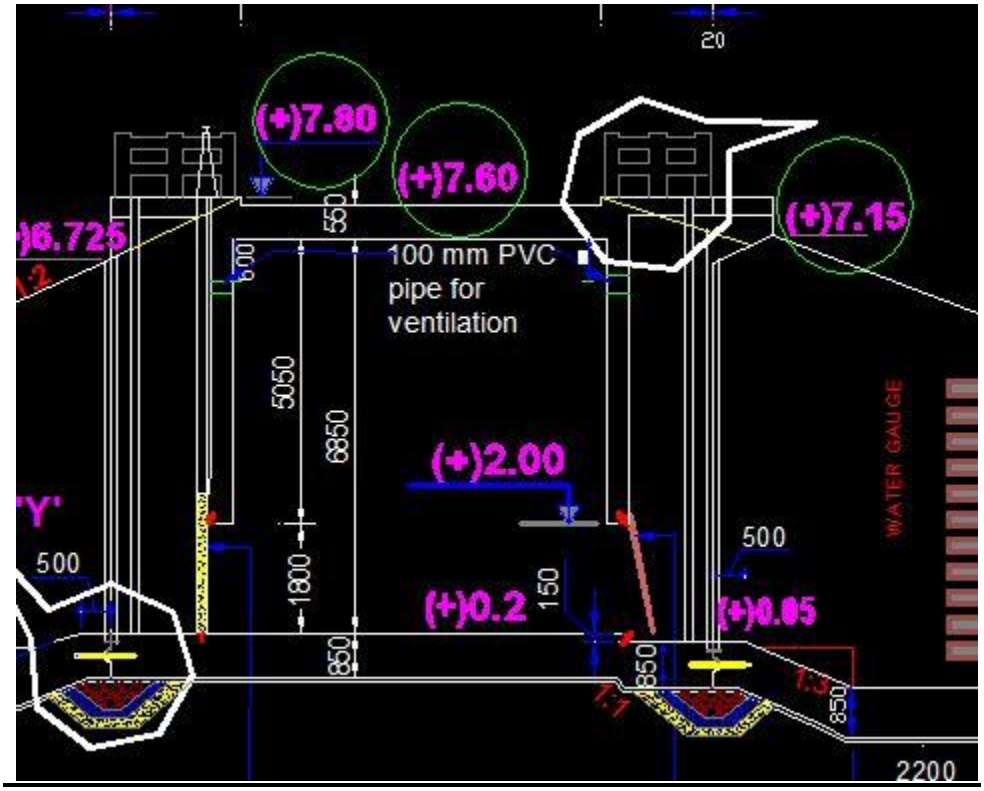
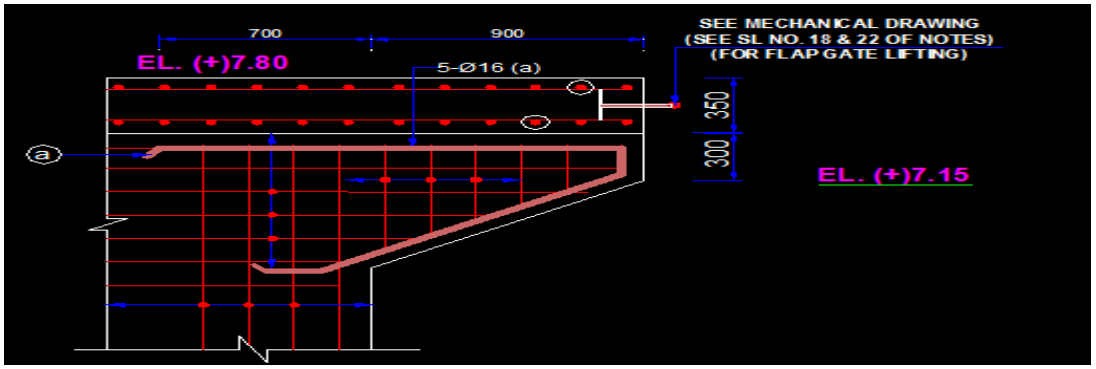
Explanation of different Levels:



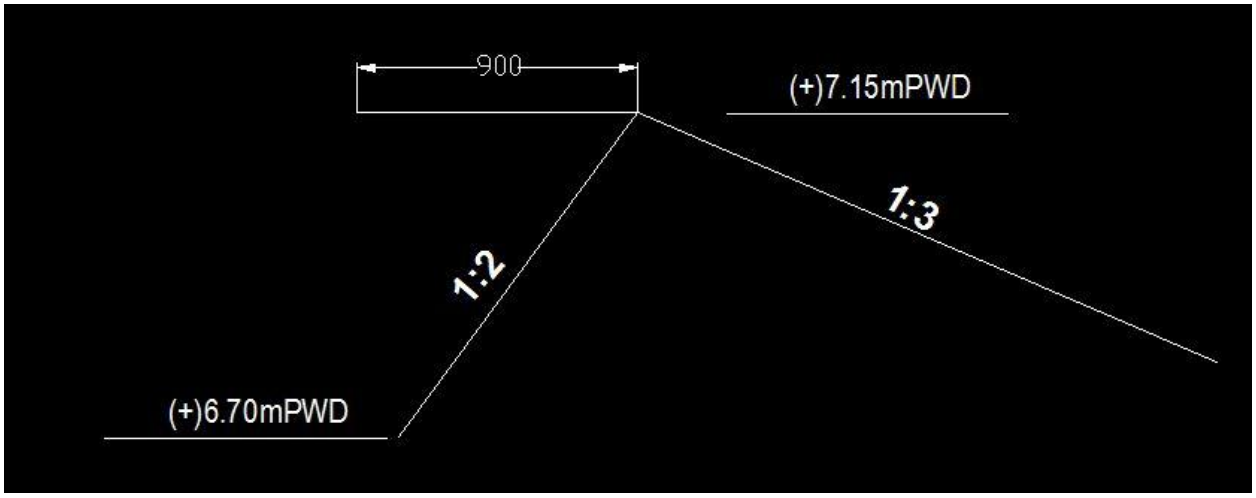
(+)7.80m PWD is the top level of head wall. (+)7.60m PWD is the top of embankment/crest level. 0.2m higher is provided for traffic convenience.(+)7.15 is obtained from the below calculations.

7.8-0.35m(walkway for observation and pulling of flapgate)-0.30m(supporting beam for walkway).

