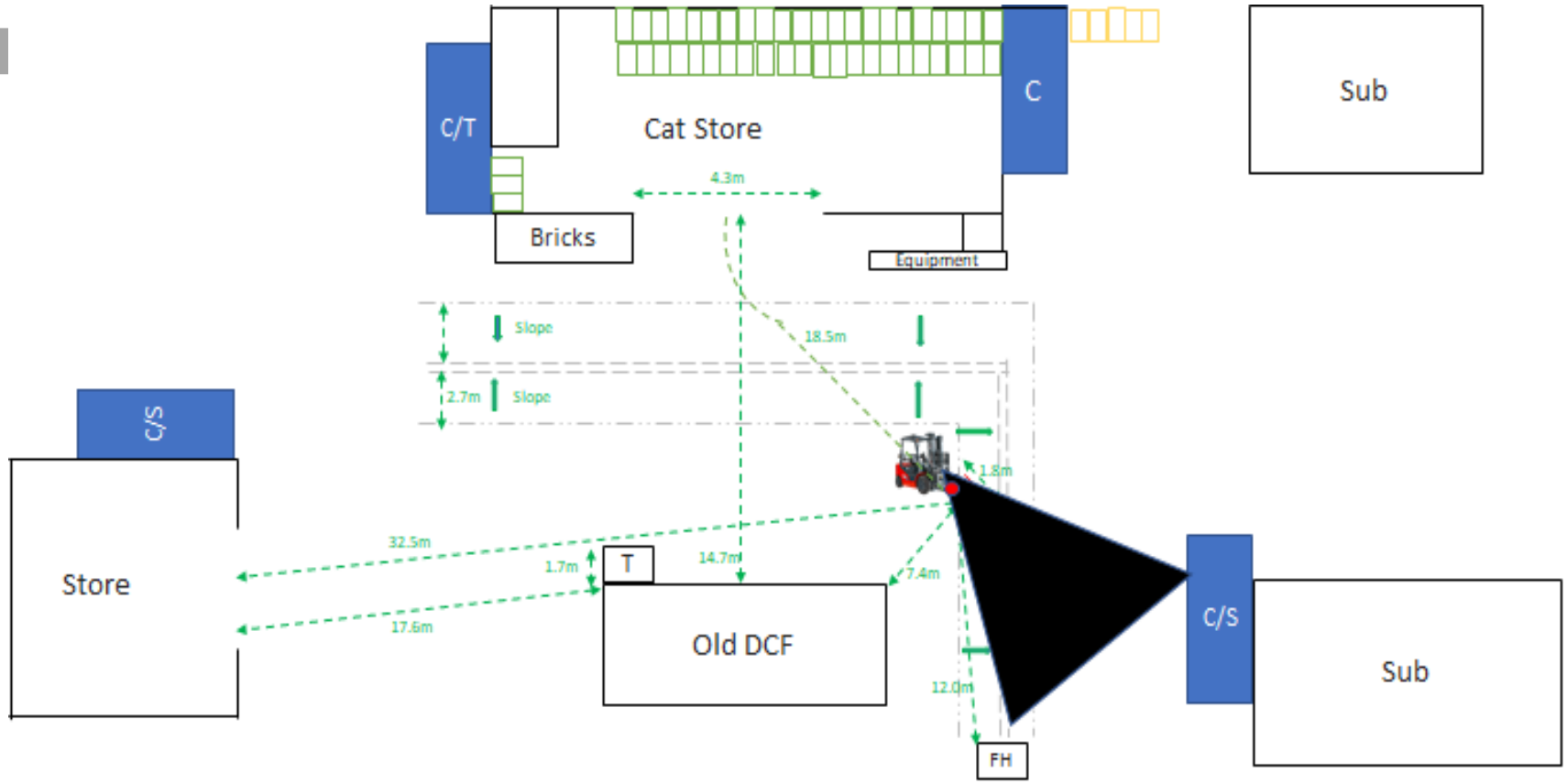

