Let $H = -\Delta + V$ be a two dimensional Schrödinger operator with a real potential $V(x)$ satisfying the decay condition $\mid V(x) \mid \leq C(x)^{-\delta}, \delta > 6$. Let $H_0 = -\Delta$. We show that the wave operators $s - \lim_{t \to \pm\infty} e^{itH} e^{-itH_0}$ are bounded in $L^p(\mathbf{R}^2)$ under the condition that H has no zero resonaces or bound states. In this paper the condition $\int_{\mathbf{R}^2} V(x)dx \neq 0$, imposed in a previous paper (K. Yajima, Commun. Math. Phys. **208**, 125-152 (1999)), is removed.