SUPPORTING INFORMATION DOCUMENT FOR MANUSCRIPT ENVPOL_2017_2538

HOW TALL BUILDINGS AFFECT TURBULENT AIR FLOWS AND POLLUTION DISPERSION WITHIN A NEIGHBOURHOOD

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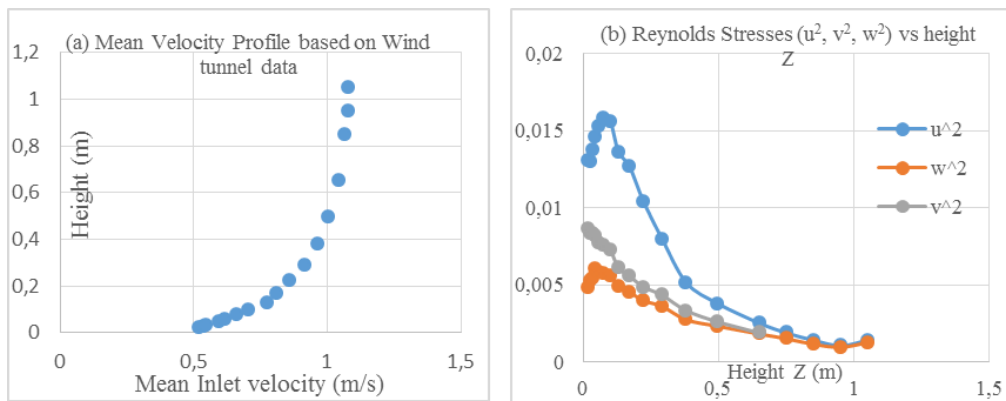
S1 The measured (wind tunnel) mean velocity profile as represented in the computational simulations; (b) the measured (wind tunnel) Reynolds stresses as represented in the computational simulations.
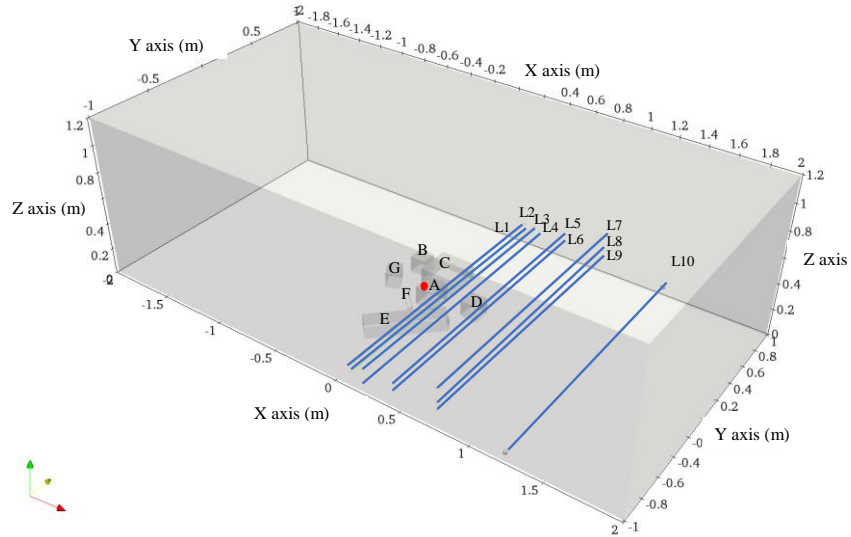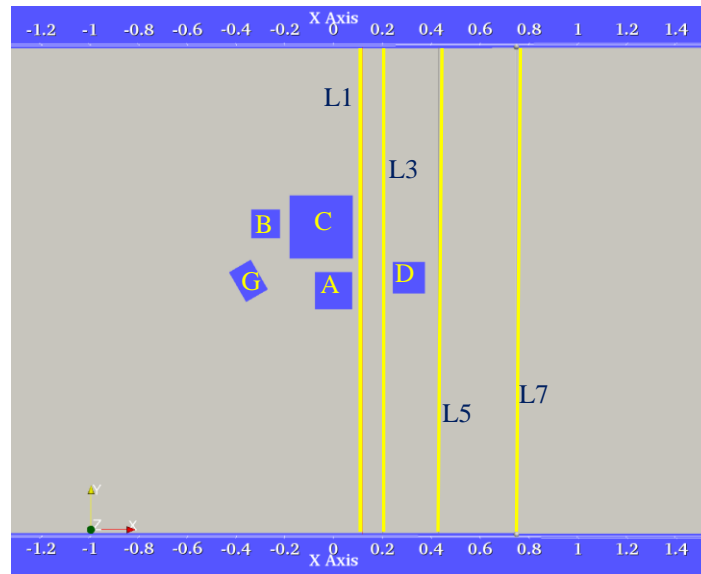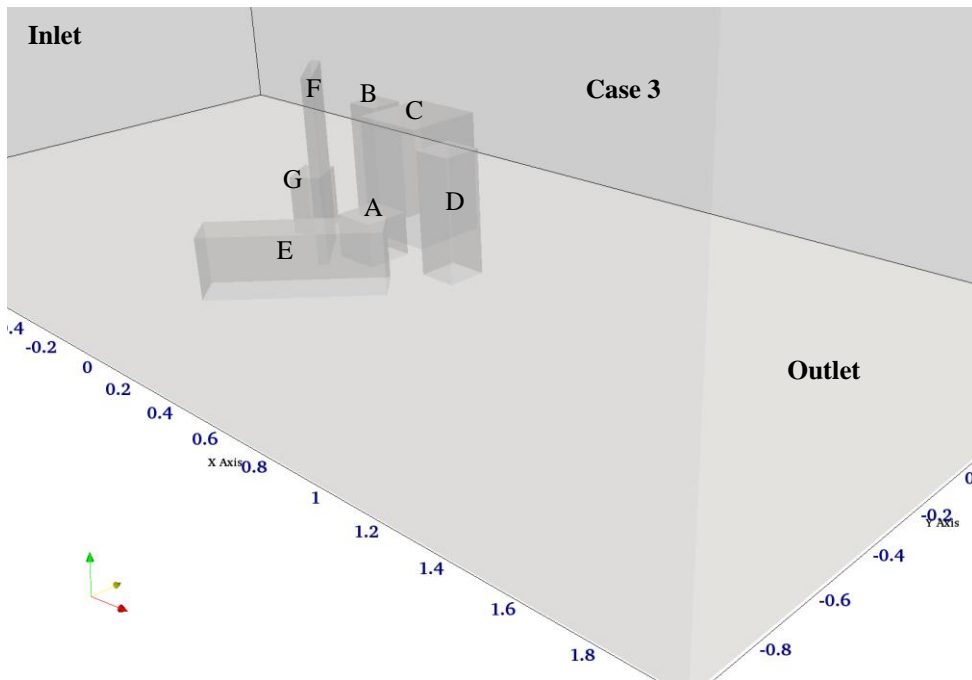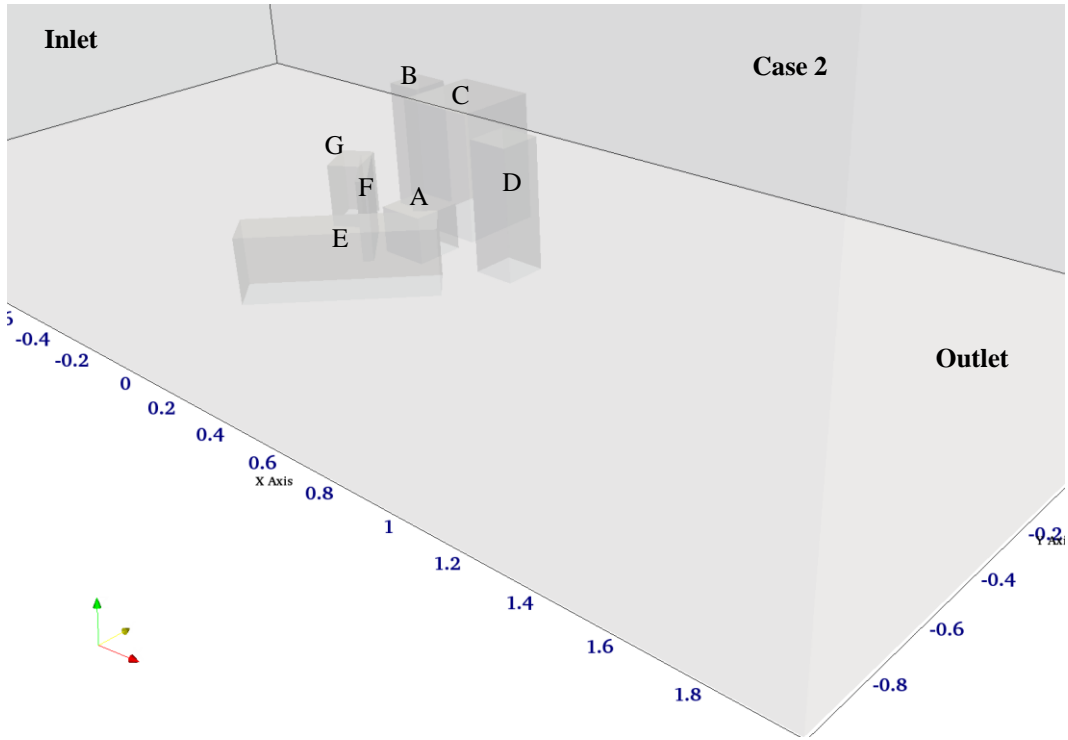
