Here is the matrix for the sensitivity analysis. The order of the parameters is the same as we used for the Jacobian function, so hopefully it is consistent with the other things we have been doing. That order again is $\alpha, \beta_1, \beta_2, \beta_3, \delta, \gamma_1, \gamma_2, \psi, \rho_1, \rho_2, \omega$.

$$\begin{bmatrix}
S & -SI & -SR_I & -SH & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & SI & SR_I & SH & -E & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & E & -I & 0 & -I & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & -H & I & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \rho_1 I & 0 & 0 & \gamma_1 I & 0 & -R_I \\
0 & 0 & 0 & 0 & 0 & 0 & \rho_2 H & 0 & 0 & \gamma_2 H & R_I \\
0 & 0 & 0 & 0 & 0 & (1-\rho_1)I & (1-\rho_2)H & 0 & -\gamma_1 I & -\gamma_2 H & 0
\end{bmatrix}$$