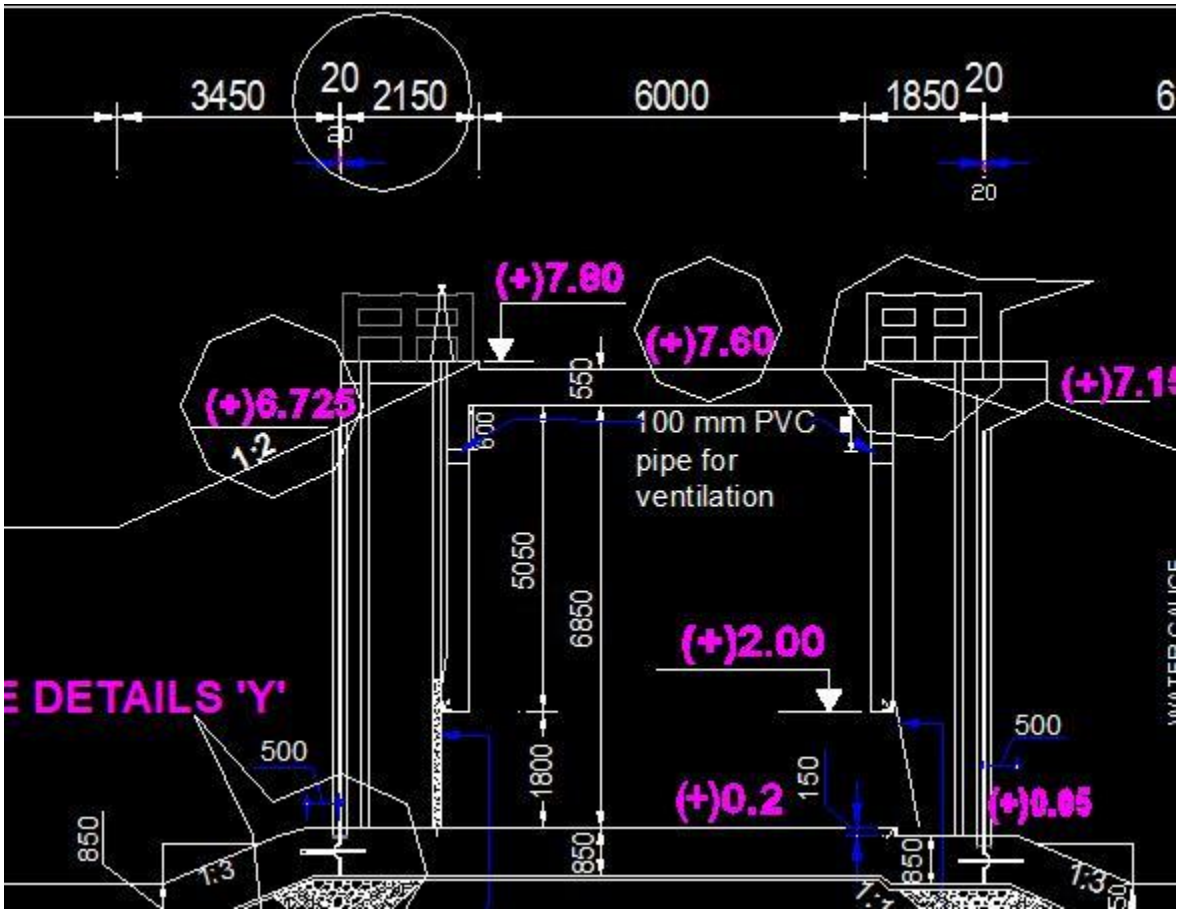
7.80-0.35-0.3=7.15



From (+)7.15m PWD R/S wing wall is dropped to both side by following picture.



The both sides are dropped for making a watertight condition.

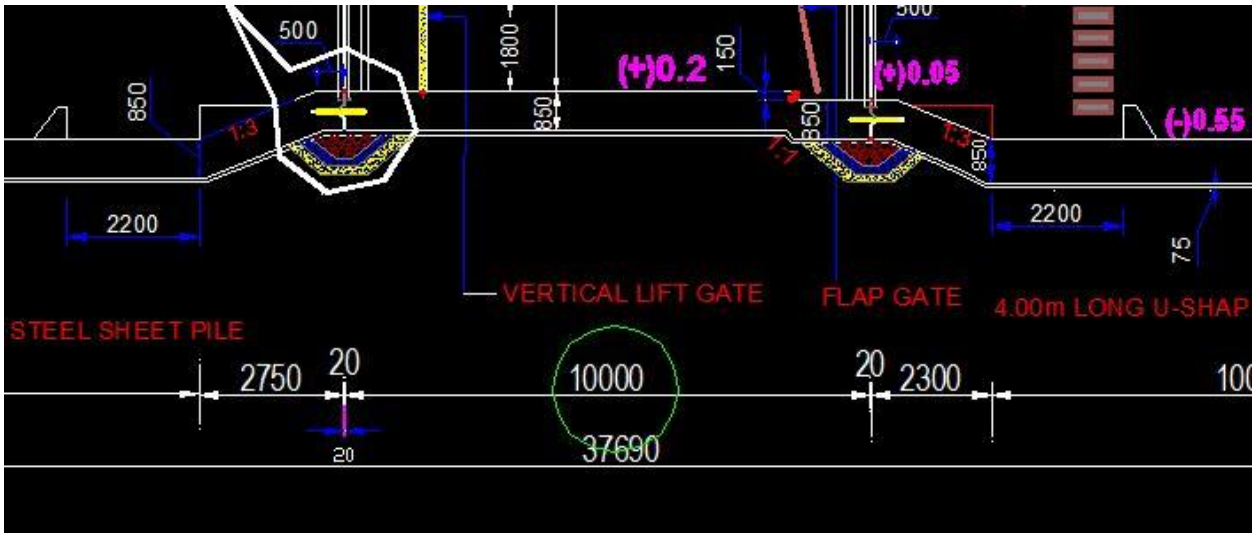


(+)6.725mPWD is obtained from the following calculations:

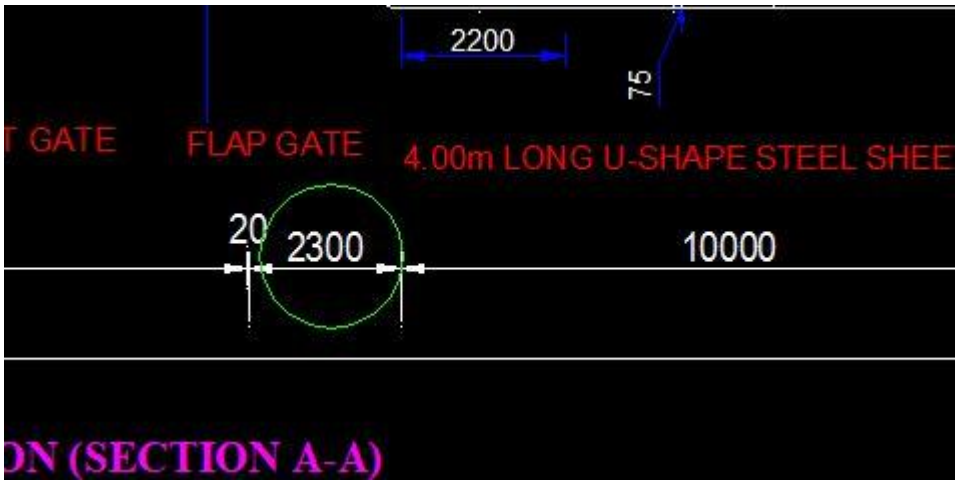
7.8-(2.15/2)=6.725

The rest levels of this drawing is obtained from slope calculaions (1:2 at country side and 1:3 at river side).

Explanation of different Dimensions:

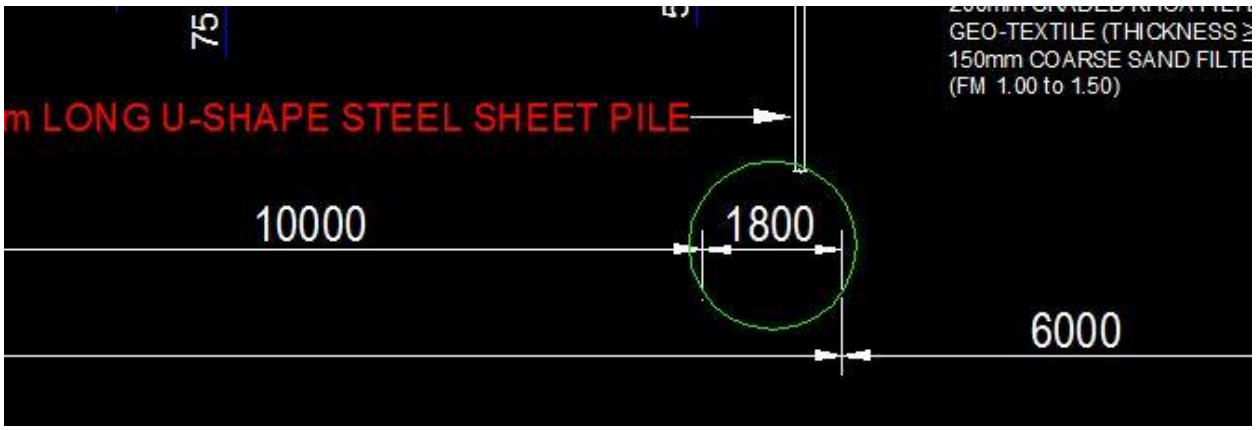


10m is barrel and extended part (6000 barrel and 2350+1850 for railing).



2300 is drop for glacie (1800) and for PVC stopper (500) (1800+500=2300).

10000 (10m) floor length.