S2b Location of some of the *x-lines* (plan view) along which the detectors used for comparison between the LES results and wind tunnel measurements were placed. The $(x\text{-}z)$ coordinates for each line are: For L1 – (x=0.119m; z=0.176m); L3 – (x=0.203m; z=0.065m); L5 –(x=0.433m; z=0.12m); L7 – (x=0.751m; z=0.126m)   *Note: Unit of distance along all axes: metres.*
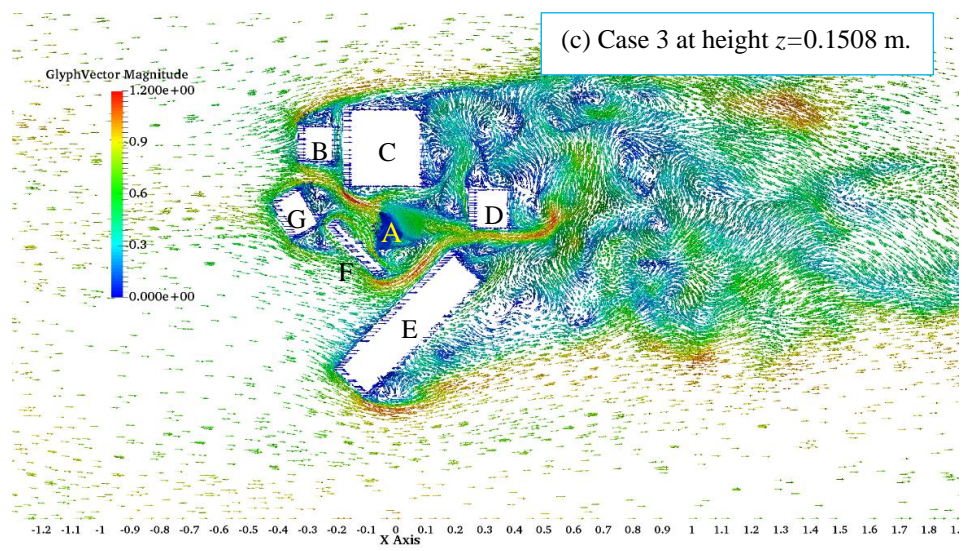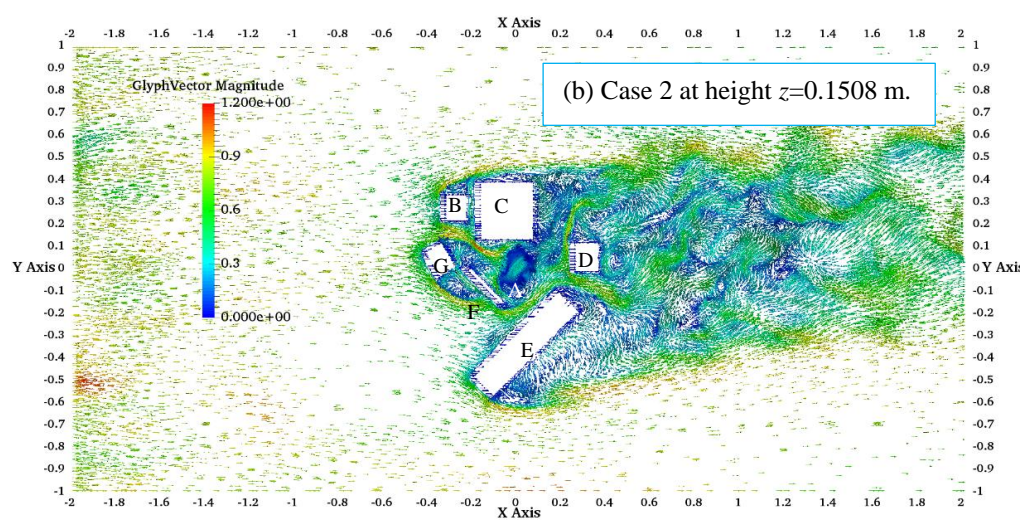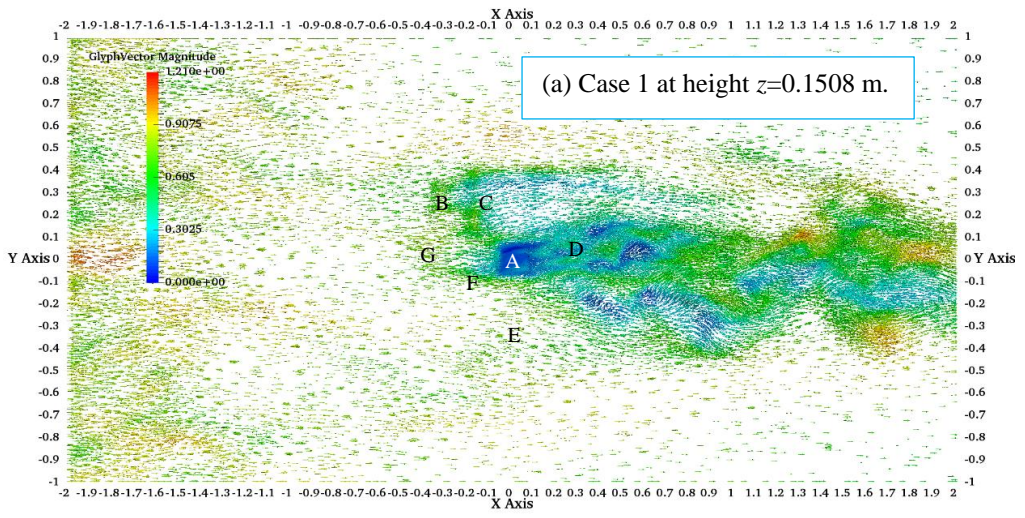