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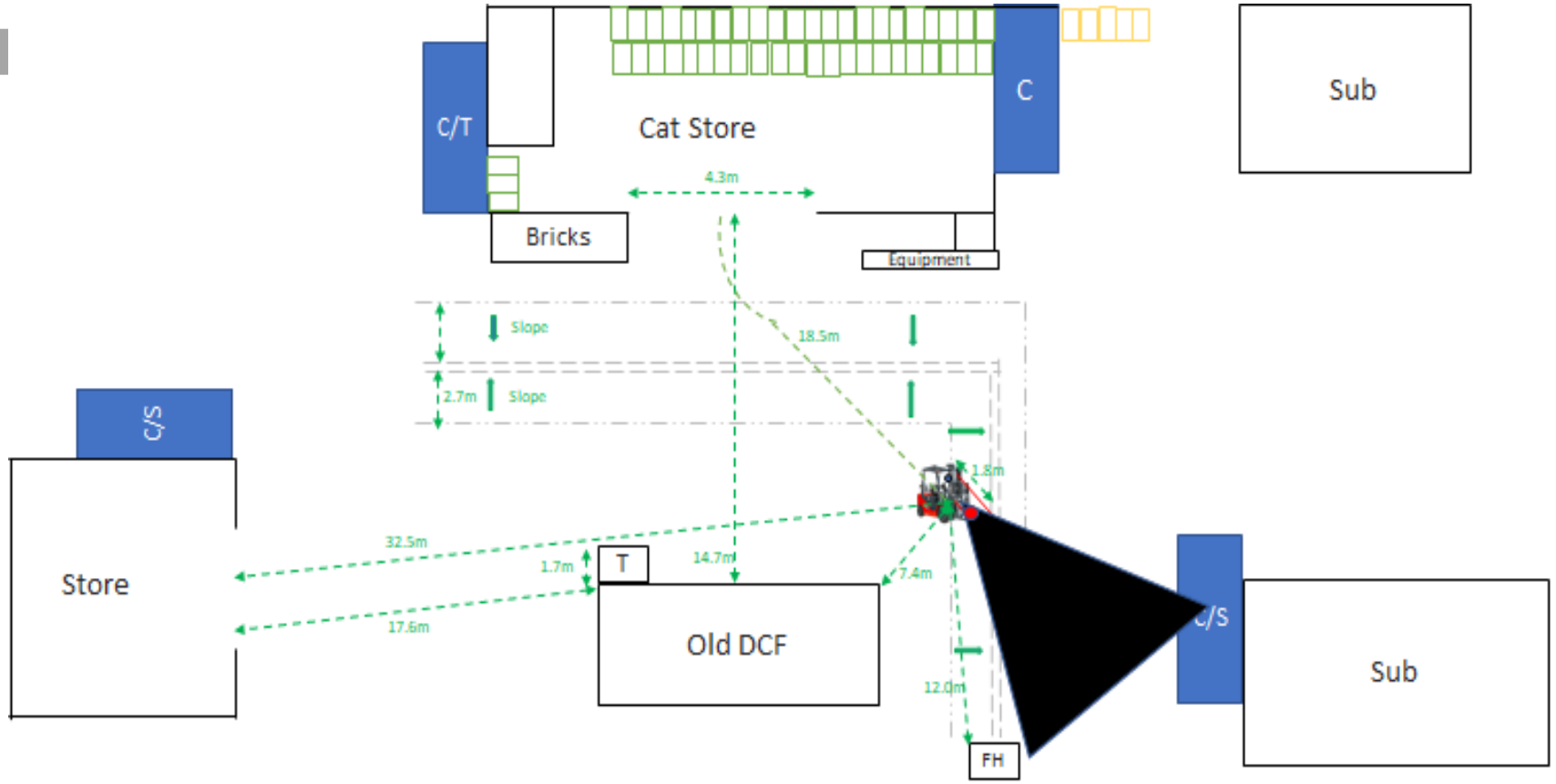

