Introductory LID Panel Notes

By:
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Background and Facts

- Stormwater Ordinance and Technical Standards for many of Central Indiana governments have been developed by CBBEL. These include:
  - Hamilton County, Noblesville, Carmel, Fishers, and Westfield
  - Boone County, Lebanon, and Zionsville
  - Hendricks County (with many jurisdictions within the County customizing and adopting the model ordinance and standards developed for the County)
  - Hancock County (with many jurisdictions within the County customizing and adopting the model ordinance and standards developed for the County), Greenfield

Background and Facts

- Stormwater Ordinance and Technical Standards for many other jurisdictions outside Central Indiana were also developed by CBBEL. These include:
  - Tippecanoe County (with many jurisdictions within the County customizing and adopting the model ordinance and standards developed for the County)
  - Lake County (with many jurisdictions within the County customizing and adopting the model ordinance and standards developed for the County)
  - Allen County (with many jurisdictions within the County customizing and adopting the model ordinance and standards developed for the County)
  - Newton County
  - And a few Others.

Background and Facts

- These Ordinance and Standards have generally the same look and feel, and include generally the same principals and requirements, with small variations to reflect specific local requirements.
- The main objective for these ordinance and standards is to protect the public.
- These standards also provide a sound and uniform set of checklists, guidance, and tools for the governments to guide their plan review process aimed at ensuring, as much as possible, that the proposed development plans will not negatively impact the public.

Background and Facts

- These standards also provide a level plain field and consistent and predictable rules of the game for the developers
- The principal stormwater management controls in all of these Standards are:
  - Requirement for post-construction on-site detention with fixed unit (cfs/acre) allowable Release Rates for control of 2-yr to 100-yr peak flow rates from the site
  - Requirement for post-construction stormwater quality treatment for the “first flush” from the site, adopted as the first inch of rainfall in CBBEL standards

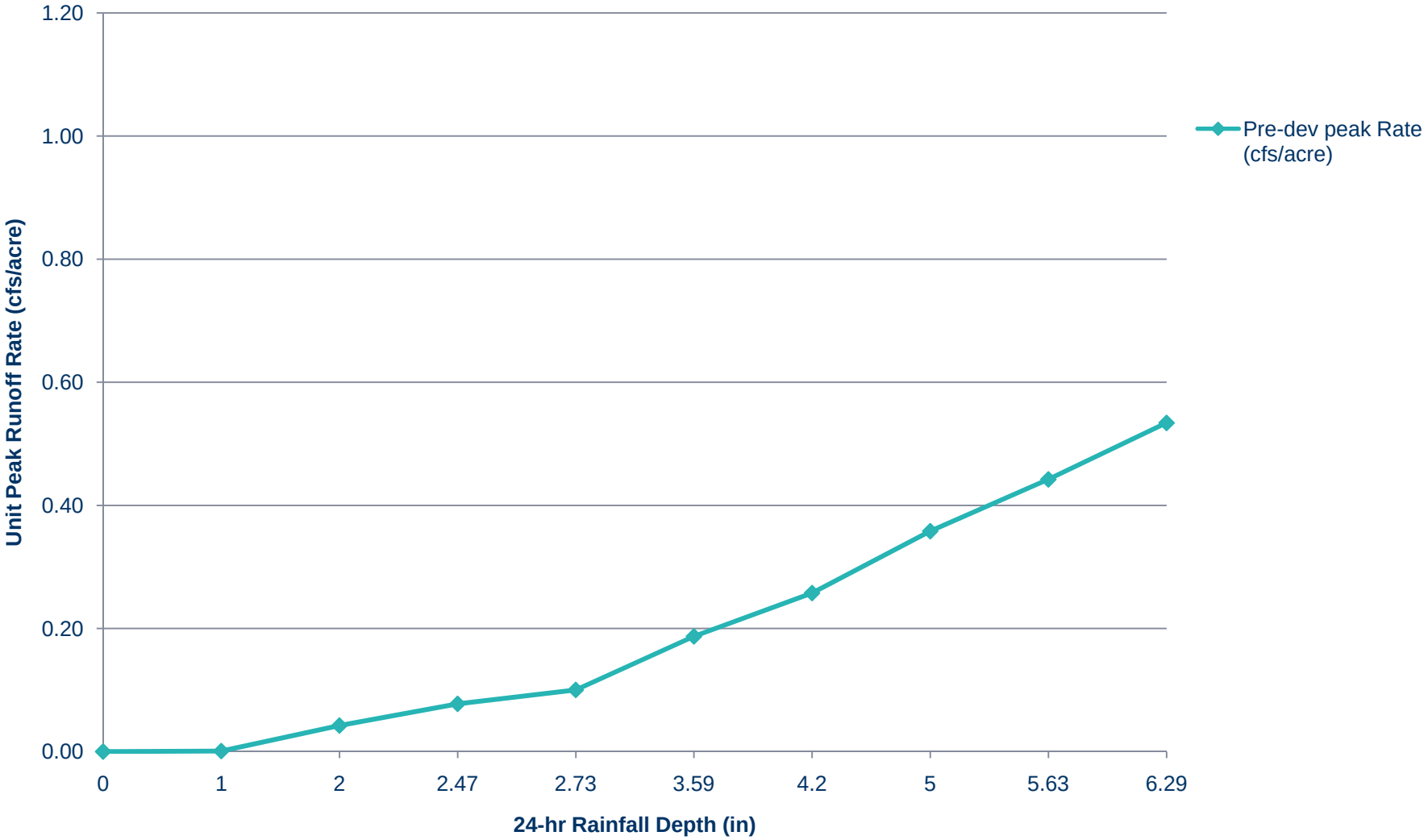
Background and Facts

- We have recently discovered a “gap” in the above control mechanisms that, if not addressed, may lead to increased streambank erosion in the receiving channels. This “gap” is caused by neglecting to control the increase of runoff as a result of development for smaller flows generally resulting from rainfalls ranging from 1 inch to 2-year frequency event (about 2.8 inches within 24 hours)
- In the months ahead, we will be working with our clients on addressing this “gap” through addition of Channel Protection Volume Requirements to post-construction water quality requirements.