S3 Computational Domain for: (a) Case 2; and (b) Case 3.
Note: Unit of distance along all axes: metres.
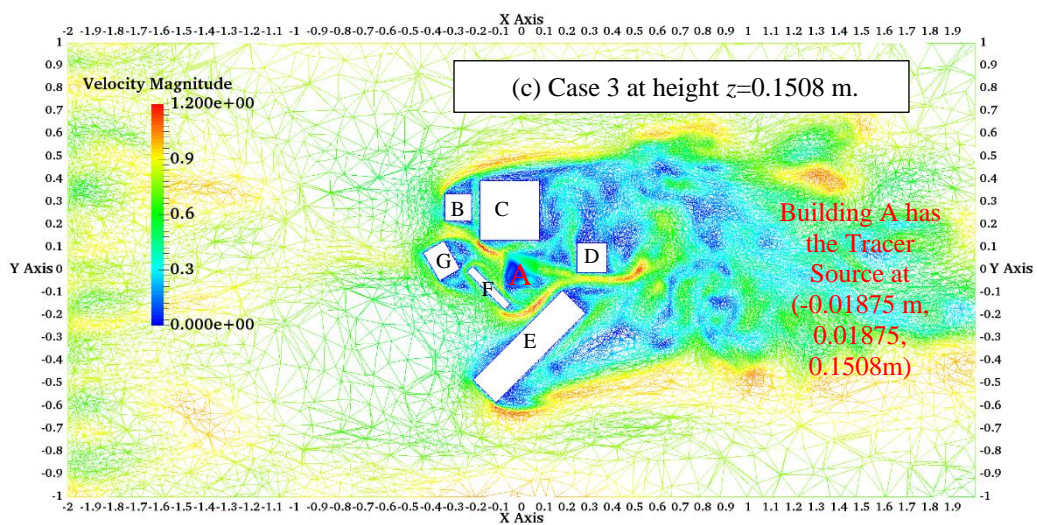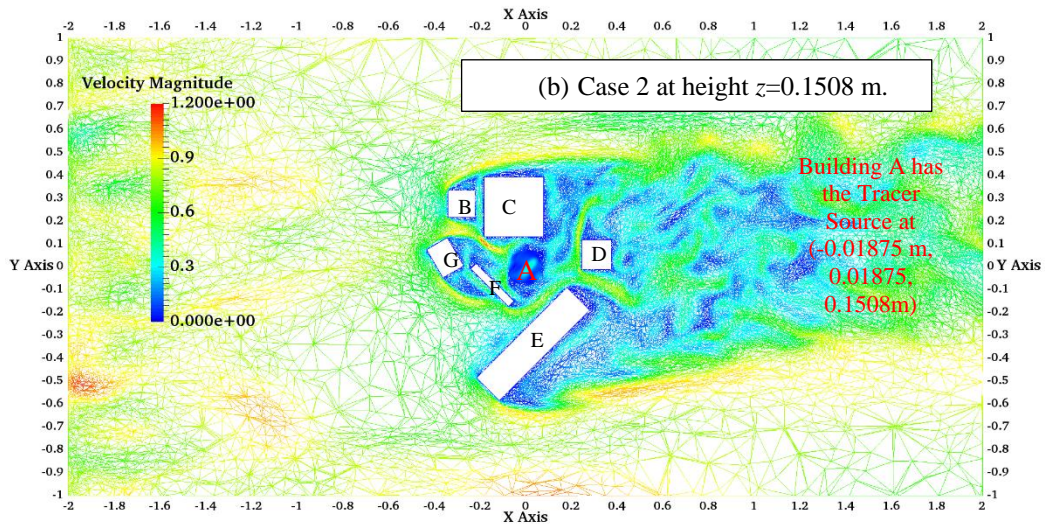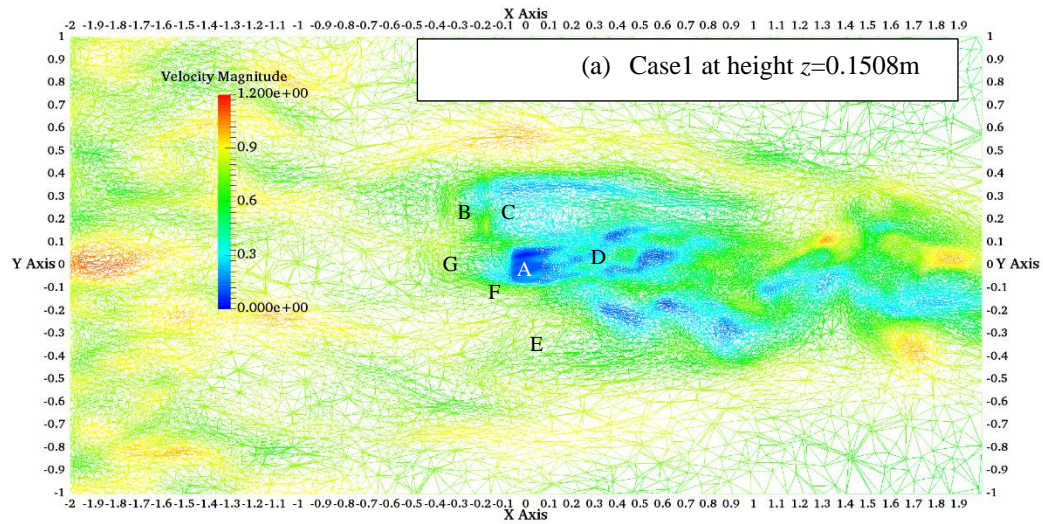
S4 Velocity Field in Wireframe presentation: Horizontal plane (X-Y) view at Z=0.1508 m of the turbulent velocity fields for the three cases: (a) Case 1; (b) Case 2; (c) Case 3.
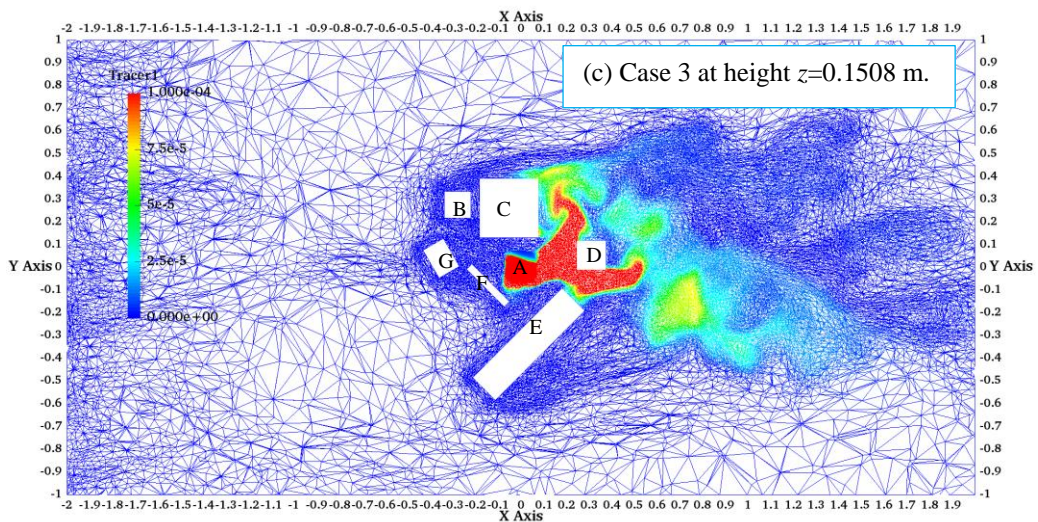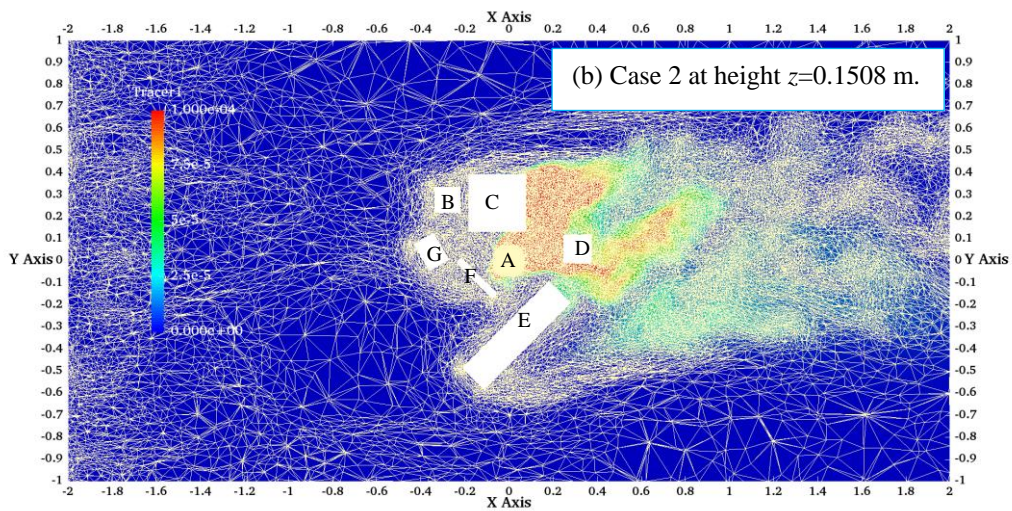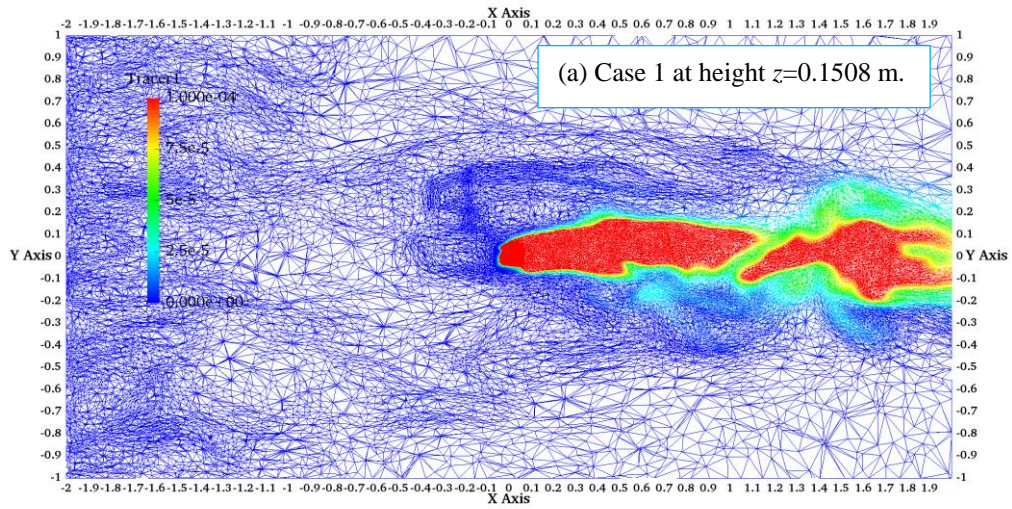*Note: Unit of distance along all axes: metres.*

