Step-1

We have to find that what words we use to describe the equation $A^T A\hat{x} = A^T b$, and the matrix $P = A\left(A^T A\right)^{-1} A^T$.

The equations $A^T A\hat{x} = A^T b$ are known in statistics as the normal equations.

That is, solving above equations system, we get a least square solution.

Step-2

$p = A\hat{x} = Pb$

This denotes the projection of b onto the column space is nearest point $A\hat{x}$.

The matrix $P = A\left(A^T A\right)^{-1} A^T$ is a projection matrix.