



Pan5

C07

R240



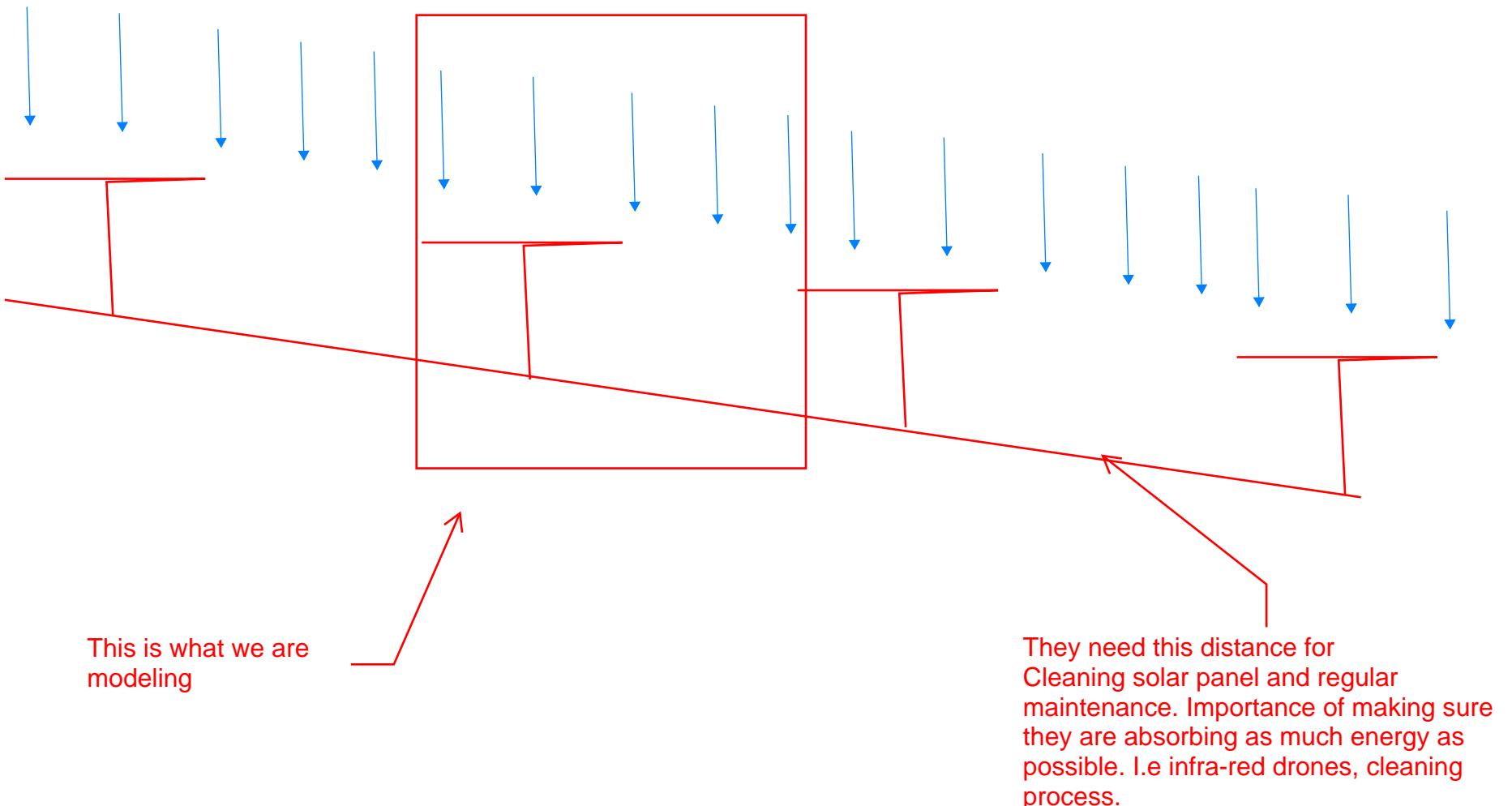
Pan5  
C07  
R139