Background and Facts

- The problem is that increased, sustained runoff for channel-forming events (1-yr to 2-yr events) resulting from new upstream development causes the channel to seek a new shape through eroding its banks
- The proposed fix is to retain or provide extended detention of the 1-year, 24-hour event to prevent increased erosion in the receiving channel. This is known as Channel Protection Volume.
- This is illustrated in the following slides:

Impact of Development on Peak Runoff Rates and a Typical Allowable Release Rate Policy with and without Channel Protection Volume and LID Controls



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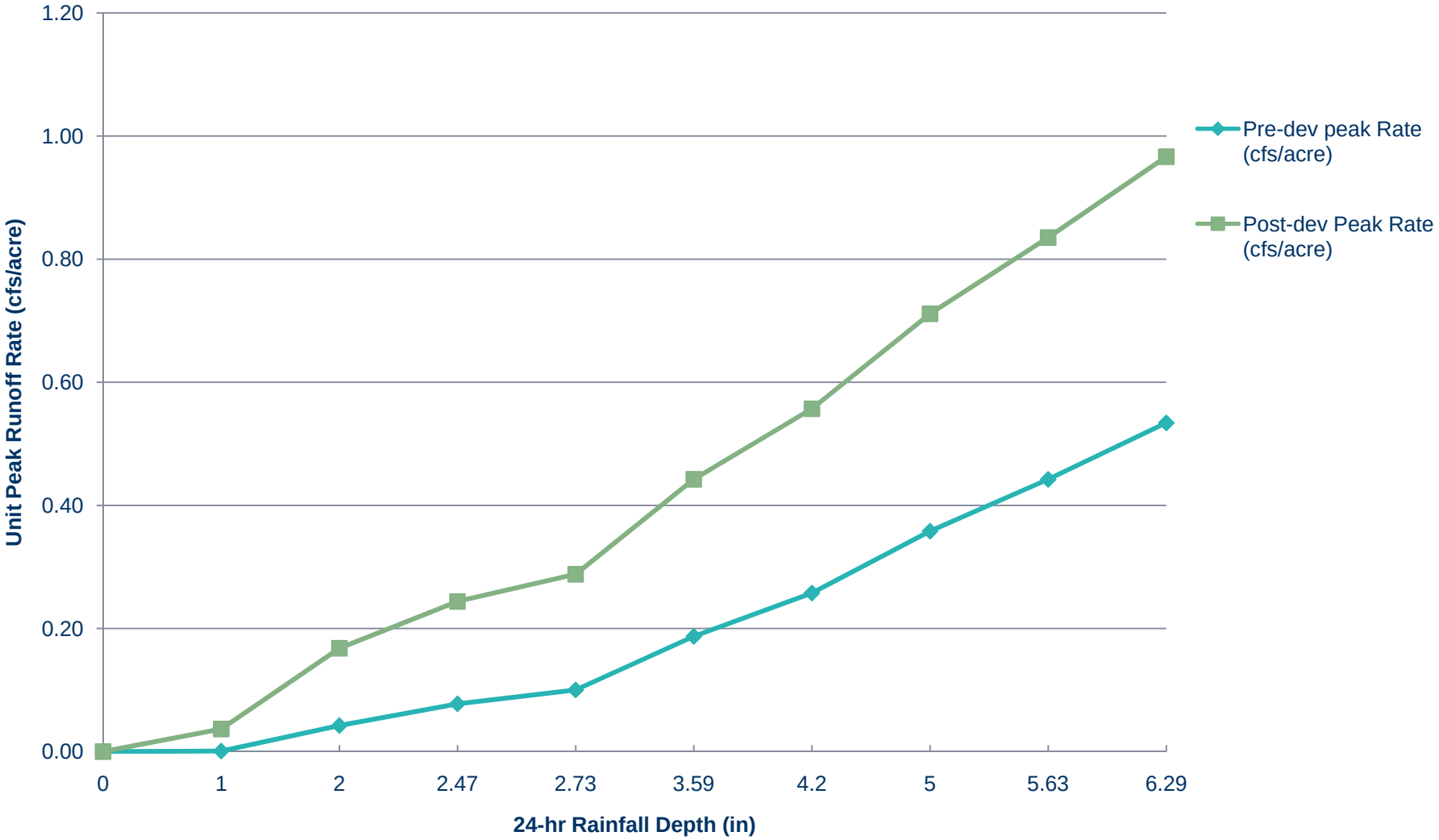