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S5 Velocity fields in Vector presentation: Horizontal Plane (X-Y) view at Z=0.1508 m of the turbulent velocity fields for the three cases: (a) Case 1; (b) Case 2; (c) Case 3.

Note: Unit of distance along all axes: metres.

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(a) Case 1 at height z=0.1508 m.

(b) Case 2 at height z=0.1508 m.

(c) Case 3 at height z=0.1508 m.

S6 Tracer Concentrations in Wireframe presentation: Horizontal plane (X-Y) view at Z=0.1508 m of Tracer dispersion with the Adaptive meshes for the three cases:(a) Case 1; (b) Case 2; (c) Case 3.
Note: Unit of distance along all axes: metres.

Velocity Magnitude

0.000e+00   0.3   0.6   0.9   1.200e+00

G   F   A   D

-0.7 -0.65 -0.6 -0.55 -0.5 -0.45 -0.4 -0.35 -0.3 -0.25 -0.2 -0.15 -0.1 -0.05 0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95

X Axis

(b) Case 2 at *y*=0 m.

Velocity Magnitude

1.200e+00
0.9
0.6
0.3
0.000e+00

Z Axi

F

G   A   D

0.8 -0.75 -0.7 -0.65 -0.6 -0.55 -0.5 -0.45 -0.4 -0.35 -0.3 -0.25 -0.2 -0.15 -0.1 -0.05 0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95

X Axis

(c) Case 3 at *y*=0 m.

Velocity Magnitude

1.200e+00
0.9
0.6
0.3
0.000e+00

F

G   A   D

-0.8-0.75-0.7-0.65-0.6-0.55-0.5-0.45-0.4-0.35-0.3-0.25-0.2-0.15-0.1-0.05 0 0.05 0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95 1 1.05 1.1 1.15