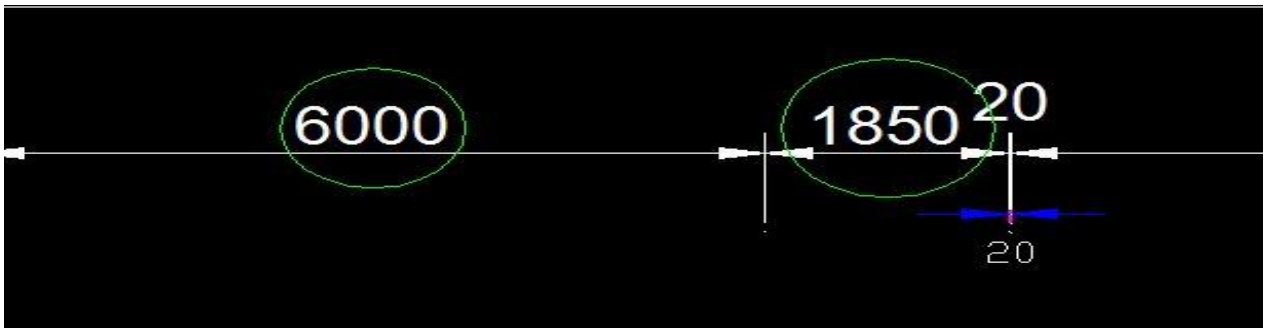


1800 for return wall.

From lower dimension upper dimension would be calculated and it will be

=10000+2300=123000

Upper dimensions are :



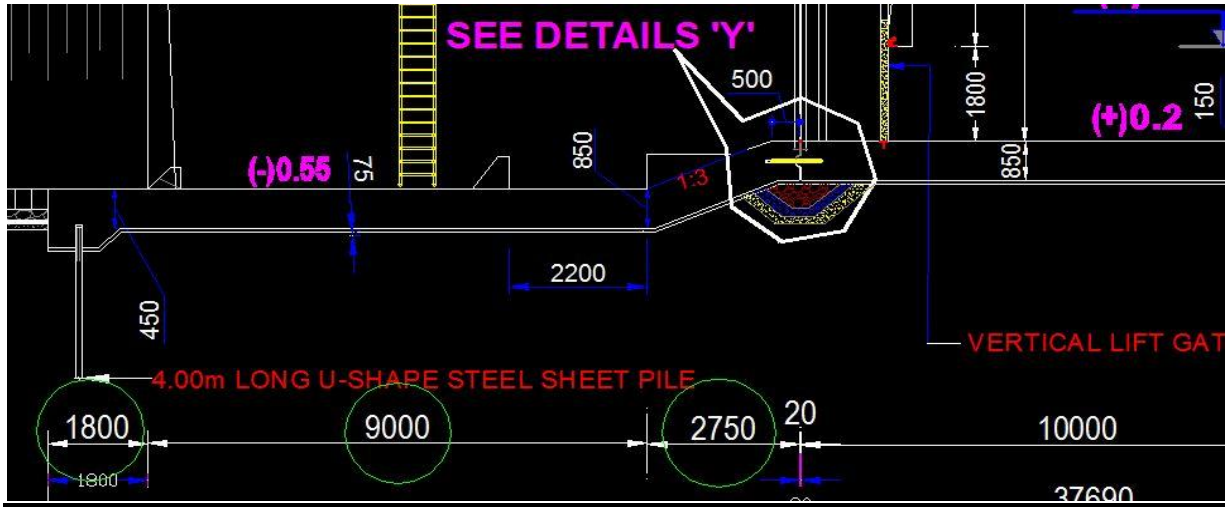
6000mm barrel length. Depends on embankment width.