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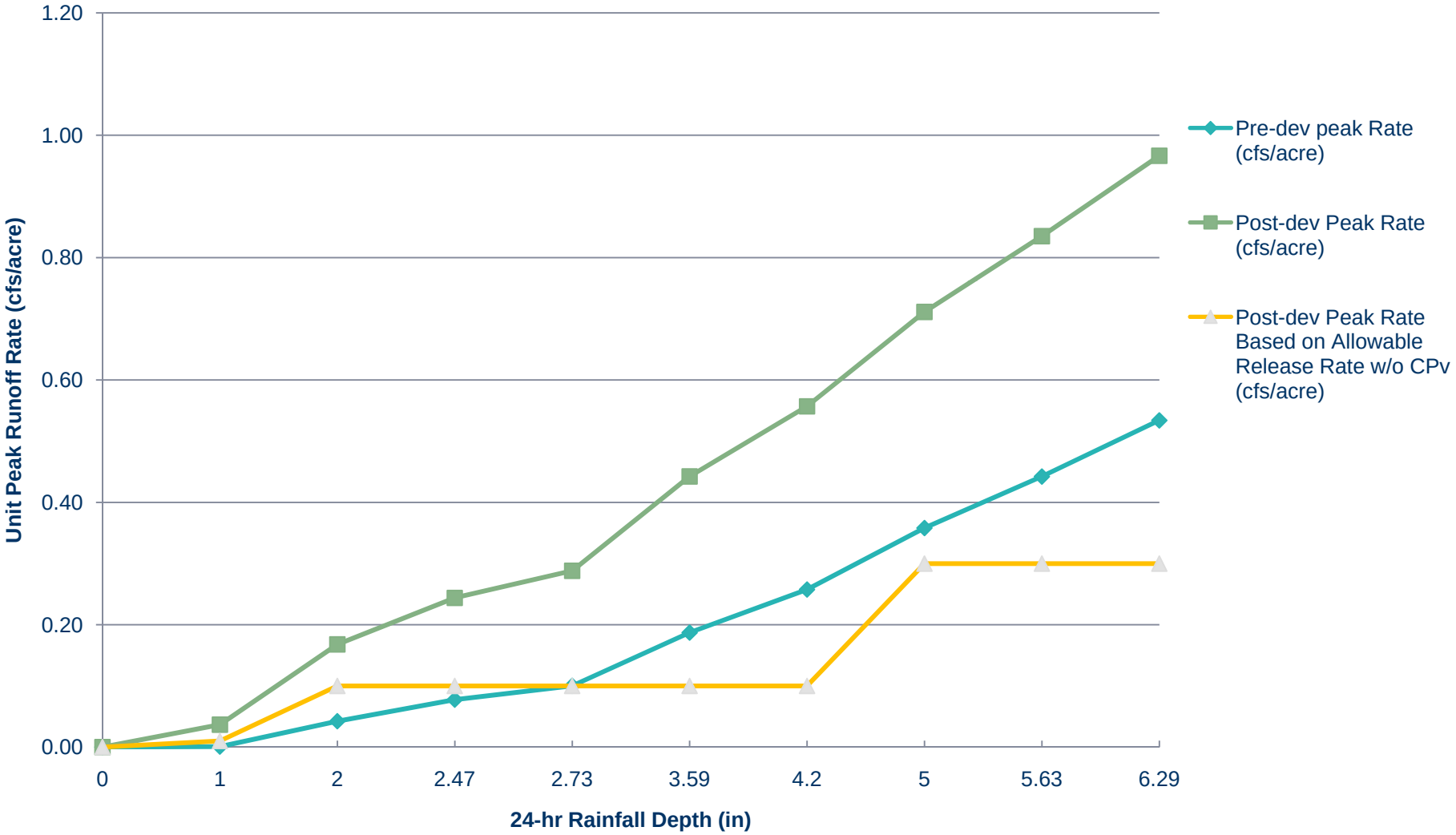

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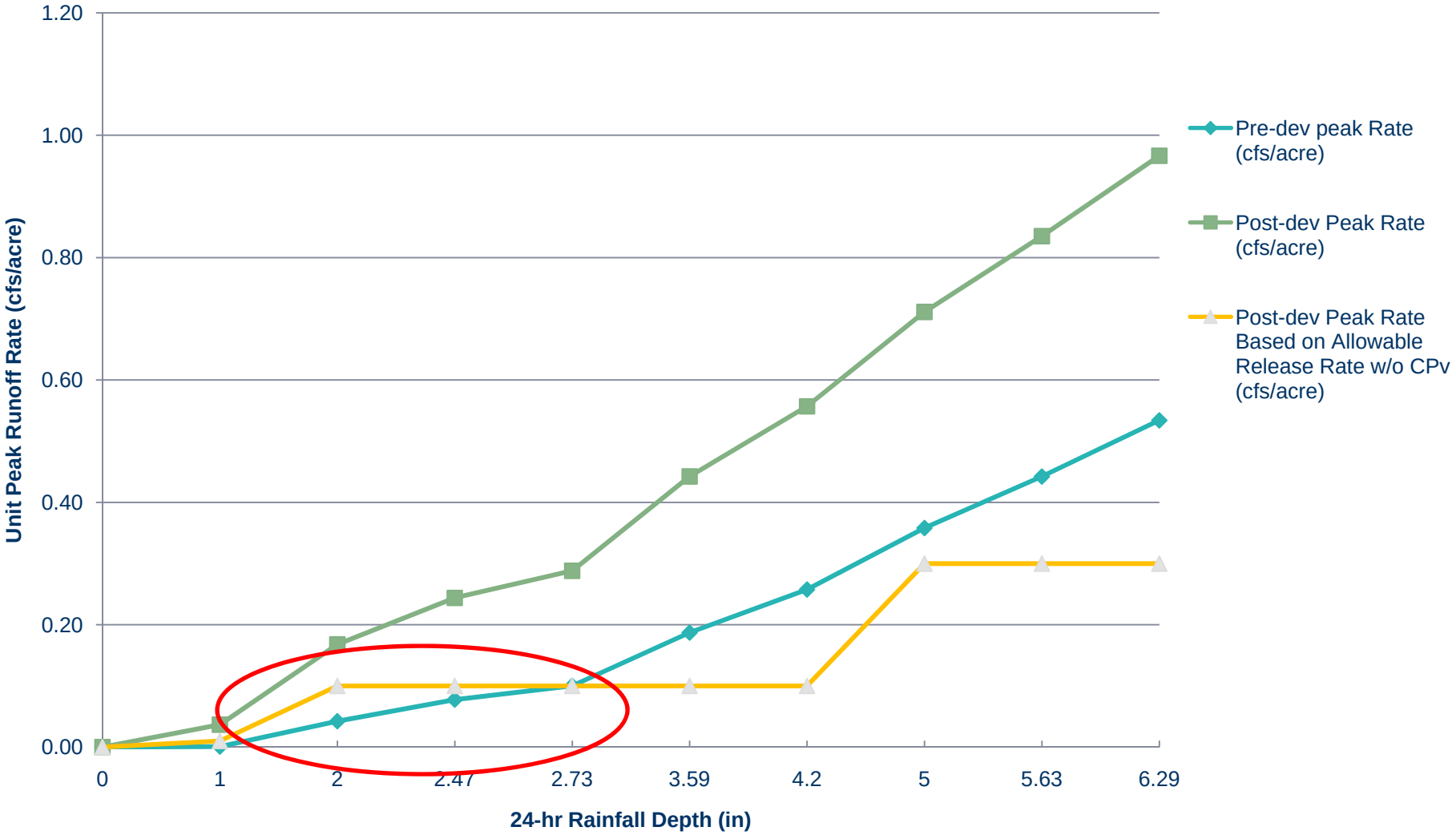

