Penny Dunn started her law enforcement career in 1986 with the Friendswood, Texas Police Department. She joined the San Marcos, Texas Police Department in 1989 and spent 28 years there, earning her Bachelor of Applied Arts and Sciences from Texas State University during that time. After spending 31 years in Texas law enforcement, Penny moved to Davidson, North Carolina in July 2017 and became Chief of Police.

Chief Dunn's experience in law enforcement includes work in several areas:

- Assistant Chief of Police
- Commander-
  - Criminal Investigation Division (CID)
  - Day Shift and Specialized Unit Command
  - Night Shift and K-9 Unit Command
- Sergeant-
  - Patrol
  - CID Division
- Detective in CID and Narcotics, including a two year assignment to the DEA-Austin federal task force
- Patrol Officer

Chief Dunn's career highlights include:

- Revision of new officer and employee recruiting and hiring process
- Revision of sworn officer evaluation instrument
- Completed 18 years of cold case investigation in 2013 with the conviction of Willie Jenkins for the 1975 capital murder of Sheryl Norris. He was sentenced to death.
- Established the first full-time dedicated Crime Victim Services Unit in Hays County
- Developed the awards recognition program for exemplary employees and citizens

Chief Dunn has been qualified as an expert in relationship violence investigations and served as the project director for the San Marcos-Hays County Family Justice Center. She has served on local social service boards, was the founder and board president for the Friends of the Family Justice Center Foundation, and currently serves on the Charlotte-Mecklenburg Family Justice Center Steering Committee and the North Carolina League of Municipalities Chief's Advisory Committee.

She enjoys spending time with her family camping, hiking, and traveling, and also working in her yard.