Difference between wing wall level=7.15-5=2.15

So horizontal length 6550 is obtained from this values=2.15*3=6.55=6550mm

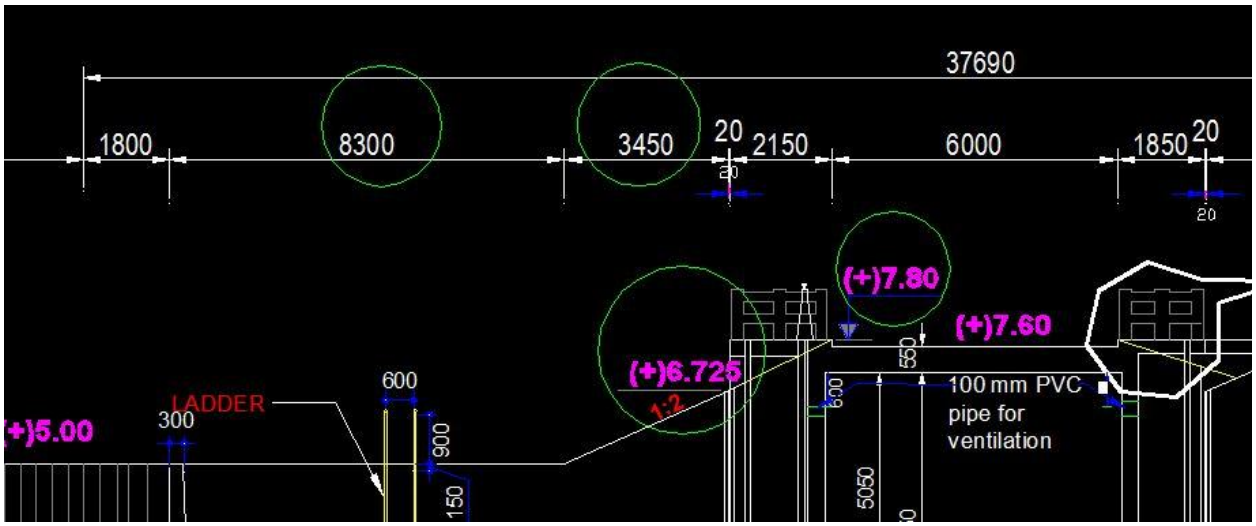
Rest 5750 is obtained from=12300-6550

C/S Portion:



9000mm is floor length provided. 2750 drop of glacie(1:3, (0.2+0.55)*3=2.75m).

Total 11750mm. From this dimension upper dimension will be obtained



top of head wall=7.80m PWD. 2150mm for railing. now, 7.80-(2.15/2)=6.725mm

Now, 6.725-5=1.725m (vertical length). So horizontal length=1.725*2(1:2 slope)

=3.45m=3450mm.