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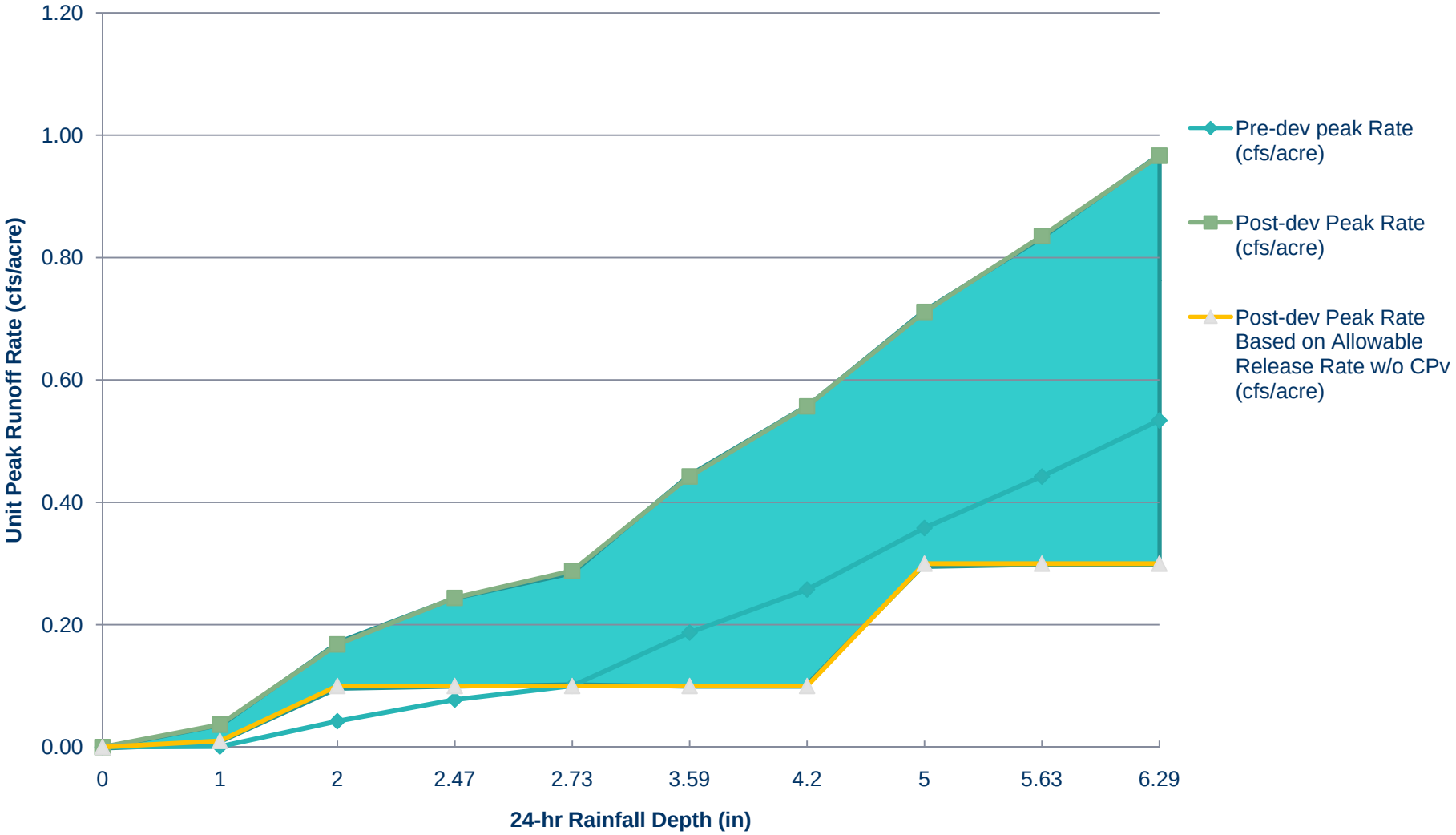

