Eccentric Embeddings of Labeled Graphs

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The eccentricity of a vertex, $e_G(v)$, is the maximum distance from v to any other vertex in G. If we assign to each vertex v of G a positive integer label, $l(v)$, under what conditions does a graph H exist such that G is an induced subgraph of H and for all $v \in V(G)$, $e_H(v) = l(v)$? What can we prescribe about the structure of H?