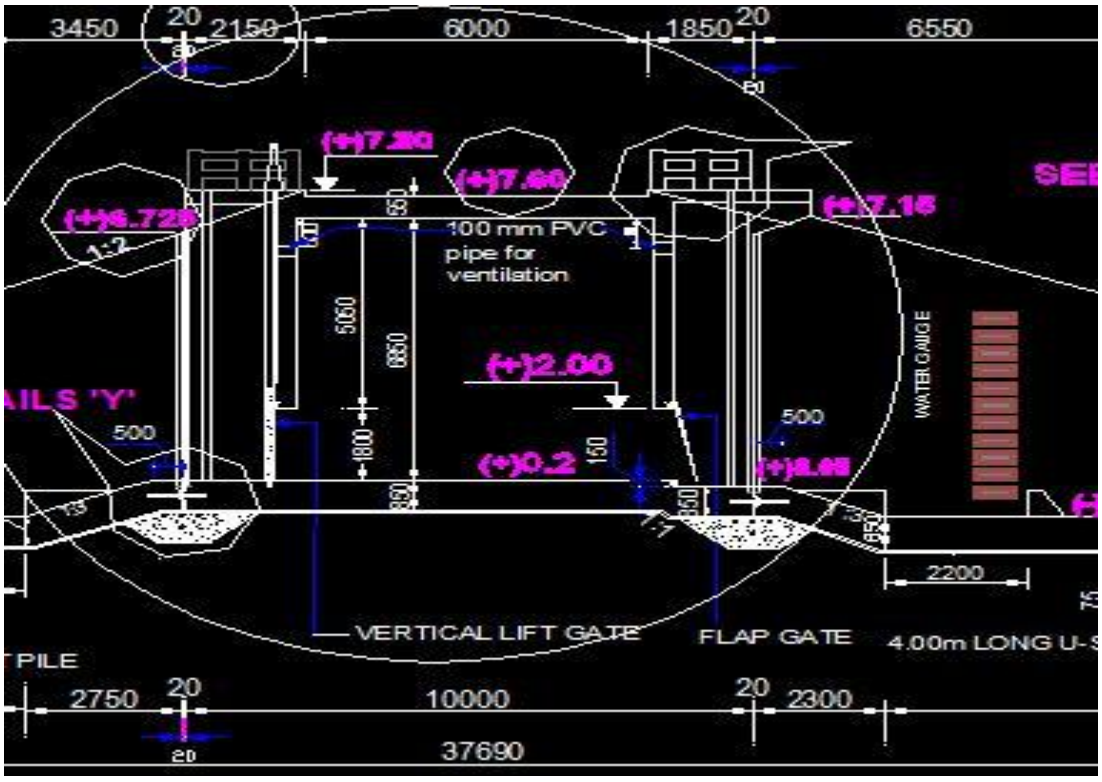
Now, 11750-3450=8300

(so all dimensions and levels are explained here).

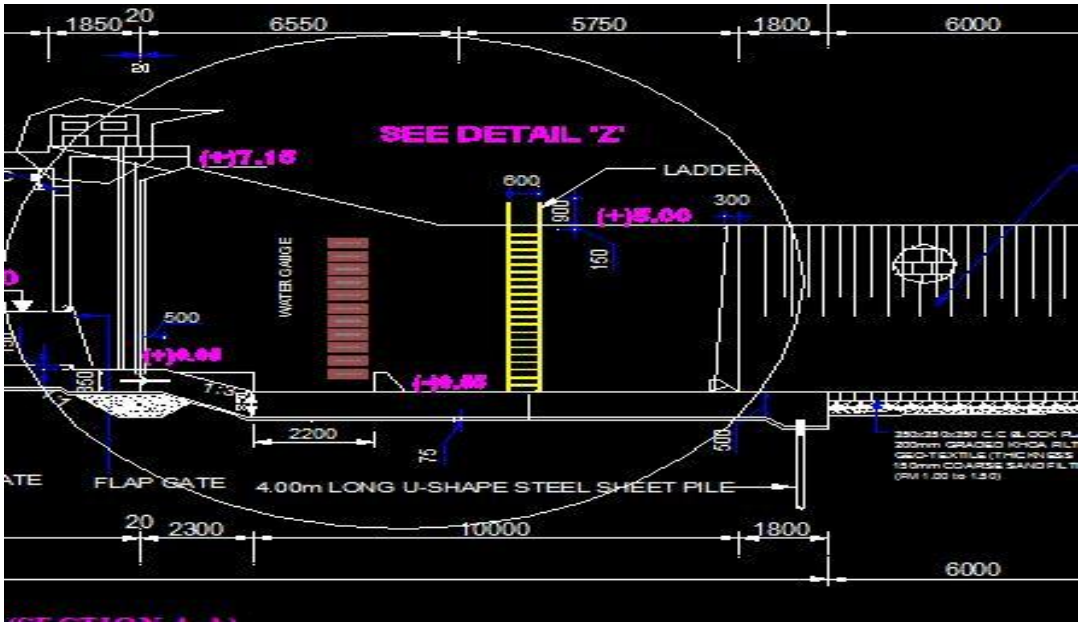
Structural Design

There are different parts in this design portion:

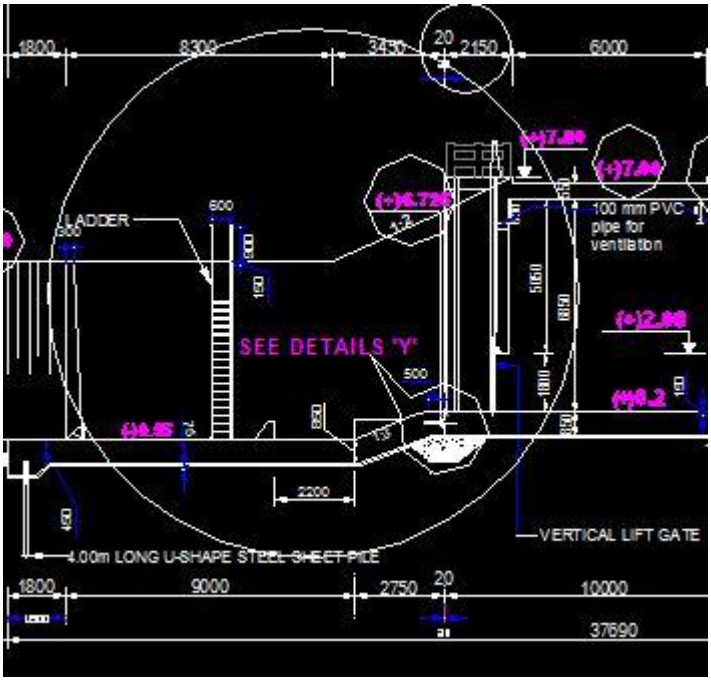
1. Barrel Portion



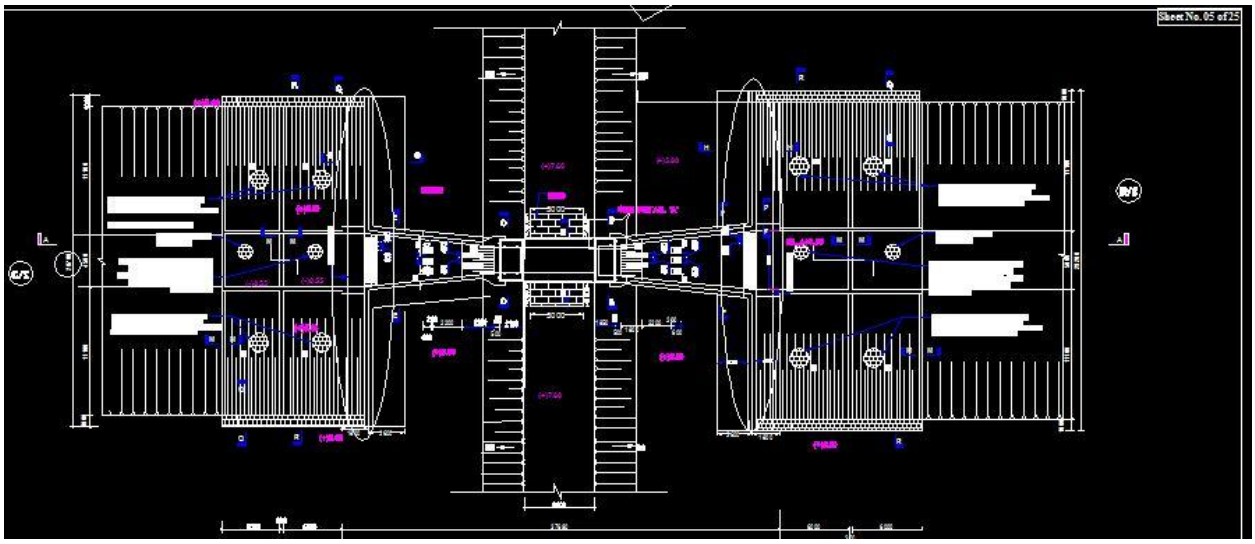
2. Wing wall (R/S)



3.Wing wall (C/S):



Return Wall:



Necessary Elements for calculations:

To find the steel for protecting flexural moment the following elements are very necessary.

M=Rbd^2

M=Asfsjd

R=(1/2)fckj, fc=0.45f'c=0.45*2900(20N/mm^2)=1305 psi

fy=400N/mm^2=58000psi

fs=0.4fy=0.4*58000=23200

n=Es/Ec, r=fs/fc=23200/1305=17.78

n=9

k=n/(n+r)=(9)/(9+17.78)=0.336

j=1-k/3=1-(0.336/3)=0.888

R=1/2*1305*0.336*.888=194

fsj=23200*0.888=20602

Design of return wall