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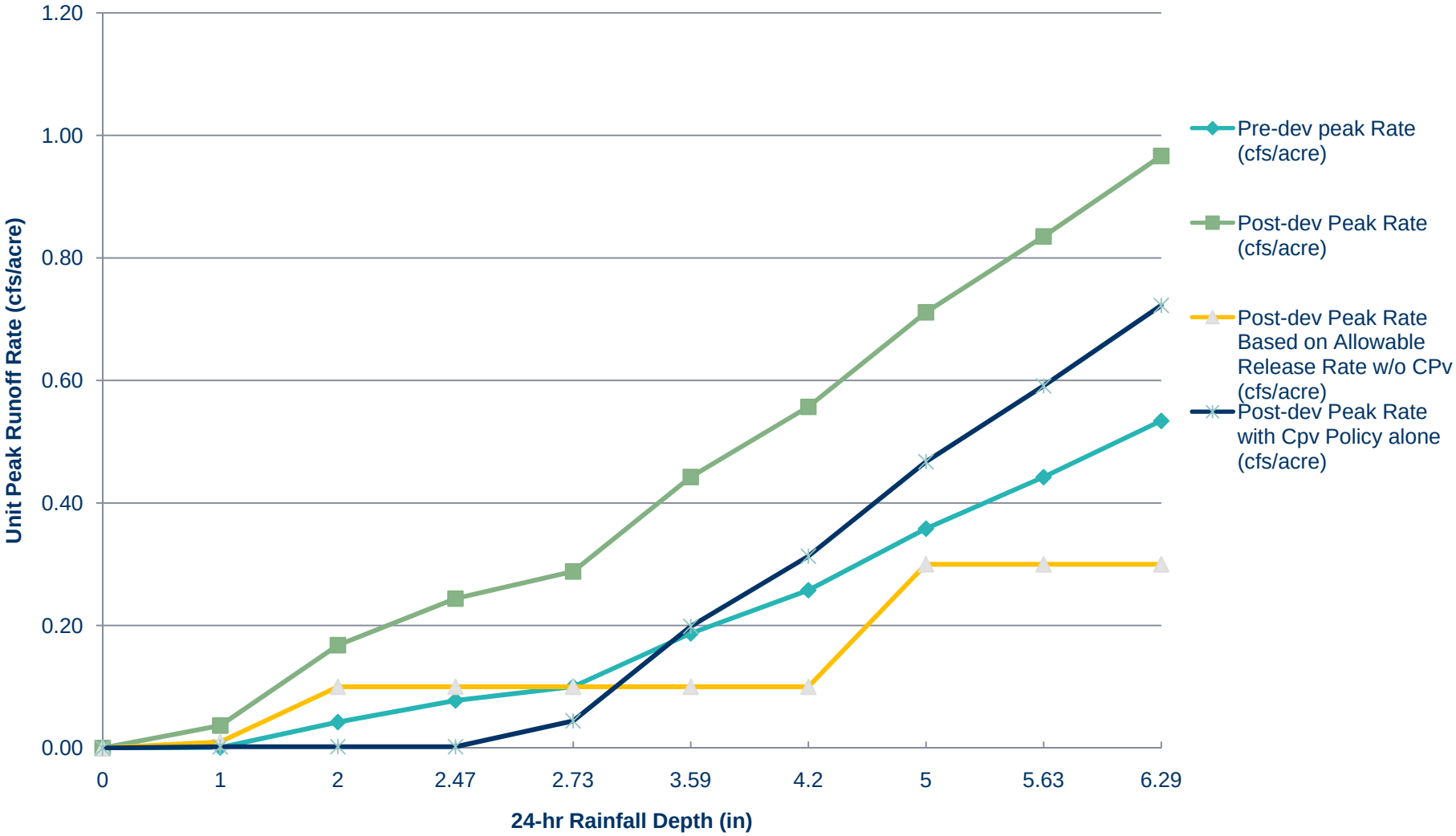

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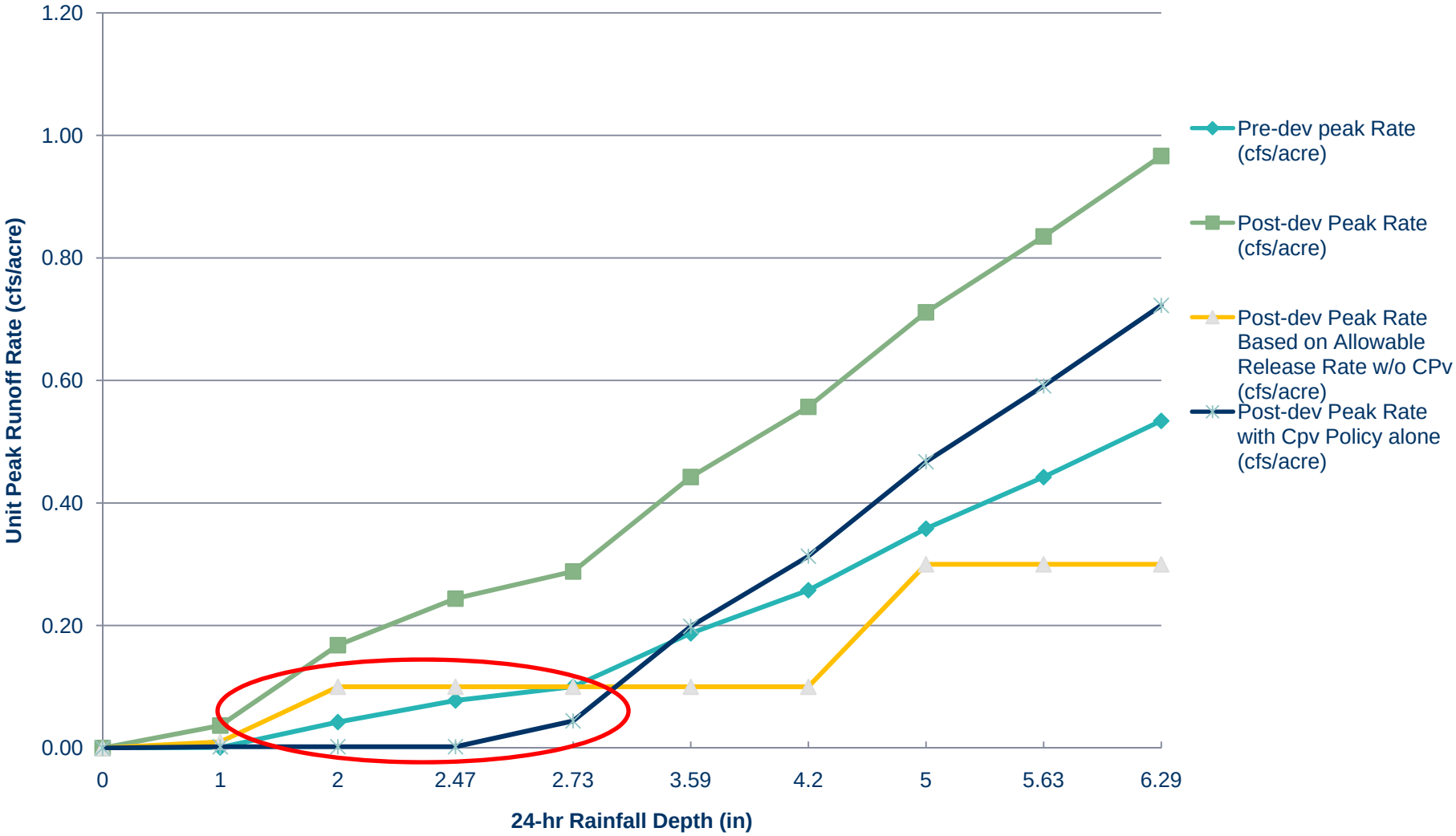