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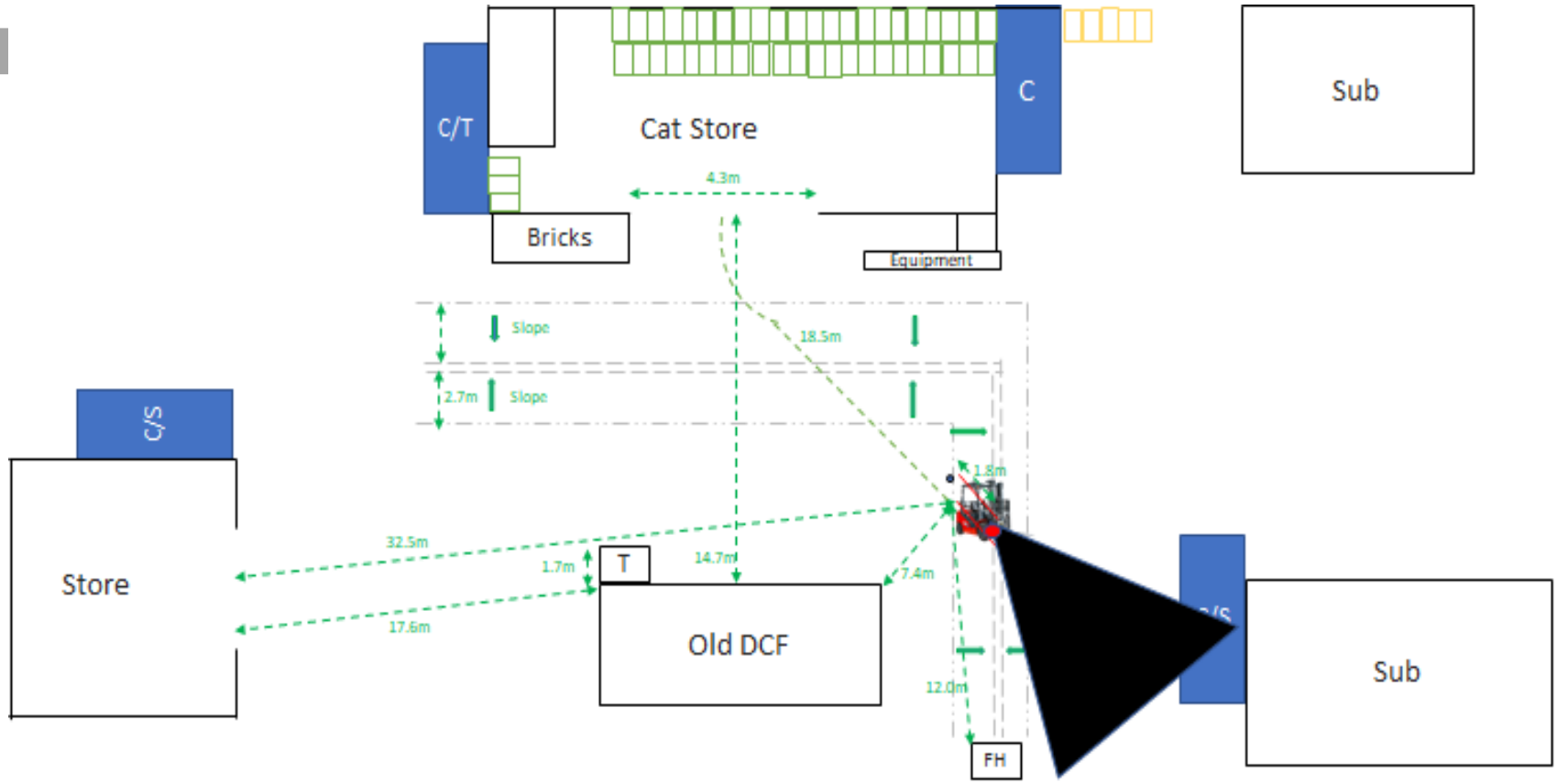