X Axis

S7 Vertical plane (*x-z*) view through the centre of the domain (Y=0.0 m), showing the interesting Variations of the **Velocity fields** for the three cases: (a) Case 1; (b) Case 2; (c) Case 3.
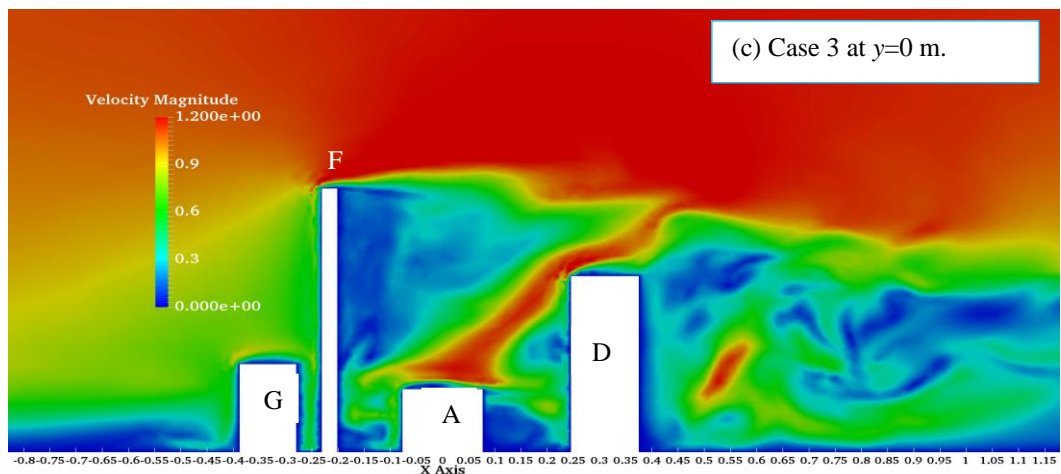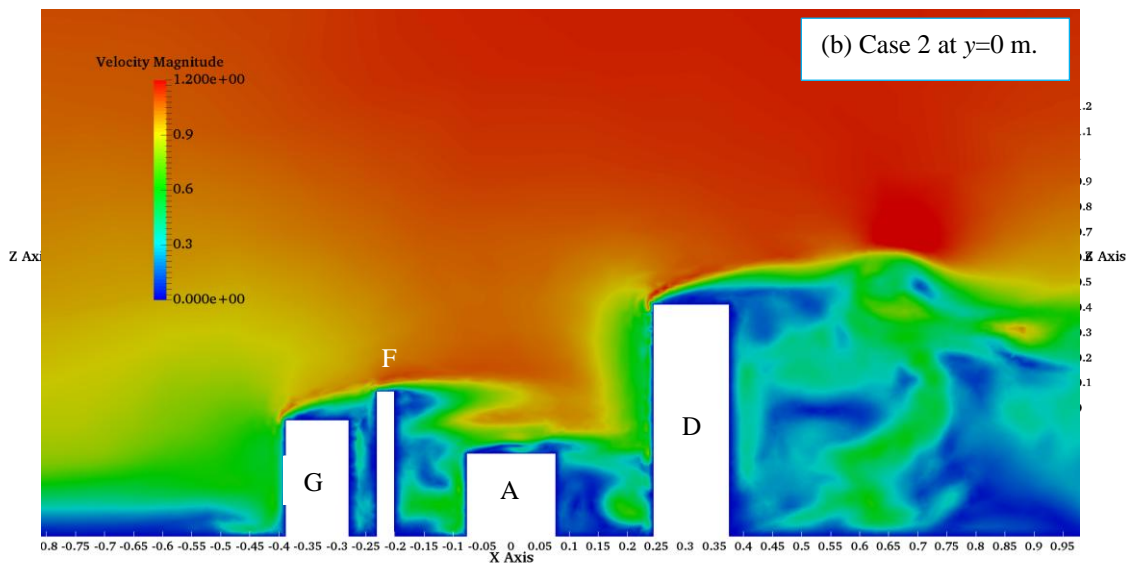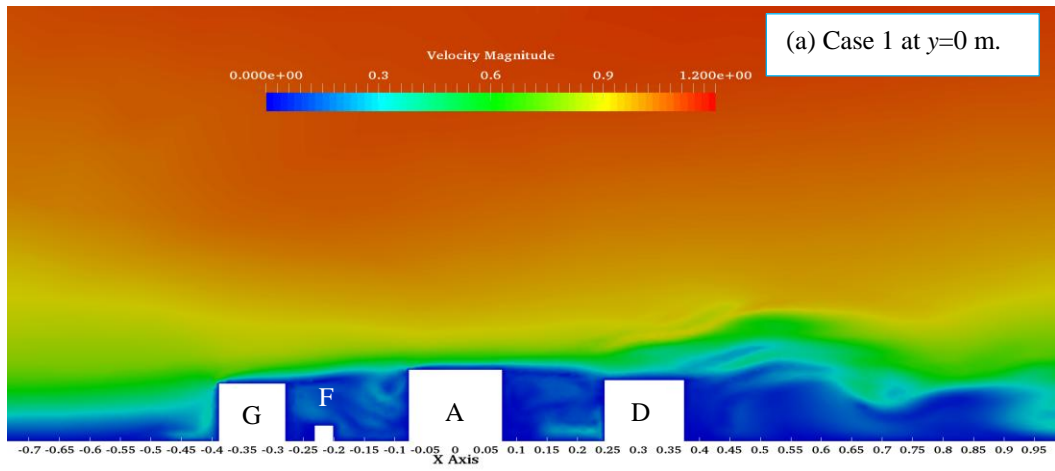