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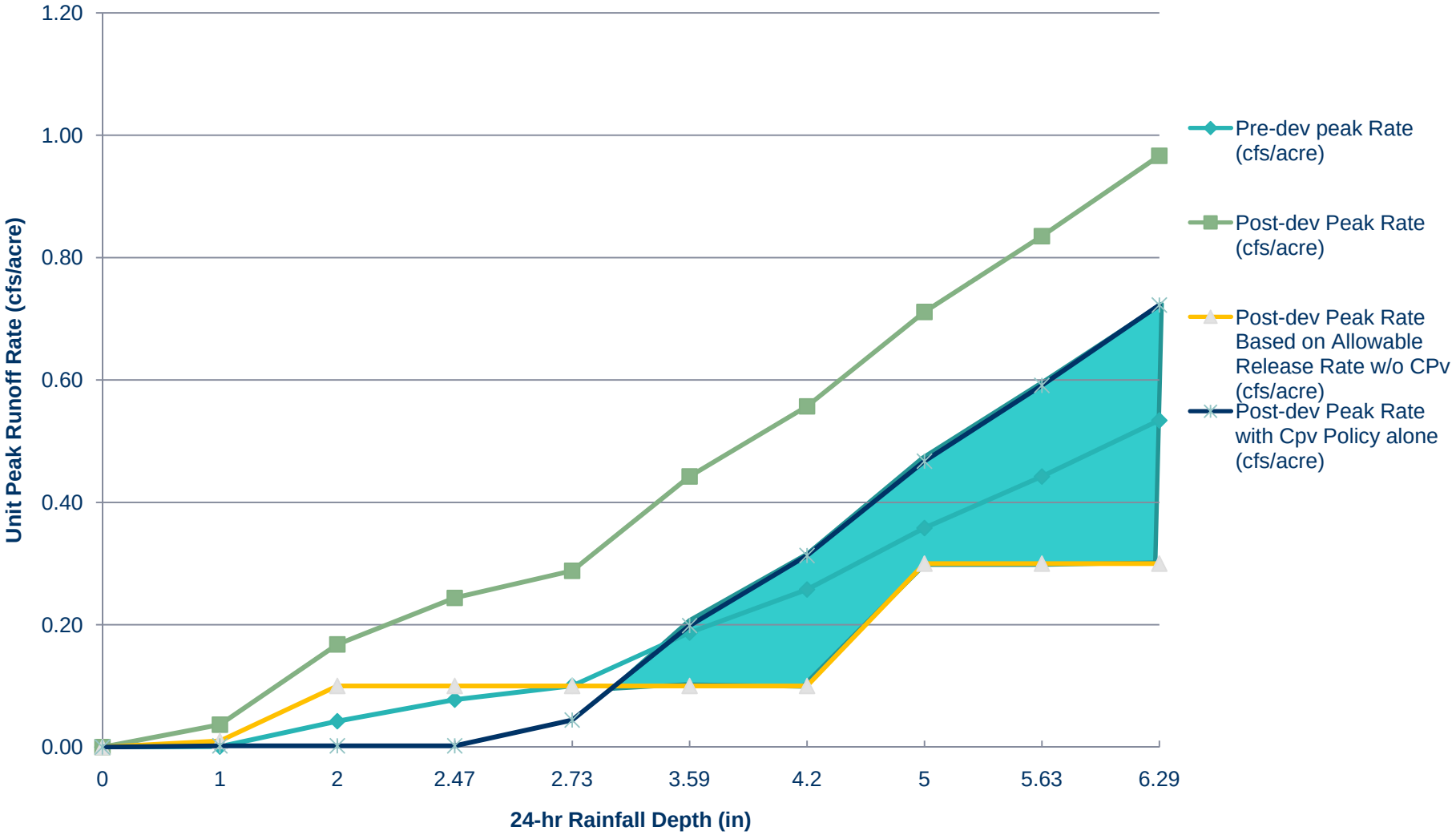