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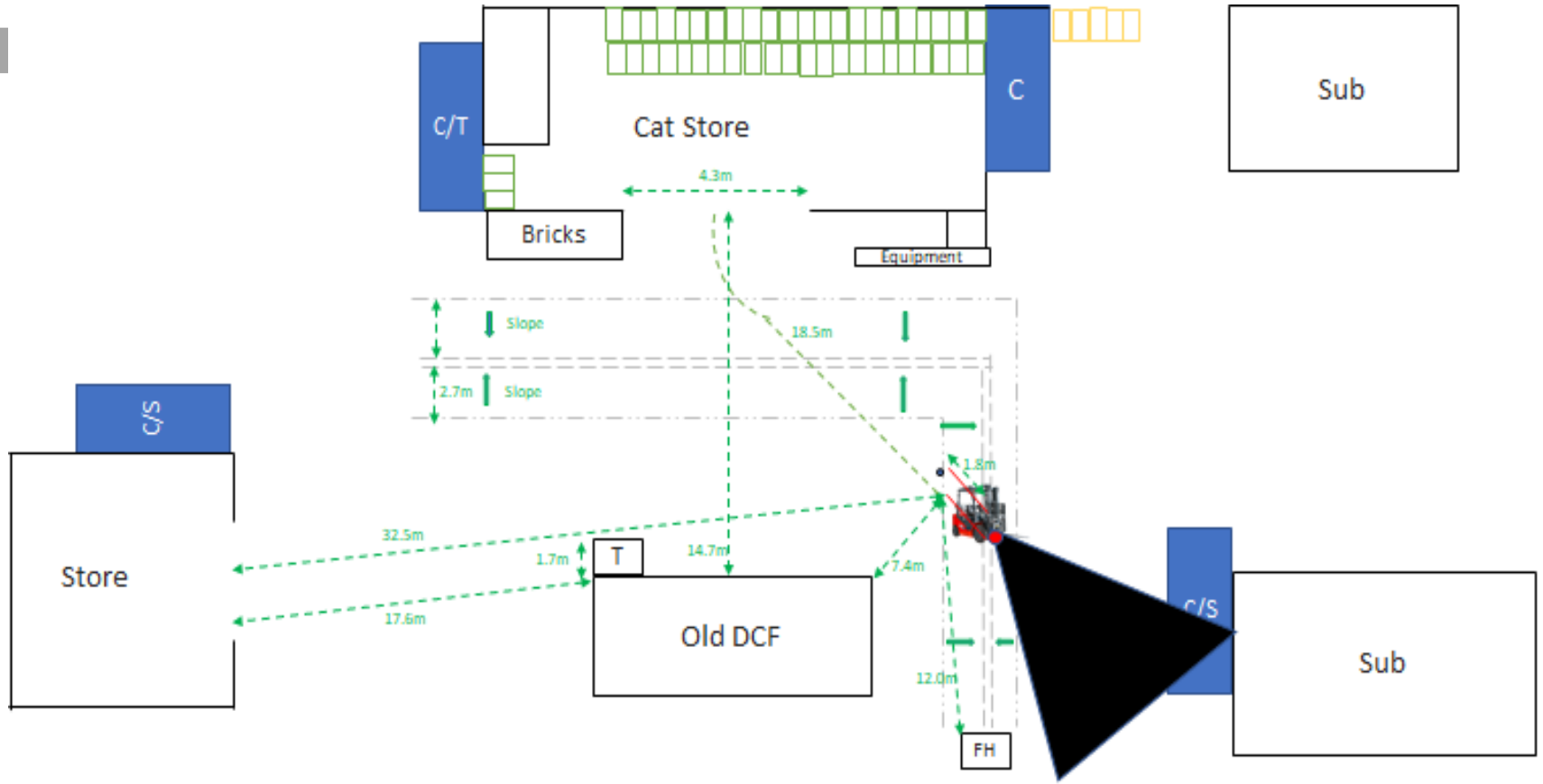