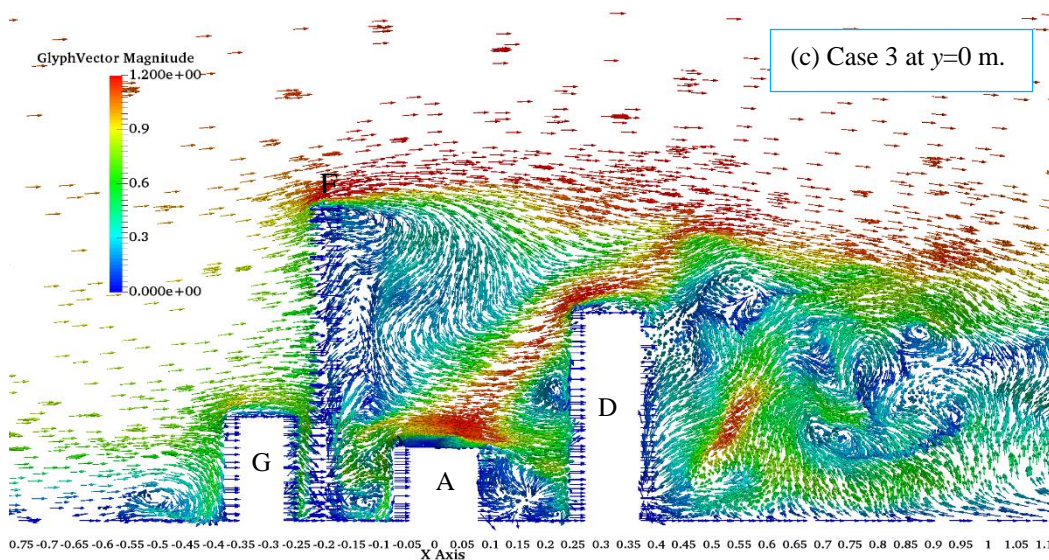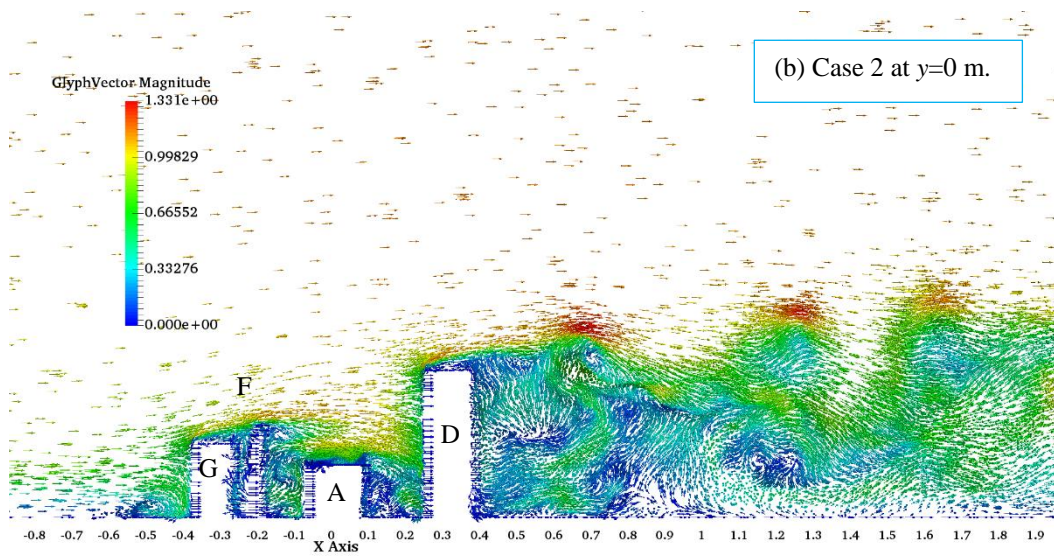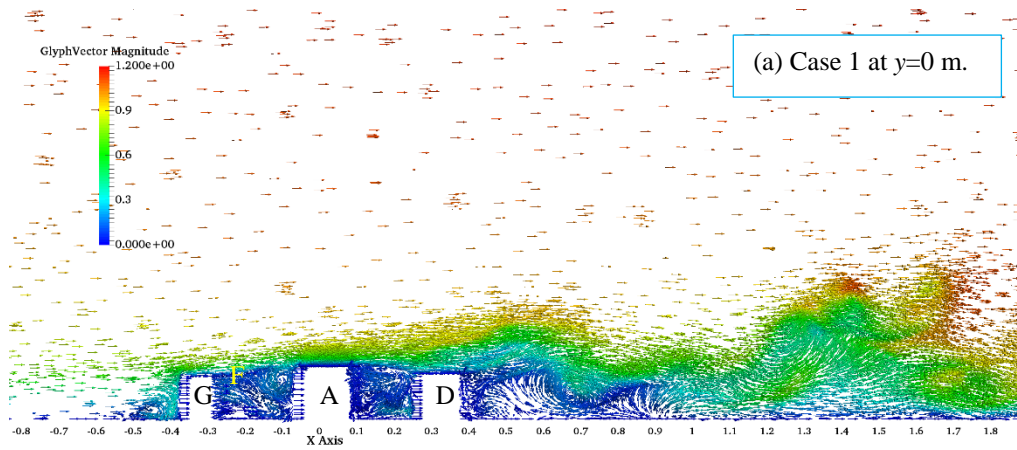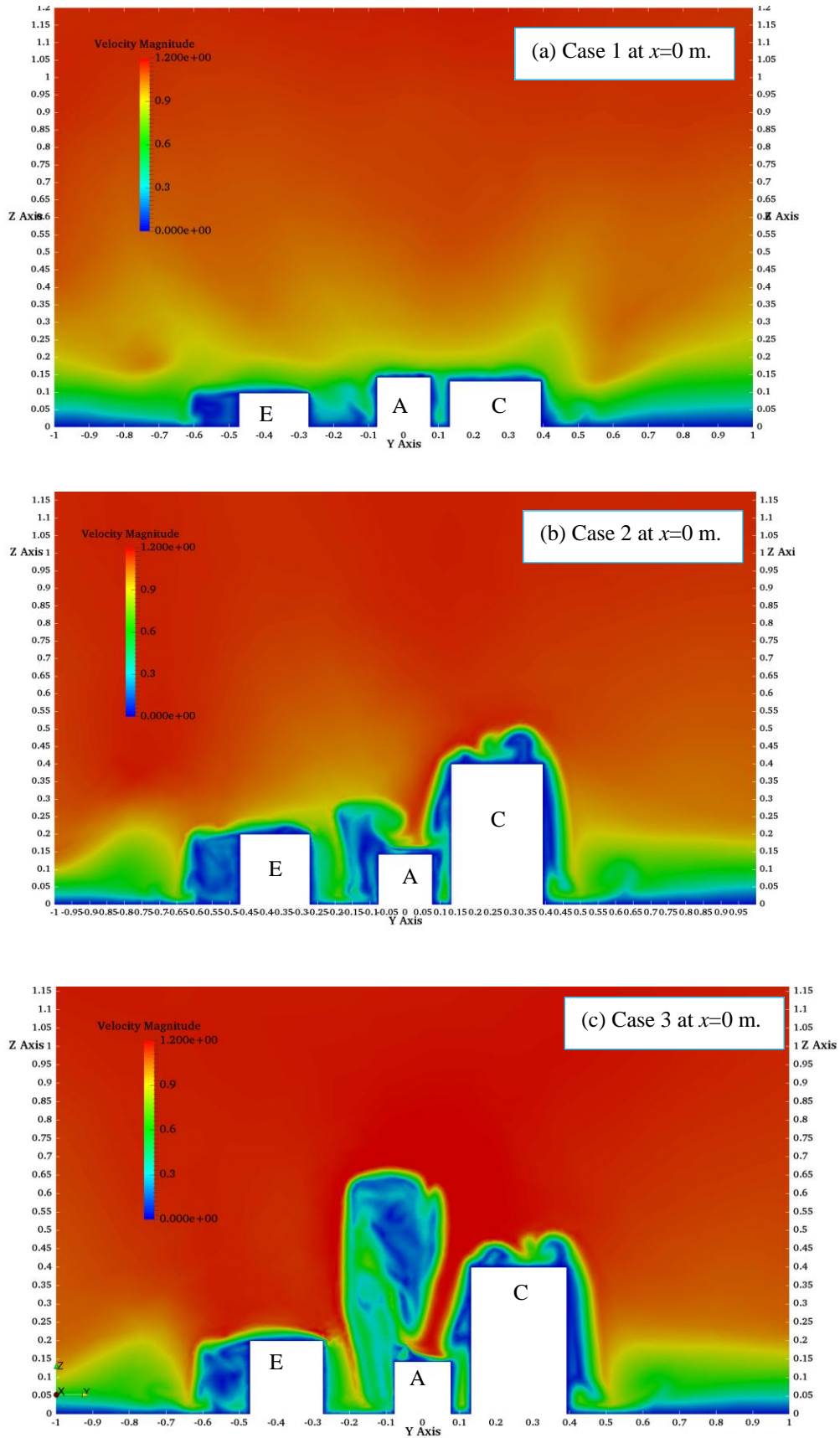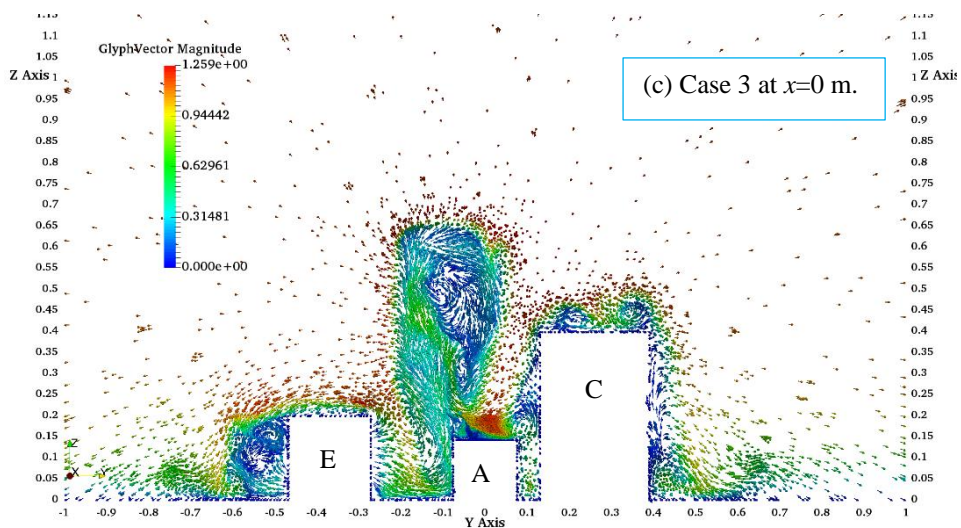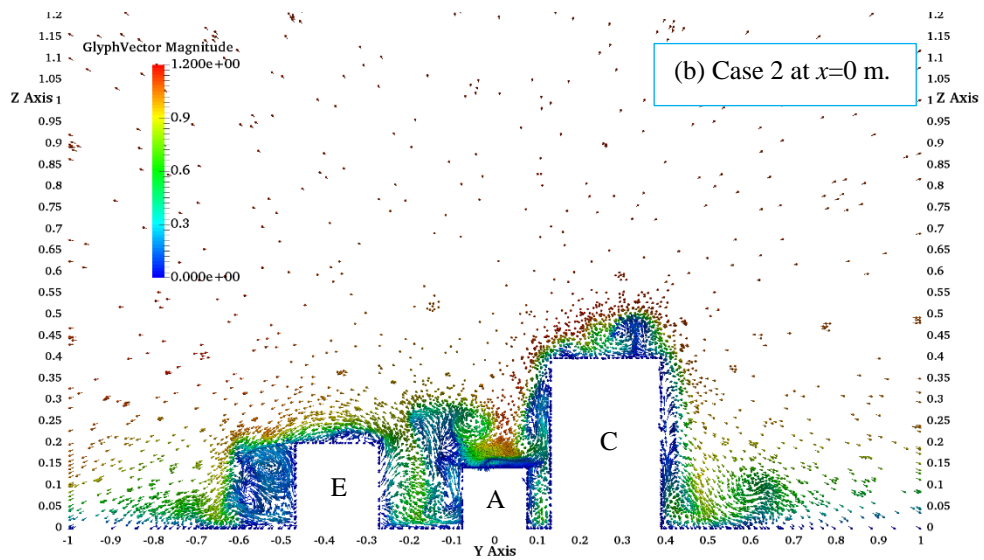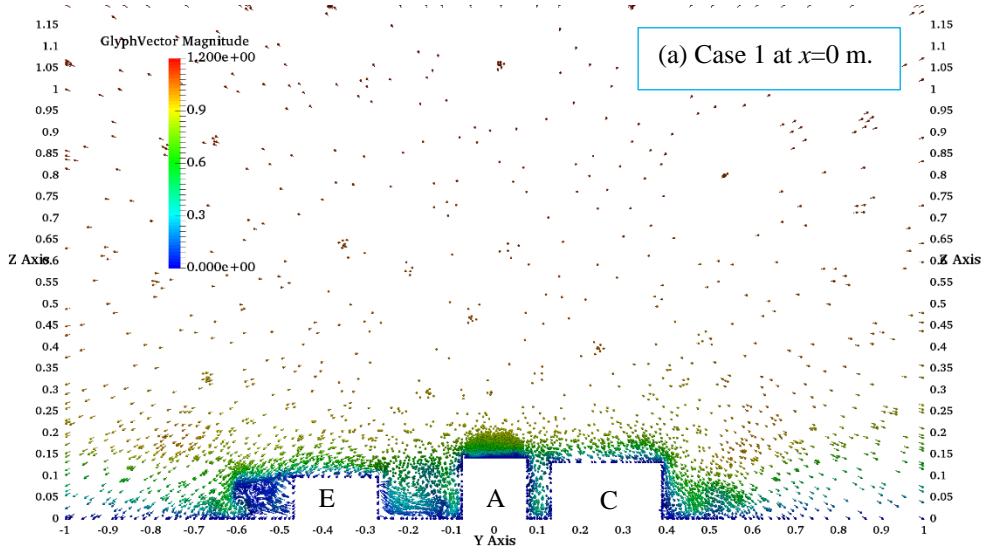*Note: Unit of distance along all axes: metres.*

