Step-1

We have to construct a 2 by 2 matrix whose null space equals its column space.

Let $A=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix}$

Column space $=\left\{a\begin{bmatrix}0\\0\end{bmatrix}+b\begin{bmatrix}1\\0\end{bmatrix}/\,a,b\in R\right\}$

$=\left\{\begin{bmatrix}b\\0\end{bmatrix}/\,b\in R\right\}$

=The line through $(1,0)$.

Step-2

For finding null space of A, take $x=\begin{bmatrix}x_1\\x_2\end{bmatrix}$, $Ax=0$

$\Rightarrow\begin{bmatrix}0 & 1\\0 & 0\end{bmatrix}\begin{bmatrix}x_1\\x_2\end{bmatrix}=\begin{bmatrix}0\\0\end{bmatrix}$

$\Rightarrow x_2=0$

$\Rightarrow\begin{bmatrix}x_1\\x_2\end{bmatrix}=\begin{bmatrix}x_1\\0\end{bmatrix}$

$=x_1\begin{bmatrix}1\\0\end{bmatrix}$

Therefore the null space of A is the line through $(1,0)$

Therefore the required matrix is $\boxed{A=\begin{bmatrix}0 & 1\\0 & 0\end{bmatrix}}$