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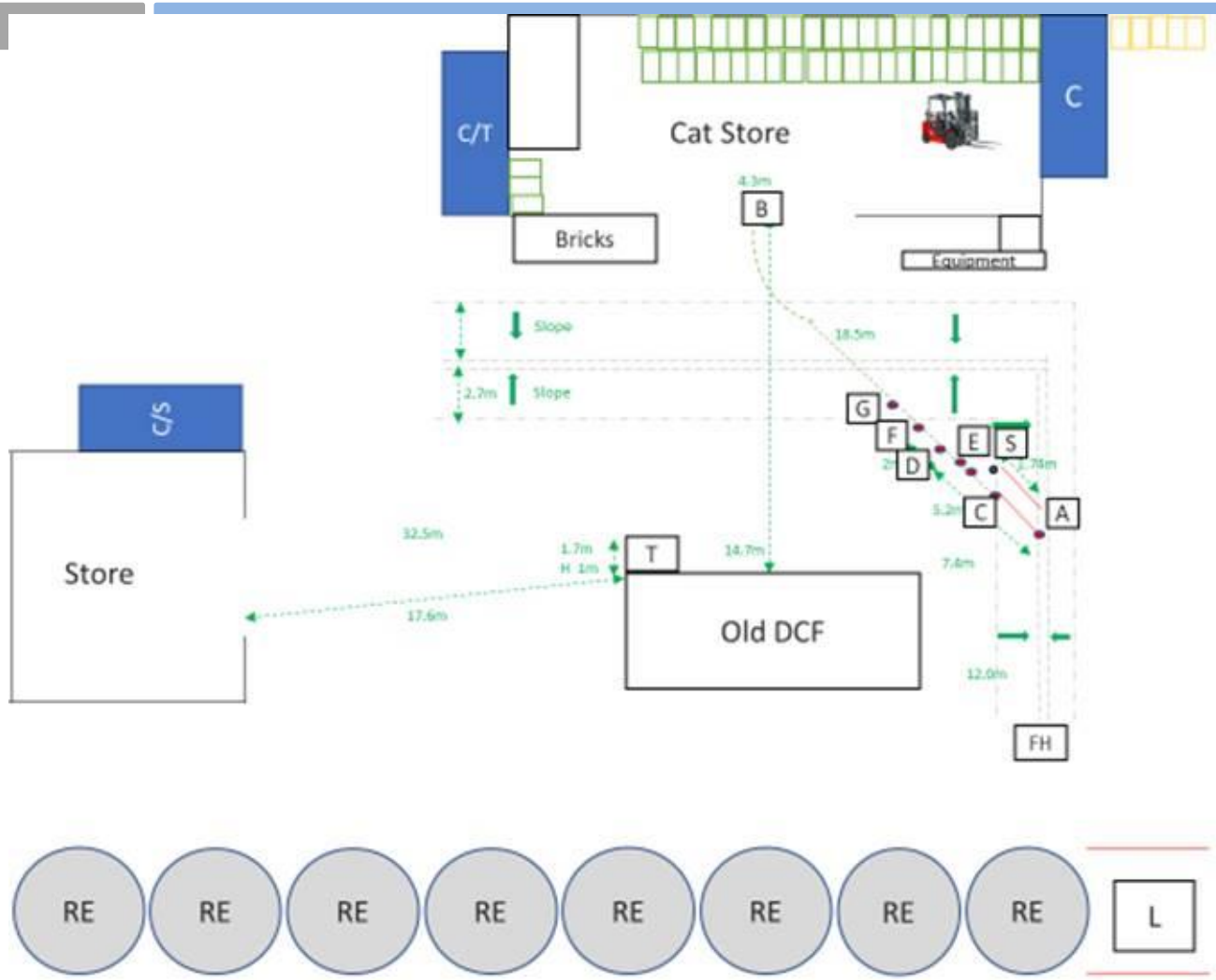

A – B = 20.24m (total distance from exit).
A – C = 1.74m (brake skid marks).
A – D = 4.2m (driver saw hat rolling)
D – C = 2.46m Point from rolling hat to break mark.
D – E = 2.32m Distance of reaction time.
A – F = 5.76m Eye witness saw injured rolling.
A – G = 7.1m Point of impact
F – G = 1.34m Point of impact to rolling

A= End of skid marks
B= Forklift leaving Cat store
C= Starting point of skid marks
D= Eye witness saw injured rolling
E= Driver saw hard hat rolling
F = Place where injured fell
G = Point of impact

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SASOL - Learning to be applied from SHE incident investigation

SHE INCIDENT LEARNING

1. Human-machine interface

- As far as reasonably practical, pedestrians should be separated from forklift operations.
- The wearing of hearing protection by pedestrians in an area where it is not required, increases the risk of not hearing vehicles/specialised mobile equipment and respond accordingly.
- Pedestrians should always stay alert when moving in areas where forklifts operate.
- Ensure proper route planning is done for forklifts.
- It is a good practice to ensure that only competent people have access to forklift keys.

2. Verification of competencies:

- Ensure that persons are trained and declared competent for the work that they are employed for.
- Confirm that training providers are accredited.
- Verify certificates for correctness and alignment with qualification / competentencies requirements.

3. Tolerance of deviations against standards by team members

- Report deviations from safety standards to front-line supervisors and managers and these deviation to be address.
- Tolerance of deviation against standards by team members can create a culture of acceptance.
- Correct at-risk behaviours through peer-to-peer behaviour based safety observations.