(a) Case 1 at *y*=0 m.

(b) Case 2 at *y*=0 m.

(c) Case 3 at *y*=0 m.

S8 Vertical plane (*x-z*) view through the centre of the domain (Y=0), showing the interesting Variations of the **Velocity fields in Vector form** for the three cases: (a) Case 1; (b) Case 2; (c) Case 3. *Note: Unit of distance along all axes: metres.*
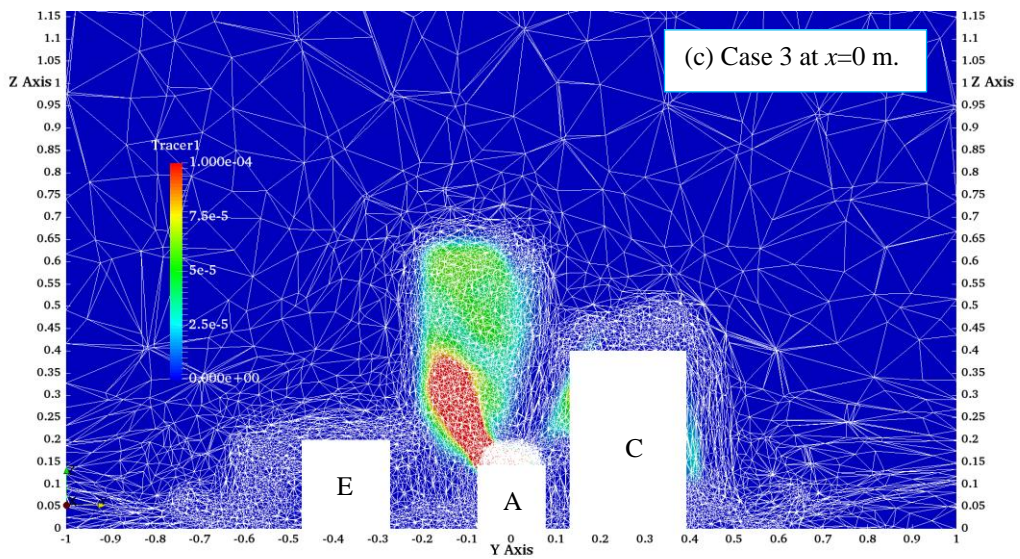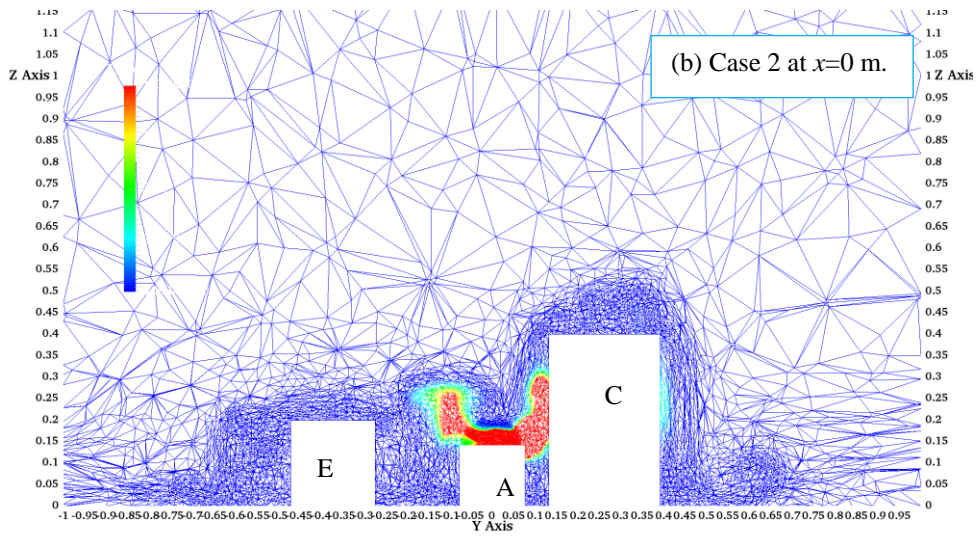
S9 Vertical plane (*y-z*) view through the centre of the domain (*x*=0), showing **the Velocity Variations** for the three cases: (a) Case 1; (b) Case 2; (c) Case 3.
Note: Unit of distance along all axes: metres.