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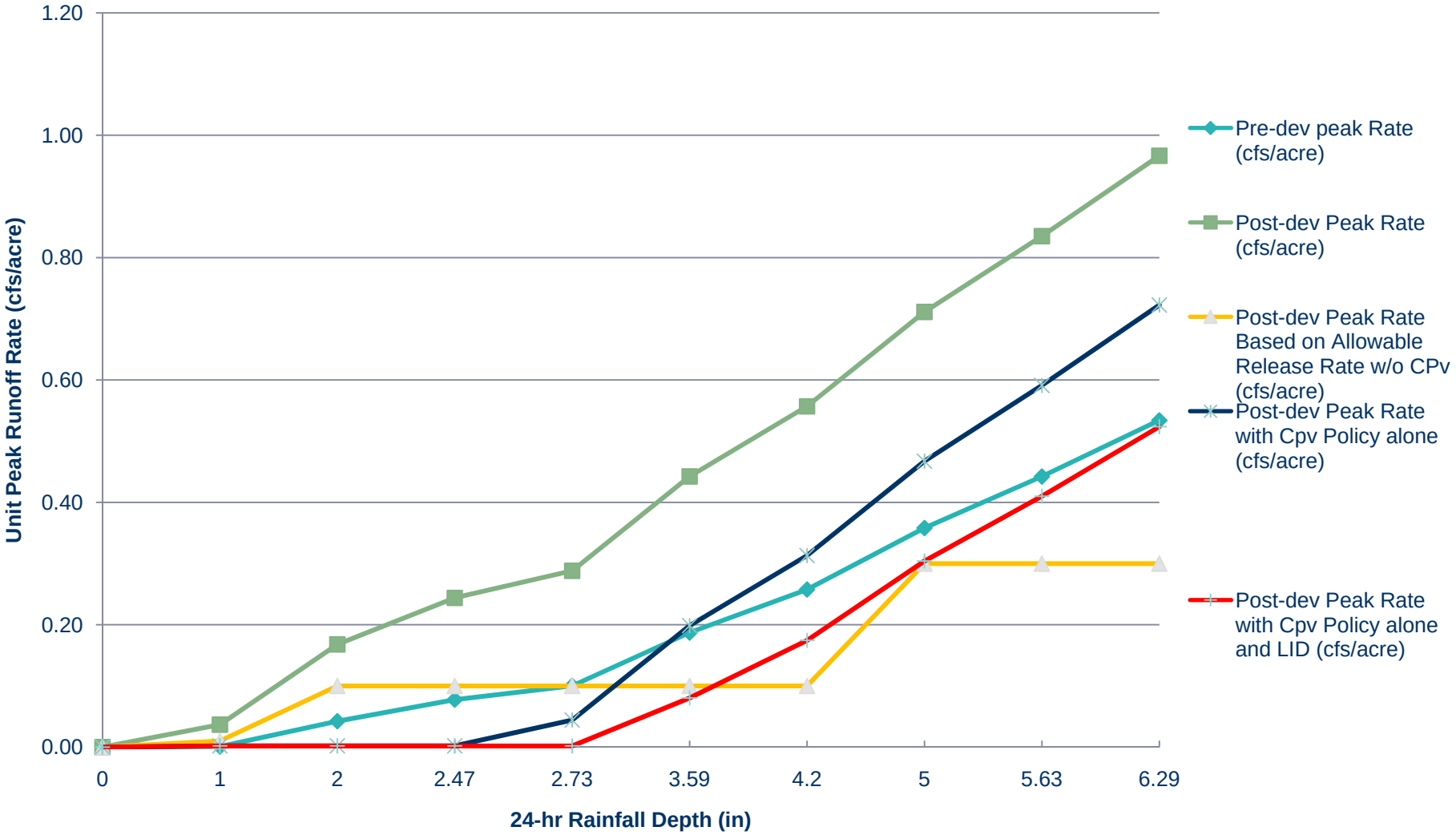

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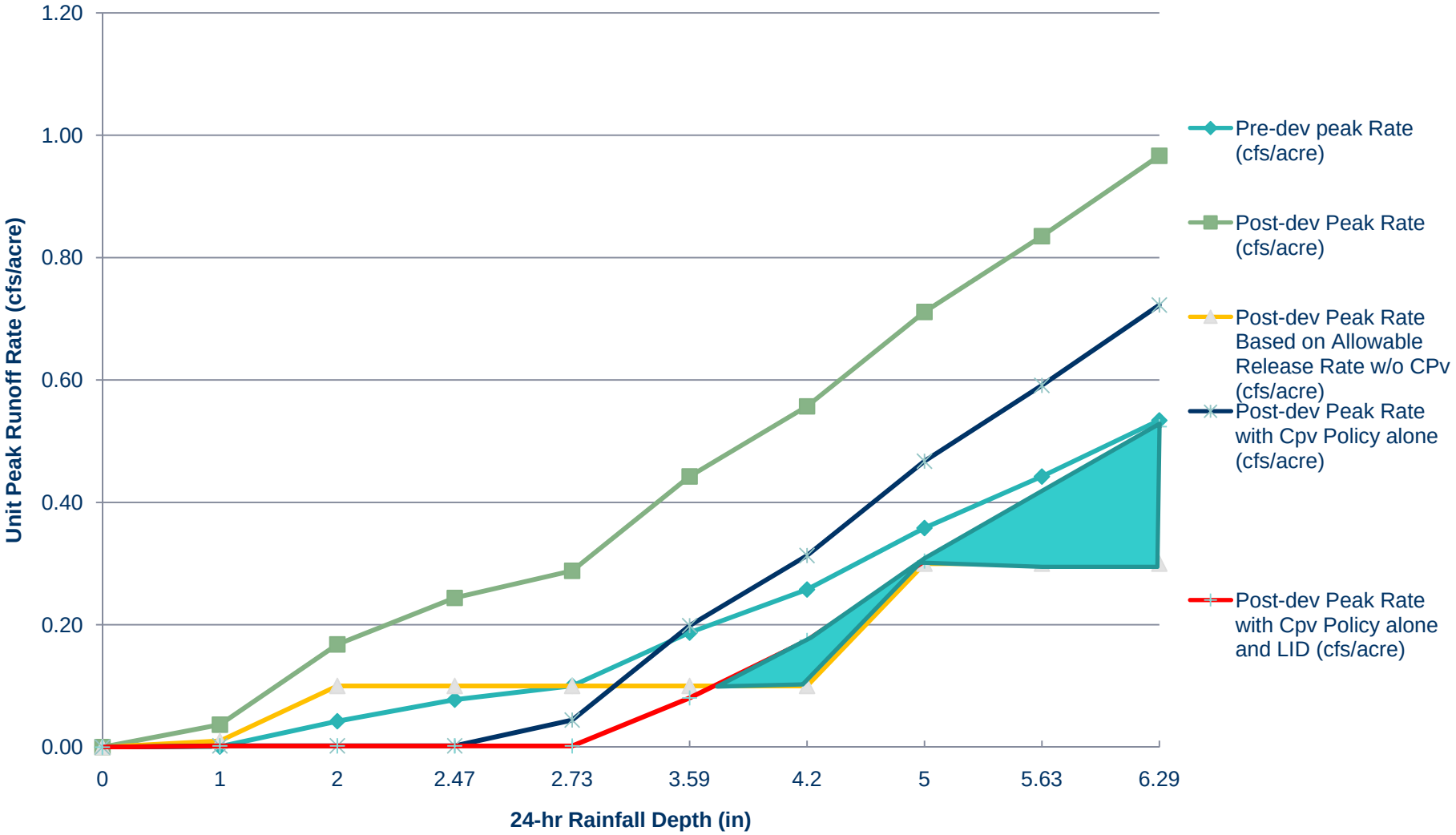