4. Risk assessments

- All tasks should be broken down into task steps to ensure all risks associated with each step is assessed and effective controls are implemented. Be mindful not to group task steps as a step might be missed, hence key hazards will be missed and not addressed.
- Ensure proper communication on the task risk assessments to all team members and test for understanding.
- Ensure that persons who perform the task are consulted and included when changes are made to the task risk assessment.
- It is a good practice that task observations are conducted on task risk assessments where changes have been made.

SASOL - Learning to be applied from SHE incident investigation

SHE INCIDENT LEARNING

5. Change management

- When changes are introduced, ensure proper understanding by all those affected by the change.
- Ensure resources that are required to effectively implement the change are provided.
- Roles and responsibilities associated to the change should be clear and precise.
- When the change that was implemented is difficult for the team to execute, it is the responsibility of the team to give feedback to management on constrains.
- A reporting culture should be encouraged, where the team feels comfortable to report concerns to management.
- Management should verify the effectiveness of the change implemented.

6. Supervision

- Foreman/supervisors should understand their roles and responsibilities to enforce requirements / rules as specified in the task risk assessment, procedures, etc.
- Foreman/supervisors have the responsibility to correct at-risk behaviours.
- Foreman/supervisors to ensure that all team members under their control are fully conversant with the requirements to safely execute the work.

SASOL - Long term corrective and preventative actions

	NUMBER	ACTION
CORRECTIVE/ PREVENTATIVE ACTIONS	Root cause 1 and root cause 5 action 1	Behavioural management to be investigated (the foreman not enforcing task risk assessment requirements and forklift operator not adhering to the procedures)
	Root cause 2and contributing factor 2 action 1	Review the service provider management of change procedure
	Root cause 2 action 2	Investigate the fitment of a flag for forklift
	Root cause 2 action 3	Discussion and roll out on the implementation of the flags if applicable to rest of the units
	Root cause 2 action 4	Flag to be ordered for immediate implementation – for service provider usage in Refining east
	Root cause 2 action 5	Support structure (incl. Safety officer support) for service provider maintenance teams to be revised/ investigated.
	Root cause 3 action 1	Review the assurance inspection process and reporting of minor deviations and trending pre-cursors and 2nd level of assurance inspection - update the assurance inspection booklets to include the requirements of the forklift.

SASOL - Long term corrective and preventative actions

	NUMBER	ACTION
CORRECTIVE/ PREVENTATIVE ACTIONS	Root cause 3 action 2	Develop guidance on first level of assurance Risk based process (human-machine interface) (Bow tie process to be used to confirm control implementation and control execution, including a service provider task) and Sasol management to conduct verifications on controls (Adverse situational and environmental controls to be included)
	Root cause 3 action 3	Revise SGI-SHE-000011 task risk assessment work instruction to include senior manager observations
	Root cause 4 Action 1	Service provider foreman/supervisor roles and responsibilities re-training to be done, incorporating enforcement of correcting behaviour – (immediate actions and long term plan)
	Root cause 4 Action 2	Service provider to investigate a business process and implement - all mobile/driven equipment operator's license validity to be verified by the service provider company
	Root cause 4 Action 2	All mobile/driven equipment operator's license validity to be verified - the validity of licenses of persons already on site must be verified immediately

SASOL - Long term corrective and preventative actions

	NUMBER	ACTION
CORRECTIVE/ PREVENTATIVE ACTIONS	Root cause 4 Action 2	Investigate a business process and implement - all mobile/driven equipment operator's license validity to be verified by the resource hub or service provider company
	Root cause 4 Action 2	All mobile/driven equipment operator's license validity to be verified - the validity of licenses of persons already on site must be verified immediately
	Root cause 6 Action 1	The pre-task risk assessment scope owner/Sasol official roles and responsibilities to be investigated Ensure pre-task risk assessment of the service providers include the verification of the situational risks by the Sasol official (Aligned with SAS-1253 Pre task risk assessment) Continuation for Sasol official/scope owner to be added in the SAS-1253.
	Contributing factor 1 Action 1	Lessons learned to be developed (main lessons learned). This must be inclusive of the wearing of hearing protection outside normal plant areas that may introduce additional risk, person to be more cautious
	Contributing factor 2 action 1	Service provider behaviour/cultural intervention to be done with team members
	Contributing factor 3 action 1	Service provider to investigate and implement the behaviour based safety system to include peer to peer observations and not only supervisor and higher