S10 Vertical plane (*y-z*) view through the centre of the domain (*x*=0.0m), showing the interesting Variations of the **Velocity fields in Vector** form for the three cases: (a) Case 1; (b) Case 2; (c) Case 3.
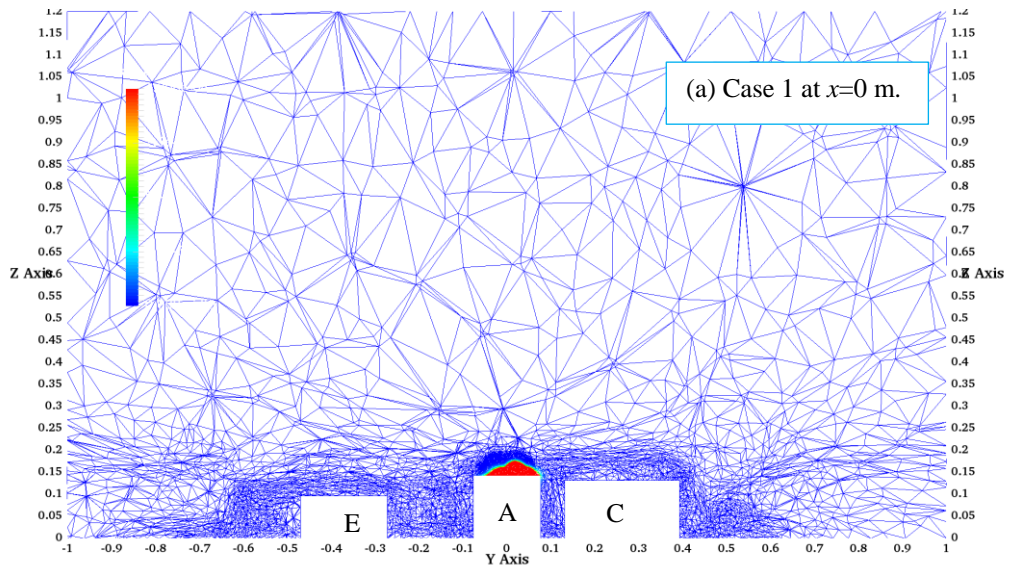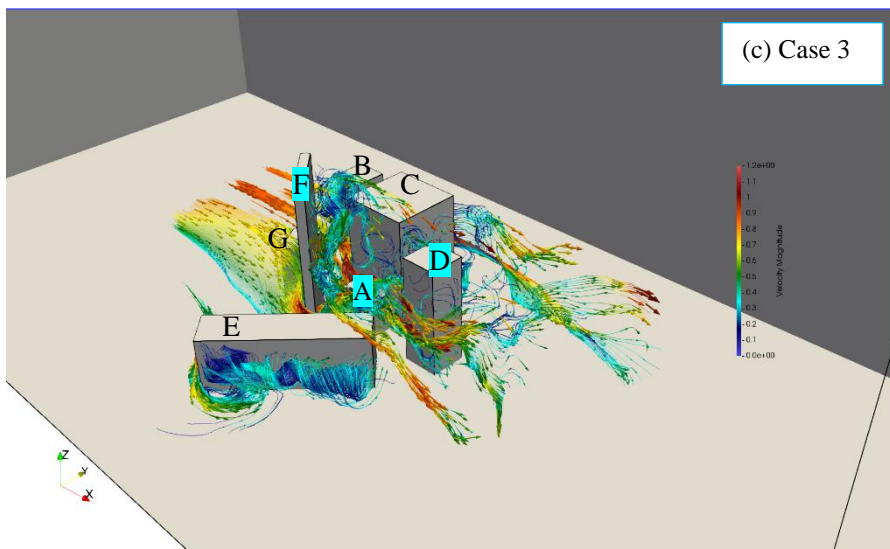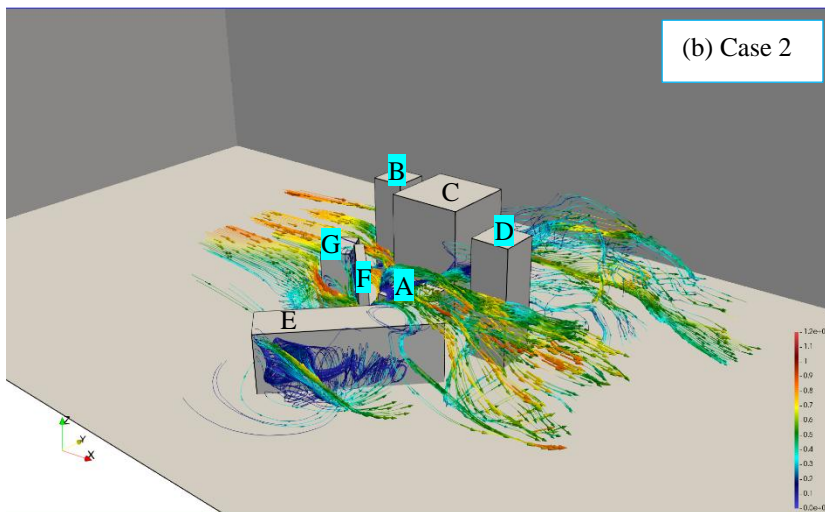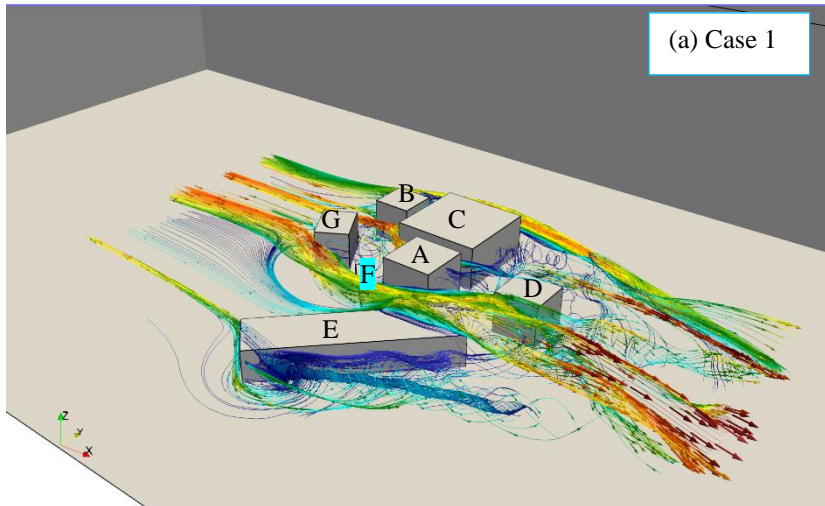*Note: Unit of distance along all axes: metres.*

S11 Vertical plane (*y-z*) view through the centre of the domain (*x*=0.0m) of the **Tracer Dispersion with the Adaptive meshes** for the three cases: (a) Case 1; (b) Case 2; (c) Case 3.
Note: Unit of distance along all axes: metres.

S12 Velocity Streamlines for the three Cases highlighting the variations
for the three building configurations.