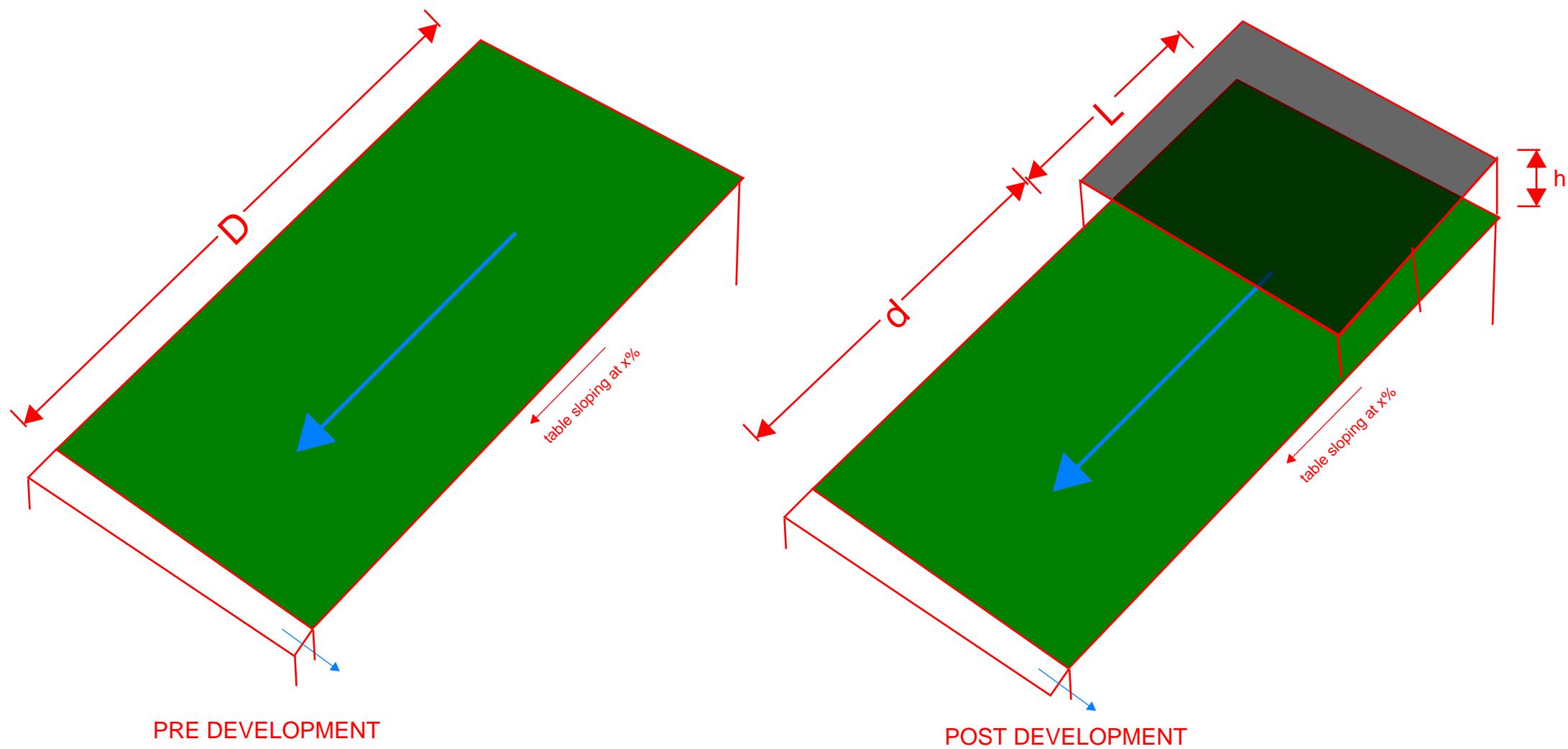
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## MODEL