SASOL - Long term corrective and preventive actions

	NUMBER	ACTION
CORRECTIVE/ PREVENTATIVE ACTIONS	Contributing factor 3 action 2	Plan to be developed for safety culture intervention with service provider human failure causation module (HFCM) and 5 components of safety culture modules.
	Contributing factor 4 action 1	Review task risk assessment and method statement on the use of the forklift, also include: limitation of mobile equipment and pedestrians (human-machine interface), where barricading needs to be done and specific scenarios to give guidance on the use of flagman and training and include area specific risks
	Contributing factor 4 action 2	Review the task risk assessments for forklift operations
	Non causal 1a Action 1	Review blank lists to ensure all information is pre-typed
	Non causal 1b and c action 1	Review exemptions and include vehicles. Implement the use of Appendix F and SAS 643 task authorisation document, as indicated in SGR-SHE-00004 permit to work procedure
	Non causal 1d action 1	Communicate and alert the task executors to sign on the permit

SASOL - Long term corrective and preventative actions

	NUMBER	ACTION
CORRECTIVE/ PREVENTATIVE ACTIONS	Non causal 1e action 1	All catalyst bag frames to be load tested and load test certificates to be available
	Non causal 2a action 1	Supply chain SHE assessment verification criteria and auditor competence to be reviewed
	Non causal 2a action 2	Re-assessment to be done on the service provider SHE assessment verification SO operations personnel to be included in this re-assessment
	Non causal 2b action 1	Review the SGI-SHE-000029 procedure to include the requirements of a flag. Incorporate a flag check in the SAS-1299 - forklift checklist, safe operating speed and barricading requirements Pre-use checklist
	Non causal 2b action 2	Baseline task risk assessment for the use of a forklift to be developed
	Non causal 3 action 1	Pre-task risk assessment works instruction re-training to be done for the Sasol officials/scope owners.
	Non causal 4 action 1	Review service provider risk management procedure. Develop a process/plan to govern the task observation process. Frequency and schedule to be available (not to be conducted by SHE personnel/line management to conduct)

SASOL - Long term corrective and preventative actions

	NUMBER	ACTION
CORRECTIVE/ PREVENTATIVE ACTIONS	Additional action 1	Investigate the possibility of using smaller catalyst bags to prevent obstructing the view of the forklift operator
	Additional action 2	Investigate the key control to be included in a procedure
	Additional action 3	Investigate if the SGI-SHE-000091 procedure training is including in the Generic SHE training matrix (Manager to foreman level)

SASOL – ACTIONS (Procedure update)

Work instruction: SHE requirement for artisan lifting practices, lifting machine / equipment and tackle

SGI-SHE-000029

Revision: 09

SAX-10029304

Purpose

To prescribe the SHE requirements for artisan rigging and lifting practices, lifting machines, equipment and tackle.

SASOL – FORKLIFT ACTIONS

5.8 SHE requirements for lift trucks: Forklifts

5.8.1 Human-machine interface mandatory provisions during forklift operations:

a) Always ensure that mobile equipment drivers' sight is not obstructed. If obstructed, additional controls such as reverse driving, a flagman or guide person and barricading to be used.

- **i.** A flagman shall also guide the forklift operator when the forklift is operated in restricted spaces.
- **ii.** The flagman must always be visible to the driver and the flagman must have line of sight of any pedestrians or obstructions.
- **iii.** When a flagman cannot be used the area or route should be barricaded to prevent pedestrians from entering the area where the forklift is being operated.

b) Visual and audible devices must be fitted on forklifts. A reverse alarm shall sound when the forklift travels in reverse. These devices should be inspected prior to use and maintained accordingly.

c) As far as reasonably practical, pedestrians should be separated from forklift operations.

d) The wearing of hearing protection by pedestrians in an area where it is not required, increases the risk of not hearing vehicles/specialised mobile equipment and respond accordingly.

e) Pedestrians should always stay alert when moving in areas where forklifts operate.

f) Ensure proper route planning is done for forklifts.

5.8.2 The forklift operator shall adjust the speed in accordance with the speed limits and the load being carried to ensure a safe travelling speed at all times.

SASOL

END