Background and Facts

- LID principals and practices are the future of stormwater management and should be encouraged by the governments, while being prudent to ensure continued protection of public
- Although the LID principals and practices have positive impact on control of water quantity and quality for the entire range of flows up to the 100-year flood, their most significant and reliable impact is limited to smaller flows, say less than 2-year flows

Background and Facts

- One of the major obstacles is the desire for and advertising of some LID controls to address larger than 2-year floods.
- CBBEL proposes that jurisdictions encourage and allow LID practices as an alternative approach for meeting post-construction water quality requirements at a development site
- CN and limited volume reduction credits may be applied to computations for controlling larger floods, but some level of detention for larger flows is always needed as a fail-safe mechanism

Background and Facts

- Another major obstacle is assurance of continued and ease of maintenance – very difficult with features that are distributed throughout the site
- CBBEL proposes that to receive LID credit, the LID features must be within common areas, protected by permanent easements, with periodic maintenance and inspection assured through permanent O&M Escrow accounts or other means of financial assurances acceptable to jurisdiction

Background and Facts

- CBBEL proposes the following steps to be followed as part of the LID approach for meeting post-construction requirements:

  Step 1: Summarize general site information

  Step 2: Map the existing features of the site and use the following BMPs to minimize disturbance and get CN reduction credit for them (assign CN according to pre-development underlying soil layer):

  - Protect Sensitive Areas (bmp#)
  - Protect Riparian Buffers (bmp#)
  - Minimize Total Disturbed Area (bmp#)
  - Protect Natural Flow Pathways (bmp#)
  - Cluster-Type Development (bmp#)

  NOTE: CN reduction credits noted in this step can be applied to 10- and 100-year water quantity calculations as well

Background and Facts

Step 3: Lay out the proposed development avoiding the protected areas so that CN credits can be applied for determining channel protection and/or water quality volume requirements in addition to considering the disturbed areas only

Step 4: Determine additional CN reduction credits for the following BMPs (assign CN according to pre-development underlying soil layer):

- Minimize Soil Compaction (bmp#)
- Protection of Existing Trees within disturbed areas (part of Minimize Total Disturbed Area) (bmp#)
- Soil Amendment and Restoration (bmp#)
- Native Revegetation (bmp#)
- Riparian Buffer Restoration (bmp#)

NOTE: CN reduction credits noted in this step can be applied to 10- and 100-year water quantity calculations as well

Background and Facts

Step 5: Calculate the amount of volume control needed for channel protection (1-yr, 24-hr rainfall, use credited CNs and disturbed area only)

Step 6: Select volume control BMPs to address channel protection requirements:

- Porous Pavement (bmp#)
- Infiltration Practices (Infiltration Basin, Subsurface Infiltration Bed, Infiltration Trench, and Dry Well) (bmp#)
- Bioretention (bmp#)
- Vegetated Swale (bmp#)
- Vegetated Roof (bmp#)

Background and Facts

NOTE: When the LID track is being pursued in all other aspects of the design but site limitations would not allow permanent volume reduction practices, channel protection volume shall, at a minimum, be accommodated through a wet-bottom extended detention facility

Step 7: If needed (if channel protection is provided through a method that does not address all pollutants of concern) – determine water quality volume and select appropriate BMPs from pre-approved list to address those specific pollutants of concern

Background and Facts

- Some aspects of the LID approach, specifically those that rely on permanently removing a limited volume of water through infiltration (distributed storage) may not work. In order to qualify for credit, the BMPs must meet the following:
  - Be constructed on A or well-drained B soils, or on amended soils with underdrains if located in areas with poorly-drained B soils or any type C or D soils. In most cases, Type C soils may be amended in the upper foot to achieve an infiltration rate comparable to B soils.
  - Be constructed in an area where the depth of seasonal high water table and any bedrock is more than a minimum of two feet from ground elevation.
  - Be constructed in a manner that any infiltration practices are adequately separated from basement foundations (50 feet up gradient, 10 feet down gradient), on-site septic systems/drainfields (50 feet), wells (100 feet), and other building elements that could be affected by infiltration systems.

QUESTIONS?

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