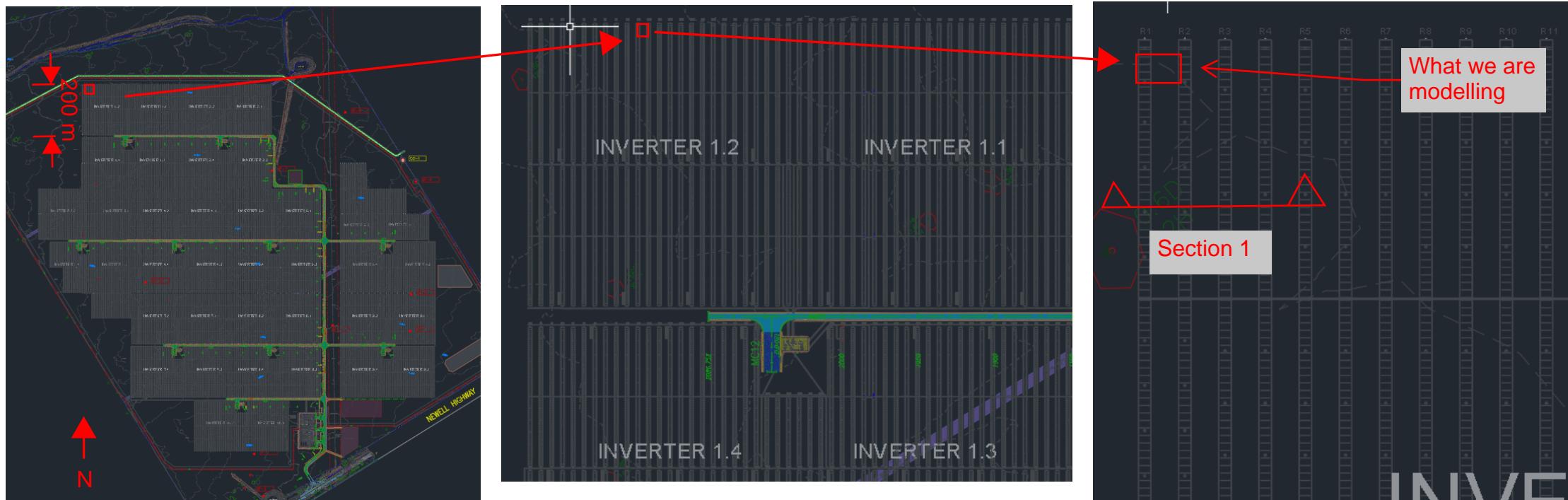


Section 1

## SETUP



We are trying to model a portion of the run off between each row of panels, which in a real life situation will accumulate along the site. The length can be up to 200 m long and run North to South. See zoom in of Wagga North Solar Farm.



## DIMENSIONS

For three of our sites, examples of:

- Panel Lengths
- Distance between Piles
- Total Length
- Pile heights.

They vary with the location and type. Usually we have small and tall piles, and central piles (where the inverter supply runs) which depend on location such as whether they are interior and exterior along the row.



### Wagga North

panel length	L	2.182 m
distance between panels	d	5 m
Total length	D	7.182 m
pile height	$h_{\min}$	1.07 m
	$h_{\max}$	1.44 m

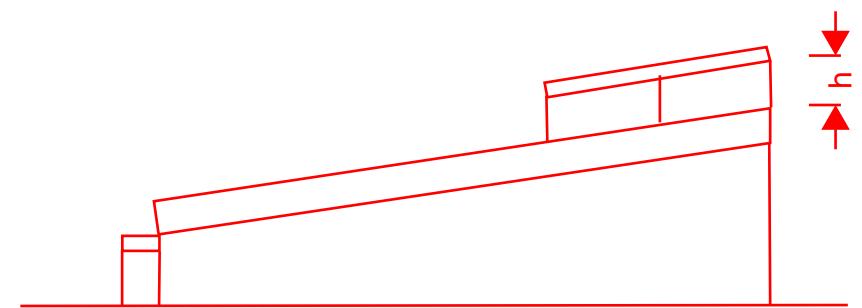
### West Wyalong

panel length	L	2.285 m
distance between panels	d	4.715 m
Total length	D	7 m
pile height	$h_{\min}$	1.37 m
	$h_{\max}$	1.52 m

### Wyalong

panel length	L	2.172 m
distance between panels	d	4.828 m
Total length	D	7 m
pile height	$h_{\min}$	1.15 m
	$h_{\max}$	1.35 m

You should use these dimensions to create the ratios and length for L,d,D and h.



## NOTES

Synthetic grass 2cm

Controlling the drying out of the grass is difficult.

Assumed it's wet and saturated, say keep it wet for 5mins before collecting the testing data. As if saturated catchment is at full capacity so there is no initial loss from the rainfall.

Remove the drainage layer, so no infiltration. (can use liquid nails to cement sheet/table)

(remember these are just suggestions, you can adopt or ignore as you please)

Not interested in exact intensity, as long as it roughly represents the minor events, like 1yr, 2 yr or 5 yr, so the measuring containers under the sprinkler are not necessary. Take the rating of the sprinkler head to get the intensity. What does the run-off hydrograph look like with and without the solar panel? Need to measure volume and time. Measuring every 5 or 10 sec by reading the scale

Once the table and sprinkler are set up, not to modify

Slope of 1 in 100 as a starting point adjust depending on ratios and variables. Solar Farms usually very flat with slopes mainly 1-4%

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What is the Rating of the Sprinkler head? (usually in L/hr)

What is the surface area of the plastic sheet, i.e. solar panel?

This will give you an intensity, compare to intensities of the different storm events to find out how many sprinkler heads will represent each storm.

How long will the experiment go for? How big does the final volume have to be?



Remember to ask what the goal of this experiment is and why we are doing it.

The overland flow time (time of concentration) can be estimated from Kinematic Wave equation (or similar) where flow over plane surfaces which are homogeneous in slope and roughness is given as:

$$T_c = \frac{6.94n'L^{0.6}}{i^{0.4}S^{0.3}}$$

$T_c$	Time of concentration (min)
$L$	Overland sheet flow path length (m)
$n'$	Surface Roughness (Retardance Coefficient)
$i$	Rainfall intensity (mm/hr)
$S$	Slope (m/m)

As much as Manning's Roughness is a dimensionless coefficient we are "scaling" the real world in our experiment so this is something that should be discussed by the students.

i.e. should the time of concentration be scaled? Does it matter? Is the field Manning's replicated in the experimental setup? Is the grass length scaled to field length?